MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

2014 WATER SUPPLY CROSS CONNECTION REPORT

Issued under authority of 1976 PA 399, as amended, and the administrative rules.
Failure to submit this form is a violation of the Act and may subject the water supply to enforcement penalties.

ENTERED

Administrative Rule R 325.11405 states in part that "a water utility shall report annually to the department on the status of the cross connection control program on a form provided by the department." Return the completed form by March 31, 2015 to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit www.michigan.gov/deq and click on Locations.

WSSN: 2310

A. Name of water utility: City Of Flint County: Genesee

B. Year that the current written cross connection control program was approved by DEQ: 1974

C. Total number of industrial, commercial, institutional, residential, and governmental accounts that must be routinely reinspected for cross connections: 2012
Of this number,
- How many are High Hazard accounts: 313 Frequency of Reinspection: Once per Year
- How many are Low Hazard accounts: 1699 Frequency of Reinspection: Once per: 3/Years

D. Number of accounts from line "C" that received an initial inspection in 2014: 12

E. Total number of reinspections required and completed in 2014 based on degree of hazard:
- High hazard reinspections required: 313 High hazard reinspections completed: 197
- Low hazard reinspections required: 566 Low hazard reinspections completed: 374

F. Number of accounts where a cross connection(s) was found to exist during inspections or reinspections in 2014: 41

G. Number of accounts from line "F" where corrective actions have been completed: 41

H. Total number of accounts from line "C" which are now in compliance with the local cross connection control program; H = C – (F - G): 2012

I. Total number of backflow prevention devices in system requiring testing: 1018

J. Number of backflow prevention devices tested in 2014: 766

Narrative Description of Program
(Outline briefly any changes or significant findings since last reporting; use additional sheets if necessary.)

Budget, and personel contraints as well as added duties for the inspector, continue to be a challenge to the CCC Program in The City. We continue in our effortto move forward.

Name: Glenn Thomas

Title: Cross Connection Control Coordinator Date: 3/23/2015

DEQ
APR 01 2015
LANSING DISTRICT

EQP 2016 (Rev. 08/2014)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

ANNUAL PUMPAGE/USAGE REPORT FOR COMMUNITY WATER SUPPLY

Issued under authori ty of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rule s, as amended.
Failure to submit this form is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.11504 states in part that "...each Type I public water supply which does not submit a monthly operation report shall submit an annual report ... of water pumpage and water use." Complete this form and return it to the appropriate Department of Environmental Quality district office ***by March 31*** following the year covered by the report. For district office addresses, visit www.michigan.gov/deq and click on Locations. Add additional sheets as needed.

Water Supply: City of Flint WSSN: 2310 County: Genesee

MONTHLY PUMPAGE/USAGE

Calendar Year ____	Well No. ____ Capacity in gpm ____	Well No. ____ Capacity in gpm ____	Well No. ____ Capacity in gpm ____	Well No. ____ Capacity in gpm ____	Total Monthly Pumpage/Usage ☒ in million gallons ☐ in gallons
JANUARY					476.53
FEBRUARY					573.37
MARCH					696.48
APRIL					565.01
MAY					576.89
JUNE					638.70
JULY					580.02
AUGUST					527.35
SEPTEMBER					535.40
OCTOBER					559.70
NOVEMBER					448.00
DECEMBER					467.30

Comments:

Total Yearly Pumpage/Usage: 6,644.75

Average Daily Pumpage/Usage (Total Yearly Pumpage / 365): 18.20

Maximum Daily Pumpage And Date: 24.46 (Pumpage) — March 5, 2014 (Date)

Minimum Daily Pumpage And Date: 12.5 (Pumpage) — November 12, 2014 (Date)

Name/Title: Brent Wright/Plant Supervisor	
Signature:	Date: March 11, 2015

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

KEITH CREAGH
DIRECTOR

January 22, 2016

Stephen Busch
701 Windy Rush Lane
Dewitt, MI 48820

Dear Mr. Busch:

Per Civil Service Rule 2-6.4, you are being suspended without pay pending an investigation for violation of Civil Service Rules.

You will be placed on an unpaid suspension beginning Monday, January 25, 2016 while the investigation commences. In the event that the investigation takes longer than seven calendar days to complete, you may continue to be suspended with pay for any days beyond February 1, 2016.

You will be contacted at a later date regarding participation in an investigatory conference.

During this time you are not to enter any state building. Please immediately provide your state identification card and your state issued phone to your immediate supervisor or the HR designee.

Sincerely,

Tamara S Eyer

Tamara Eyer, HR Director
Quality of Life Human Resources

cc: Keith Creagh, DEQ Director
Jim Sygo, DEQ Chief Deputy Director
Amy Epkey, DEQ Deputy Director

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

KEITH CREAGH
DIRECTOR

April 20, 2016

Stephen Busch
701 Windy Rush Lane
Dewitt, MI 48820

Dear Mr. Busch:

The Department of Environmental Quality learned today that criminal charges have been filed against you. Under Civil Service Rule 2-6.5, you are suspended without pay effective today, April 20, 2016.

Sincerely,

Tamara Eyer, HR Director
Quality of Life Human Resources

cc: Keith Creagh, DEQ Director

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

KEITH CREAGH
DIRECTOR

April 20, 2016

Michael Prysby
12130 Center Road
Bath, MI 48808

Dear Mr. Prysby:

The Department of Environmental Quality learned today that criminal charges have been filed against you. Under Civil Service Rule 2-6.5, you are suspended without pay effective today, April 20, 2016.

Sincerely,

Tamara Eyer, HR Director
Quality of Life Human Resources

cc: Keith Creagh, DEQ Director

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Keith Creagh, Director

THROUGH: Jim Sygo, Chief Deputy Director

FROM: Mary Ann Dolehanty, Interim Chief
Office of Drinking Water and Municipal Assistance

DATE: March 1, 2016

SUBJECT: Reassignment of Michael Prysby

I am recommending the permanent reassignment of Michael Prysby, Environmental Engineer Licensed 12, Office of Drinking Water and Municipal Assistance (ODWMA), Lansing District Office, into the vacant Environmental Engineer Licensed 12 position in the Transportation and Flood Hazard Unit, Field Operations Section – Lakes Michigan and Superior, Water Resources Division (WRD). This position was recently vacated by Jim Watling due to a promotion. I am asking this reassignment be effective Monday, March 28, 2016.

Please let me know if you have any questions. I may be reached at 517-284-6544.

cc: Pete Ostlund, WRD
Jim Watling, WRD
Amy Lachance, WRD
Kathy Tetzlaff, ODWMA
Bethel Skinker, WRD
Michael Prysby, WRD

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	October 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Signature of Operator-in-Charge	Genesee
	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	18.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	63	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	1.9	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.1	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.7%	Percent of Treated Water

Chemical Data

Chlorine on hand:	18,000	lb.	Est. supply:	33	days
Primary Coagulant (Ferric Chloride) on hand:	181,220	lb.	Est. supply:	14	days
Lime (CaO) on hand:	161	tons	Est. supply:	15	days
Fluoride on Hand:	2,100	lb.	Est. supply:	6	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	82	82
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application

City of Flint Water Treatment Plant

WSSN: 2310

October 2015

Date	Million Gallons Treated	Million Gallons Purchased	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
								Raw			Plate Settler	Applied
								Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	16.0		3.4	16.3	149.4	5.6	0.82	6	16.2	28.3	8.30	1.10
2	3.4		2.7	16.3	149.3	5.4	0.77	2	16.8	15.9	9.00	0.99
3	0.0		n/a	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	n/a
4	8.1		3.7	15.9	161.4	5.3	0.93	6	12.7	16.0	4.30	2.81
5	11.9		3.9	17.0	179.5	5.3	0.93	6	8.4	9.3	5.97	2.86
6	13.4		3.5	14.9	198.6	5.4	0.85	6	10.4	19.8	6.80	1.64
7	14.2		3.7	14.4	182.8	5.5	0.86	6	12.1	19.8	7.41	1.60
8	15.1		3.7	13.5	154.5	5.3	0.89	6	8.6	12.6	6.76	1.77
9	16.2		3.5	12.6	130.3	5.0	0.85	6	13.6	21.2	3.01	1.58
10	17.3		4.9	12.0	123.3	5.2	0.92	6	9.3	12.3	3.82	3.41
11	16.1		3.5	12.8	133.0	5.4	0.90	6	10.4	12.3	3.50	3.01
12	15.5		3.6	13.3	162.1	5.1	0.95	6	7.3	8.2	3.67	1.45
13	15.1		3.3	15.7	178.4	5.2	0.91	6	11.1	18.8	3.64	1.16
14	14.8		3.4	16.4	182.6	5.3	0.90	6	8.9	16.3	3.60	1.20
15	15.5		3.6	15.3	163.6	5.0	0.93	6	9.5	16.1	3.99	1.35
16	11.4		3.5	15.6	167.8	5.0	0.90	5	11.3	16.9	4.15	2.35
17		14.4										
18		12.6										
19		13.0										
20		12.2										
21		13.4										
22		11.3										
23		12.3										
24		11.2										
25		10.7										
26		10.7										
27		12.5										
28		11.9										
29		11.7										
30		13.9										
31		11.8										
Avg.	12.8	12.2	3.6	14.8	161.1	5.3	0.89	5	11.0			1.89
Max.	17.3	14.4	4.9	17.0	198.6	5.6	0.95	6	16.2	28.3	9.00	3.41
Min.	0.0	10.7	2.7	12.0	123.3	5.0	0.77	0	7.3			0.99
Total	204.0											

City of Flint Water Treatment Plant

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	6	0.08	0.10	6	0	0	6	0.08	0.09	6	0	0	0.08
2	2	0.09	0.10	2	0	0	2	0.12	0.13	2	0	0	0.08
3	0	n/a	n/a	0	0	0	0	n/a	n/a	0	0	0	n/a
4	4	0.11	0.13	4	0	0	4	0.11	0.15	4	0	0	0.10
5	5	0.10	0.11	5	0	0	5	0.09	0.10	5	0	0	0.09
6	6	0.10	0.11	6	0	0	6	0.09	0.11	6	0	0	0.09
7	6	0.09	0.10	6	0	0	6	0.09	0.10	6	0	0	0.09
8	6	0.10	0.12	6	0	0	6	0.10	0.12	6	0	0	0.10
9	6	0.10	0.10	6	0	0	6	0.09	0.09	6	0	0	0.09
10	6	0.12	0.13	6	0	0	6	0.12	0.13	6	0	0	0.11
11	6	0.12	0.14	6	0	0	6	0.11	0.12	6	0	0	0.12
12	6	0.11	0.13	6	0	0	6	0.11	0.12	6	0	0	0.10
13	6	0.11	0.13	6	0	0	6	0.09	0.10	6	0	0	0.11
14	6	0.10	0.12	6	0	0	6	0.09	0.10	6	0	0	0.09
15	6	0.10	0.11	6	0	0	6	0.10	0.11	6	0	0	0.10
16	5	0.12	0.14	5	0	0	5	0.12	0.15	5	0	0	0.10
17													0.31
18													0.34
19													0.11
20													0.10
21													0.10
22													0.08
23													0.09
24													0.08
25													0.08
26													0.07
27													0.08
28													0.08
29													0.08
30													0.10
31													0.09
Avg.	5	0.10	0.12	5	0	0	5	0.10	0.11	5	0	0	
Max.	6	0.12	0.14	6	0	0	6	0.12	0.15	6	0	0	0.34
Min.	0	0.09	0.10	0	0	0	0	0.08	0.09	0	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Phosphate Application (mg/L)			Phosphate Residual (mg/L)	Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					C.S. #2	P.S. #4	Total		Intermediate Chlorine	Post Chlorine	Total Chlorine	C.S. # 2		3 MG Well		Tap	
		Raw	Tap	Dist.				Tap				Free	Total	Free	Total	Free	Total
1	0.5	0.21	0.73							4.7	4.7			2.3	2.6	1.8	2.1
2	0.5	0.22	0.71							4.5	4.5			2.7	3.0	2.1	2.4
3	n/a	n/a	0.74							n/a	0.0			1.9	2.1	1.6	1.8
4	0.6	0.21	0.74							3.7	3.7			1.1	1.3	1.6	1.8
5	0.6	0.22	0.67							5.0	5.0			2.4	2.7	2.3	2.6
6	0.6	0.21	0.81							4.5	4.5			2.1	2.4	2.0	2.3
7	0.5	0.22	0.73							4.6	4.6			2.1	2.4	2.0	2.3
8	0.6	0.22	0.70	0.70						4.5	4.5			2.1	2.3	2.1	2.4
9	0.5	0.25	0.72							4.1	4.1			2.3	2.5	2.2	2.4
10	0.5	0.24	0.68							4.2	4.2			2.0	2.3	1.9	2.2
11	0.5	0.22	0.72							4.4	4.4			2.4	2.7	1.5	1.8
12	0.6	0.24	0.73							4.2	4.2			2.3	2.5	2.3	2.6
13	0.5	0.23	0.73							4.4	4.4			2.0	2.3	2.0	2.3
14	0.5	0.21	0.73	0.69						4.2	4.2			2.2	2.5	2.2	2.5
15	0.5	0.21	0.72							4.3	4.3			2.2	2.5	2.2	2.5
16	0.5	0.21	0.72							4.2	4.2			2.1	2.4	2.2	2.5
17			0.69									0.9	1.0			0.8	1.0
18			0.70					1.15				0.8	1.0			0.7	0.9
19			0.66									0.9	1.1			0.9	1.0
20			0.68	0.67				1.19				0.9	1.1			0.9	1.1
21			0.68					1.22				0.9	1.1			0.7	0.9
22			0.64					1.16				0.8	1.0			0.8	1.0
23			0.68									0.9	1.1			0.8	1.1
24			0.80					1.24				0.9	1.1			0.9	1.1
25			0.82									0.9	1.1			0.9	1.0
26			0.67					1.14				0.9	1.0			0.9	1.0
27			0.68	0.66								1.0	1.1			1.0	1.1
28			0.66					1.26				0.9	1.0			0.9	1.0
29		0.23	0.69					1.28				0.8	0.9			0.8	0.9
30			0.74									0.9	1.1			0.8	1.1
31			0.76									0.9	1.1			0.8	1.0
Avg.	0.51	0.22	0.70	0.70					0.0	4.4	4.1	0.9	1.1	2.1	2.4	1.4	1.7
Max.	0.60	0.25	0.81	0.73					0.0	5.0	5.0	1.0	1.1	2.7	3.0	2.3	2.6
Min.	0.50	0.21	0.62	0.66					0.0	3.7	0.0	0.8	0.9	1.1	1.3	0.7	0.9

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.13	7.33	280	136	220	42	32	94	82.6	44.9	13.1	5.0	43	84
2	8.18	7.15	272	146	220	36	52	110	84.2	50.5	15	4.9	47	88
3	n/a	7.28	n/a	138	n/a	38	n/a	100	n/a	42.5	n/a	7.8	n/a	86
4	8.27	7.19	260	130	222	36	38	94	83.4	42.5	12.6	5.8	47	87
5	8.32	7.55	262	152	222	50	40	102	85.0	48.8	12.3	7.3	46	84
6	8.31	7.37	272	134	220	40	46	94	77.0	36.1	19.4	10.7	50	88
7	8.30	7.46	266	134	228	40	38	94	82.6	42.5	14.6	6.8	44	80
8	8.35	7.38	262	134	224	44	38	90	84.2	44.1	12.8	5.8	46	82
9	8.28	7.84	264	128	220	42	44	86	90.6	38.9	9.2	8.7	47	83
10	8.27	7.81	264	174	220	74	44	100	93.8	64.1	10.7	3.4	46	77
11	8.30	7.96	272	164	224	58	46	88	87.4	47.3	13.1	8.7	44	77
12	8.35	7.61	270	144	228	60	44	84	86.8	44.9	13.6	7.8	47	77
13	8.38	7.60	276	132	222	48	54	84	89.0	42.5	13.1	6.3	45	79
14	8.33	7.60	278	142	228	48	50	98	85.6	46.5	14.6	6.3	46	84
15	8.34	7.46	274	144	226	44	40	100	88.8	45.7	12.3	7.3	43	81
16	8.33	7.61	286	144	224	46	62	98	113.0	54.5	1.5	1.9	50	85
17		7.59		108		72		34		33.7		5.3		18
18		7.67		108		60		48		32.9		6.3		48
19		7.41		98		72		26		32.8		3.9		12
20		7.46		102		74		20		31.3		5.8		12
21		7.44		100		76		24		33.7		3.9		12
22		7.49		102		78		20		32.1		5.3		12
23		7.37		102		70		32		40.1		0.5		13
24		7.36		102		74		28		30.5		5.8		13
25		7.41		102		72		30		31.3		5.0		13
26		7.36		102		74		28		30.5		6.3		11
27		7.39		100		74		26		29.7		6.3		13
28		7.41		100		72		20		31.3		5.3		12
29	8.32	7.48	260	100	226	72	42	28	93.0	29.7	8.7	6.3	43	12
30		7.22		104		72		32		30.5		6.0		13
31		7.37		100		72		20		33.7		6.8		14

Avg.	8.30	7.46	268	122	224	59	45	63	88.0	39.3	12.3	6.0	46	50
Max.	8.36	7.90	288	174	228	78	62	110	113.0	64.1	19.4	10.7	50	88
Min.	8.13	7.15	260	98	220	36	32	24	77.0	29.7	1.5	0.5	43	11

Bacteriological & Physical Parameters

City of Flint Water Treatment Plant

WSSN: 2310

October 2015

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Temp. C	Color	
	Raw (Colilert MPN)		P.S. 4		Plant Tap								
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Tap	Raw	Tap
1	1	2143	6	0	1	0	1370	<2	0.47	18.8			
2	1	2187	6	0	1	0	2760	<2	0.47	17.3			
3	0	n/a	6	0	1	0	n/a	<2	0.48	n/a			
4	1	1565	6	0	1	0	1000	<2	0.39	15.2			
5	1	1789	6	0	1	0	900	<2	0.41	14.9			
6	1	3654	6	0	1	0	2160	<2	0.39	15.3			
7	1	2014	6	0	1	0	970	<2	0.38	15.1			
8	1	1860	6	0	1	0	900	<2	0.37	14.6			
9	1	12033	6	0	1	0	2310	<2	0.38	16.1			
10	1	2359	6	0	1	0	1120	<2	0.41	14.9			
11	1	4352	6	0	1	0	1950	<2	0.40	14.5			
12	1	2046	6	0	1	0	1280	<2	0.39	15.1			
13	1	2098	6	0	1	0	1280	<2	0.39	15.0			
14	1	2282	6	0	1	0	770	<2	0.38	14.9			
15	1	1720	6	0	1	0	1080	<2	0.38	14.9			
16	1	1260	6	0	1	0	860	2	0.38	14.8			
17					1	0		<2	0.21		16.5		
18					1	0		<2	0.27		15.4		
19					1	0		<2	0.19		15.3		
20					1	0		<2	0.20		15.2		
21					1	0		<2	0.20		15.1		
22					1	0			0.20		15.1		
23					1	0			0.19		15.1		
24					1	0			0.20		14.8		
25					2	0			0.20		14.8		
26					2	0			0.20		14.8		
27					2	0		<2	0.20		14.8		
28					2	0			0.20		14.7		
29	1	3076	2	0	2	0			0.20		14.4		
30			2	0	2	0			0.18		15.1		
31			2	0	2	0			0.20		14.9		
Avg.									0.31	15.4	15.0		
Max.		12033					2760	2	0.48	18.8	16.5		
Min.									0.19	14.5	14.4		

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	1.2	1.2	1.2	0.8	0.1	0.1	0.9	1.1	0.9	0.7	10
2											0
3											0
4											0
5											0
6											0
7	1.5	1.0	1.2	0.1	0.2	0.1	0.6	1.5	0.1	1.4	10
8	1.3	1.0	1.3	1.2	0.3	0.1	0.8	1.5	1.2	0.6	10
9											0
10											0
11											0
12											0
13	1.3	1.2	1.3	1.7	1.0	0.1	0.9	1.3	4.0	1.5	10
14	1.0	1.3	1.4	1.3	1.6	0.1	1.0	1.5	1.3	1.7	10
15	1.1	1.4	1.4	1.0	0.8	0.1	0.7	1.2	1.2	1.1	10
16											0
17											0
18											0
19											0
20	0.1	0.5	0.7	0.5	0.5	0.1	0.8	0.7	0.7	0.7	10
21	0.1	0.4	0.6	0.5	0.4	0.1	0.4	0.6	0.5	0.7	10
22											0
23											0
24											0
25											0
26											0
27	0.1	0.6	0.8	0.3	0.4	0.1	0.3	0.8	0.3	0.8	10
28	0.1	0.5	0.8	0.4	0.5	0.1	0.3	0.7	0.5	0.6	10
29											0
30											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.80

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	1.5	1.5	1.5	1.2	0.3	0.3	1.2	1.4	1.2	0.9	10
2											0
3											0
4											0
5											0
6											0
7	1.7	1.3	1.5	0.3	0.4	0.3	0.9	1.8	0.1	1.7	10
8	1.6	1.3	1.5	1.4	0.5	0.3	1.0	1.8	1.5	1.0	10
9											0
10											0
11											0
12											0
13	1.5	1.4	1.5	2.0	1.2	0.3	1.2	1.5	4.0	1.8	10
14	1.2	1.5	1.7	1.5	0.9	0.3	1.3	1.8	1.6	2.0	10
15	1.3	1.6	1.6	1.3	1.1	0.3	1.0	1.5	1.5	1.4	10
16											0
17											0
18											0
19											0
20	0.2	0.6	0.8	0.8	0.6	0.3	0.9	0.8	0.9	0.8	10
21	0.3	0.6	0.8	0.6	0.5	0.3	0.6	0.7	0.6	0.8	10
22											0
23											0
24											0
25											0
26											0
27	0.2	0.7	0.9	0.4	0.5	0.2	0.4	0.9	0.4	0.9	10
28	0.2	0.6	0.9	0.5	0.6	0.3	0.4	0.8	0.6	0.7	10
29											0
30											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow
Operator-in-Charge

September 2015
Month/Year

F-1R, F-2
Certification of Operator-in-Charge

F-1
Water Plant Classification

Signature of Operator-in-Charge

Genesee
County

DEQ
RESOURCE MANAGEMENT DIVISION
OCT 16 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	18.6	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	60	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.0	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.9	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.7%	Percent of Treated Water

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	24	days
Primary Coagulant (Ferric Chloride) on hand:	151,901	lb.	Est. supply:	9	days
Lime (CaO) on hand:	223	tons	Est. supply:	20	days
Fluoride on Hand:	10,000	lb.	Est. supply:	24	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	179	178
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application

City of Flint Water Treatment Plant

WSSN: 2310

September 2015

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	18.2	5.6	12.9	161.5	5.2	0.75	6	7.0	7.8	5.15	1.41
2	17.6	5.6	14.0	175.0	4.8	0.79	6	9.7	24.1	5.46	1.61
3	17.5	6.3	13.4	170.3	4.8	0.73	6	7.7	8.6	5.54	1.46
4	17.2	6.2	14.9	174.7	5.1	0.76	6	10.6	12.0	5.32	1.34
5	15.9	5.1	18.1	158.2	5.6	0.85	6	13.4	22.3	5.34	1.31
6	15.7	5.7	18.3	157.7	5.7	0.86	6	12.3	21.8	6.40	1.37
7	15.1	4.5	19.2	161.1	5.9	0.87	6	10.1	12.4	6.25	1.45
8	14.5	2.9	18.4	172.4	6.3	0.92	6	15.6	23.0	6.55	1.45
9	14.5	2.9	17.9	167.3	6.3	0.93	6	14.3	24.5	6.65	1.42
10	14.4	2.8	18.8	165.6	6.3	0.94	6	13.9	22.4	6.08	1.43
11	14.3	2.7	18.5	160.2	6.5	0.88	6	10.9	12.6	6.54	1.37
12	14.2	2.7	17.5	156.9	6.5	0.85	6	12.0	18.8	6.78	1.80
13	14.2	2.6	16.3	158.7	6.6	0.85	6	11.0	11.3	7.03	1.40
14	14.1	2.6	17.1	154.7	6.6	0.83	6	10.4	12.6	6.78	1.40
15	14.2	2.7	17.9	157.3	6.7	0.77	6	23.6	38.9	6.93	1.34
16	14.2	3.3	16.9	175.9	6.6	0.81	6	16.1	32.2	6.76	1.32
17	14.2	3.3	19.5	167.1	6.5	0.77	6	12.5	22.8	6.10	1.50
18	14.7	3.8	20.6	164.5	6.4	0.71	6	8.9	11.3	7.43	1.29
19	14.8	2.8	20.7	161.3	6.5	0.71	6	8.2	11.1	7.32	1.2
20	14.6	3.2	21.1	139.9	6.5	0.63	6	8.9	13.0	7.72	1.04
21	14.9	4.0	17.7	139.6	6.3	0.67	6	8.7	11.1	7.94	1.71
22	14.9	4.0	18.5	152.0	6.3	0.87	6	7.0	8.2	7.52	1.28
23	14.9	4.0	17.9	174.2	6.4	0.86	6	8.3	11.5	8.11	1.22
24	15.2	5.0	18.0	161.6	6.2	0.76	6	6.8	9.4	8.13	1.30
25	15.3	5.0	17.8	174.0	5.7	0.86	6	14.2	21.2	7.68	1.29
26	15.2	5.0	17.7	142.7	5.7	0.84	6	15.6	27.7	7.46	2.88
27	15.2	5.0	17.6	156.7	5.7	0.87	6	10.0	11.2	7.28	1.02
28	15.4	4.9	17.0	149.0	5.7	0.80	6	12.1	19.1	7.38	1.24
29	15.6	4.9	16.9	153.7	5.7	0.80	6	14.4	20.7	6.82	1.10
30	15.9	4.7	16.9	169.7	5.6	0.81	6	13.3	19.9	7.72	1.38

Avg.	15.2	4.1	17.6	161.1	6.0	0.81	6	11.6			1.41
Max.	18.2	6.3	21.1	175.9	6.7	0.94	6	23.6	38.9	9.76	2.88
Min.	14.1	2.5	12.8	139.6	4.8	0.63	6	6.8			1.02
Total	456.6										

Filter turbidity

City of Flint Water Treatment Plant

WSSN: 2310

September 2015

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	6	0.11	0.13	6	0	0	6	0.11	0.11	6	0	0	0.10
2	6	0.11	0.13	5	0	0	6	0.11	0.13	6	0	0	0.10
3	6	0.10	0.14	6	0	0	6	0.10	0.10	6	0	0	0.09
4	6	0.11	0.13	6	0	0	6	0.10	0.11	6	0	0	0.10
5	6	0.10	0.12	6	0	0	6	0.11	0.12	6	0	0	0.09
6	6	0.10	0.10	6	0	0	6	0.10	0.10	6	0	0	0.10
7	6	0.11	0.12	6	0	0	6	0.10	0.11	6	0	0	0.09
8	6	0.10	0.13	6	0	0	6	0.09	0.10	6	0	0	0.09
9	6	0.10	0.11	6	0	0	6	0.10	0.10	6	0	0	0.09
10	6	0.10	0.12	6	0	0	6	0.09	0.10	6	0	0	0.09
11	6	0.10	0.11	6	0	0	6	0.11	0.12	6	0	0	0.09
12	6	0.12	0.16	6	0	0	6	0.11	0.12	6	0	0	0.10
13	6	0.12	0.12	6	0	0	6	0.11	0.12	6	0	0	0.10
14	6	0.11	0.14	6	0	0	5	0.11	0.14	5	0	0	0.10
15	6	0.11	0.12	6	0	0	6	0.11	0.12	6	0	0	0.10
16	6	0.10	0.12	6	0	0	6	0.10	0.11	6	0	0	0.09
17	6	0.10	0.11	6	0	0	6	0.09	0.11	6	0	0	0.09
18	6	0.09	0.11	6	0	0	6	0.09	0.10	6	0	0	0.09
19	5	0.08	0.09	5	0	0	5	0.07	0.08	5	0	0	0.08
20	6	0.08	0.10	6	0	0	6	0.08	0.09	6	0	0	0.08
21	6	0.09	0.09	6	0	0	6	0.09	0.14	6	0	0	0.08
22	6	0.10	0.12	6	0	0	6	0.10	0.12	6	0	0	0.09
23	6	0.09	0.10	6	0	0	6	0.09	0.10	6	0	0	0.09
24	6	0.09	0.11	6	0	0	6	0.08	0.10	6	0	0	0.08
25	6	0.10	0.10	6	0	0	5	0.09	0.10	5	0	0	0.09
26	6	0.10	0.12	6	0	0	6	0.10	0.14	6	0	0	0.09
27	6	0.09	0.09	6	0	0	6	0.09	0.10	6	0	0	0.09
28	6	0.09	0.10	6	0	0	6	0.09	0.10	6	0	0	0.08
29	6	0.10	0.11	6	0	0	6	0.09	0.10	6	0	0	0.09
30	6	0.09	0.09	6	0	0	6	0.09	0.10	6	0	0	0.08
Avg.	6	0.10	0.11	6	0	0	6	0.10	0.11	6	0	0	
Max.	6	0.12	0.16	6	0	0	6	0.11	0.14	6	0	0	0.10
Min.	5	0.08	0.09	5	0	0	5	0.07	0.08	5	0	0	

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine			3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.22	0.77		0.0	4.8	4.8			2.3	2.6	2.4	2.6
2	0.5	0.21	0.79	0.73	0.0	4.7	4.7			2.3	2.6	2.3	2.7
3	0.5	0.21	0.78		0.0	4.5	4.5			2.4	2.8	2.2	2.5
4	0.6	0.20	0.73		0.0	5.0	5.0			2.1	2.5	1.9	2.3
5	0.6	0.20	0.81		0.0	5.2	5.2			2.2	2.6	1.9	2.2
6	0.6	0.21	0.81		0.0	5.4	5.4			2.5	2.8	1.9	2.2
7	0.7	0.19	0.81		0.0	5.8	5.8			2.2	2.4	1.9	2.2
8	0.6	0.19	0.81		0.0	4.9	4.9			2.5	2.8	2.2	2.6
9	0.6	0.21	0.79	0.79	0.0	5.0	5.0			2.3	2.6	2.0	2.4
10	0.6	0.21	0.80		0.0	5.0	5.0			2.2	2.4	2.1	2.4
11	0.5	0.22	0.76		0.0	5.1	5.1			2.1	2.4	2.0	2.4
12	0.5	0.19	0.72		0.0	5.3	5.3			2.3	2.6	2.2	2.5
13	0.6	0.18	0.75		0.0	5.2	5.2			1.7	2.0	1.8	2.1
14	0.6	0.19	0.78		0.0	5.5	5.5			2.2	2.6	2.2	2.6
15	0.6	0.22	0.80	0.78	0.0	5.1	5.1			2.4	2.7	2.4	2.7
16	0.6	0.20	0.77		0.0	5.1	5.1			2.1	2.4	2.1	2.4
17	0.6	0.21	0.81		0.0	5.2	5.2			2.0	2.3	1.9	2.2
18	0.5	0.21	0.75		0.0	5.1	5.1			2.2	2.5	2.1	2.6
19	0.5	0.20	0.72		0.0	5.0	5.0			2.1	2.3	1.9	2.3
20	0.5	0.21	0.74		0.0	5.1	5.1			2.1	2.4	1.9	2.3
21	0.4	0.21	0.70		0.0	5.3	5.3			2.0	2.3	1.8	2.1
22	0.5	0.23	0.75		0.0	5.1	5.1			2.2	2.5	2.0	2.3
23	0.6	0.22	0.76	0.75	0.0	4.9	4.9			2.2	2.5	2.0	2.3
24	0.5	0.20	0.72		0.0	4.8	4.8			2.4	2.6	1.9	2.1
25	0.5	0.21	0.76		0.0	4.8	4.8			2.1	2.4	1.8	2.3
26	0.5	0.20	0.70		0.0	3.9	3.9			2.3	2.6	1.8	2.0
27	0.5	0.21	0.75		0.0	4.8	4.8			2.3	2.7	2.3	2.7
28	0.5	0.21	0.76		0.0	4.7	4.7			2.3	2.6	2.2	2.5
29	0.5	0.21	0.74		0.0	4.8	4.8			2.3	2.5	2.3	2.6
30	0.5	0.21	0.74		0.0	4.8	4.8			2.1	2.4	1.8	2.1
Avg.	0.54	0.21	0.76	0.76	0.0	5.0	5.0			2.2	2.5	2.0	2.4
Max.	0.70	0.23	0.81	0.79	0.0	5.8	5.8			2.5	2.8	2.4	2.7
Min.	0.40	0.18	0.70	0.73	0.0	3.9	3.9			1.7	2.0	1.8	2.0

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.24	7.32	262	126	224	40	38	86	74.5	34.5	18.4	9.7	48	82
2	8.26	7.55	256	130	222	48	34	82	78.6	36.1	14.6	9.7	52	81
3	8.30	7.42	266	128	218	52	48	76	89.8	41.7	10.2	5.8	49	84
4	8.35	7.39	262	126	214	40	48	86	94.6	40.9	6.3	5.8	80	80
5	8.42	7.40	262	134	222	42	40	92	85.8	48.1	11.7	3.4	45	86
6	7.30	7.30	264	138	222	38	42	100	85.0	43.3	12.6	7.3	47	90
7	8.35	7.26	258	132	224	36	34	96	81.0	40.1	13.6	7.8	45	92
8	8.30	7.28	256	134	216	40	40	94	81.0	45.7	13.1	4.9	44	87
9	8.26	7.25	260	136	218	42	42	94	71.3	42.5	19.9	7.3	45	89
10	8.35	7.43	254	134	218	44	36	90	76.2	43.3	15.5	6.3	46	90
11	8.25	7.21	246	126	206	40	40	86	70.5	39.3	17	6.8	51	92
12	8.16	7.26	248	130	206	38	42	92	81.0	42.5	11.2	5.8	42	84
13	8.21	7.32	256	132	206	42	50	90	84.2	43.3	11.2	5.8	42	83
14	8.31	7.40	250	138	212	42	38	96	81.8	44.9	11.2	6.3	44	83
15	8.26	7.42	250	130	212	42	38	88	81.0	40.1	11.7	7.3	46	86
16	8.26	7.33	254	134	220	40	34	94	85.0	40.9	10.2	7.8	46	85
17	8.21	7.44	250	134	218	44	34	90	73.7	41.7	16	7.3	47	97
18	8.17	7.28	258	132	194	36	62	96	68.1	35.3	20.9	10.7	42	91
19	8.22	7.44	256	140	220	34	36	106	83.4	47.3	11.7	5.3	44	92
20	8.21	7.27	270	142	214	36	56	106	84.2	45.7	14.6	6.8	45	95
21	8.24	7.28	256	142	220	38	36	104	80.2	42.5	13.6	8.7	44	93
22	8.35	7.35	258	132	232	40	26	92	81.8	40.1	13.1	7.8	47	89
23	8.24	7.34	254	136	220	38	34	98	82.6	44.9	11.7	5.8	45	87
24	8.21	7.36	260	138	222	40	38	98	83.4	43.3	12.6	7.3	48	92
25	8.28	7.26	258	142	216	36	42	106	81.0	34.5	13.1	4.9	51	94
26	8.41	7.35	268	132	226	38	40	94	85.0	41.7	13.1	6.8	45	89
27	8.34	7.26	262	130	220	36	42	94	85.8	42.5	11.7	5.8	43	87
28	8.29	7.29	264	138	220	38	44	100	74.5	40.9	19	8.7	50	88
29	8.14	7.26	260	130	222	40	38	90	72.1	39.3	19.4	7.8	51	90
30	8.15	7.37	266	136	220	40	46	96	85.8	44.9	12.8	5.8	46	86
Avg.	8.23	7.34	258	134	217	40	41	94	80.8	41.7	13.7	6.9	47	88
Max.	8.42	7.55	270	142	232	52	62	106	94.6	48.1	20.9	10.7	80	97
Min.	7.3	7.21	246	126	194	34	26	76	68.1	34.5	6.3	3.4	42	80

WSSN: 2310

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		P.S. 4		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	1850	6	0	1	0	1120	<2	0.38	21.9				
2	1	3255	6	0	1	0	2390	<2	0.41	22.3				
3	1	3076	6	0	1	0	1610	2	0.41	23.0				
4	1	12033	6	0	1	0	4140	<2	0.40	23.6				
5	1	17329	6	0	1	0	1830	<2	0.42	23.6				
6	1	5794	6	0	1	0	2230	<2	0.43	23.8				
7	1	5172	6	0	1	0	1510	<2	0.41	24.8				
8	1	19863	6	0	1	0	>7380	<2	0.41	24.6				
9	1	7270	6	0	1	0	3110	<2	0.41	25.0				
10	1	14136	6	0	1	0	1660	<2	0.41	23.7				
11	1	14136	6	0	1	0	2990	<2		23.3				
12	1	7701	6	0	1	0	3550	<2	0.41	21.5				
13	1	4611	6	0	1	0	1560	<2	0.41	19.6				
14	1	3873	6	0	1	0	1610	<2	0.41	19.6				
15	1	4352	6	0	1	0	7380	<2	0.40	20.0				
16	1	3654	6	0	1	0	>7380	<2	0.41	20.0				
17	1	2098	6	0	1	0	3110	<2	0.41	21.6				
18	1	3255	6	0	1	0	>7380	4	0.44	22.0				
19	1	9804	6	0	1	0	1710	2	0.44	22.2				
20	1	3448	6	0	1	0	1240	<2	0.44	20.3				
21	1	2187	6	0	1	0	1460	<2	0.49	20.3				
22	1	2700	6	0	1	0	1610	<2	0.48	20.3				
23	1	2143	6	0	1	0	1120	<2	0.49	20.2				
24	1	1872	6	0	1	0	1240	<2	0.49	20.3				
25	1	2282	6	0	1	0	1370	<2	0.48	22.2				
26	1	4352	6	0	1	0	1240	2	0.48	21.4				
27	1	3130	6	0	1	0	2020	<2	0.48	21.1				
28	1	2909	6	0	1	0	1710	<2	0.47	21.5				
29	1	2603	6	0	1	0	1460	<2	0.47	21.4				
30	1	2014	6	0	1	0	1950	<2	0.48	19.8				

Avg.									0.44	21.8				
Max.		19863					7380	< 2	0.49	25.0				
Min.									0.38	19.6				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	1.3	1.1	1.6	1.0	0.6	0.3	0.4	1.8	1.4	1.9	10
2	1.0	1.4	1.3	1.1	0.5	0.1	0.5	1.4	1.0	1.2	10
3	1.3	1.5	1.3	0.8	0.4	0.1	1.2	1.4	0.7	1.6	10
4											0
5											0
6											0
7											0
8	1.3	1.0	1.5	1.0	0.5	0.1	0.9	1.6	0.5	0.8	10
9	0.8	0.5	1.6	1.0	0.3	0.1	0.9	1.3	0.9	0.7	10
10											0
11											0
12											0
13											0
14											0
15	1.3	1.6	1.6	1.4	0.5	0.1	0.9	1.6	0.5	0.7	10
16	0.6	1.2	1.4	0.8	0.4	0.2	0.7	1.3	0.5	1.6	10
17											0
18											0
19											0
20											0
21											0
22	1.0	1.0	1.3	1.0	0.5	0.5	0.1	0.6	1.2	0.5	10
23	0.1	1.1	1.3	1.0	0.4	0.1	0.8	1.2	0.4	1.2	10
24	1.0	0.8	1.3	0.8	0.3	0.1	0.6	1.2	0.9	0.6	10
25											0
26											0
27											0
28											0
29											0
30											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.90

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	1.5	1.4	1.9	1.2	0.9	0.5	0.7	2.1	1.7	2.2	10
2	1.3	1.7	1.6	1.4	0.8	0.1	0.8	1.7	1.3	1.5	10
3	1.6	1.8	1.6	1.2	0.7	0.2	1.5	1.7	1.0	1.8	10
4											0
5											0
6											0
7											0
8	1.6	1.3	1.8	1.3	0.8	0.3	1.3	1.9	0.8	1.0	10
9	1.1	0.7	1.9	1.3	0.5	0.3	1.2	1.6	1.2	0.9	10
10											0
11											0
12											0
13											0
14											0
15	1.6	1.9	1.9	1.7	0.7	0.2	1.2	2.0	0.7	1.0	10
16	0.9	1.5	1.7	1.1	0.6	0.3	1.0	1.6	0.7	1.9	10
17											0
18											0
19											0
20											0
21											0
22	1.3	1.3	1.6	1.3	0.7	0.7	0.3	0.9	1.5	0.7	10
23	0.3	1.4	1.6	1.3	0.6	0.3	1.1	1.5	0.6	1.5	10
24	1.3	1.1	1.6	1.1	0.5	0.3	0.9	1.5	1.3	0.9	10
25											0
26											0
27											0
28											0
29											0
30											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.2

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	August 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	20.2	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	68	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.2	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.9	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.4%	Percent of Treated Water

DEQ
RESOURCE MANAGEMENT DIVISION
SEP 21 2015
LANSING DISTRICT

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	24	days
Primary Coagulant (Ferric Chloride) on hand:	179,000	lb.	Est. supply:	14	days
Lime (CaO) on hand:	192	tons	Est. supply:	19	days
Fluoride on Hand:	18,000	lb.	Est. supply:	40	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	213	213
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application — City of Flint Water Treatment Plant — August 2015 — Page 2

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	16.1	4.5	16.5	149.6	4.8	0.90	6	7.8	10.6	3.91	2.72
2	15.1	4.6	16.0	168.6	5.0	0.88	6	7.2	10.2	3.54	2.58
3	15.5	4.7	15.9	155.0	4.8	0.91	6	11.2	17.5	3.53	1.17
4	15.8	4.3	15.3	160.3	4.7	0.87	6	9.0	10.3	4.34	1.65
5	15.7	4.5	16.3	159.4	4.7	0.89	6	7.1	8.2	3.62	1.23
6	15.5	4.3	16.4	148.6	4.6	0.93	6	7.2	8.6	3.58	1.55
7	16.5	4.5	15.3	135.9	4.5	0.88	6	6.6	7.3	3.42	1.18
8	17.2	4.2	14.6	147.5	4.8	0.88	6	6.8	7.7	3.17	1.29
9	17.4	4.3	14.7	164.0	4.7	0.90	6	8.5	10.6	4.06	1.54
10	17.4	4.3	14.8	168.4	4.5	0.84	6	10.1	13.5	4.02	1.24
11	17.2	4.1	14.0	171.5	4.5	0.83	6	9.9	20.1	3.96	1.10
12	17.2	4.0	14.0	148.3	4.3	0.84	6	16.5	42.3	4.09	1.50
13	17.3	4.3	15.0	163.2	4.5	0.93	6	14.3	39.7	4.33	1.46
14	17.5	4.2	16.0	156.7	1.7	0.89	6	16.6	25.2	4.48	1.20
15	17.7	4.2	16.6	150.8	4.7	0.90	6	10.0	21.5	5.65	1.05
16	17.7	4.2	16.8	149.5	4.8	0.84	6	11.6	22.9	4.96	1.19
17	17.3	4.2	19.3	158.5	4.9	0.85	6	12.1	24.8	4.52	1.07
18	17.7	4.1	16.6	160.0	4.7	0.86	6	4.7	5.1	4.57	1.54
19	17.8	4.1	16.0	175.3	4.6	0.87	6	7.0	13.4	4.01	1.4
20	17.9	4.3	16.4	165.9	4.5	0.81	6	5.9	8.7	4.90	1.05
21	18.1	4.5	16.7	155.5	4.4	0.82	6	7.3	8.2	4.58	1.73
22	19.0	4.4	15.0	170.5	4.3	0.84	6	9.1	22.4	3.93	1.23
23	19.1	4.5	16.0	173.7	4.7	0.86	6	10.7	23.2	5.05	1.31
24	18.9	4.9	16.3	179.7	4.9	0.90	6	7.1	8.2	5.39	1.28
25	19.7	4.9	15.7	165.7	4.7	0.87	6	9.1	22.4	4.99	0.94
26	19.8	5.0	15.9	160.0	4.6	0.08	6	10.7	23.2	5.10	1.32
27	19.5	5.1	15.8	153.5	4.7	0.78	6	7.1	8.2	5.63	1.26
28	19.0	5.1	17.6	163.5	4.9	0.80	6	8.5	20.1	6.02	1.04
29	19.3	5.2	15.9	162.1	4.9	0.80	6	8.5	9.6	5.85	1.49
30	18.4	5.3	18.8	165.5	5.1	0.79	6	7.0	7.6	6.25	1.10
31	18.8	5.4	15.8	151.1	5.0	0.79	6	7.8	8.5	5.54	2.02
Avg.	17.6	4.5	16.0	160.0	4.6	0.83	6	9.1			1.40
Max.	19.8	5.4	19.3	179.7	5.1	0.93	6	16.6	42.3	6.25	2.72
Min.	15.1	4.0	14.0	135.9	1.7	0.08	6	4.7			0.94
Total	547.1										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	3	0.09	0.11	3	0	0	3	0.08	0.09	3	3	0	0.09
2	7	0.10	0.12	6	0	0	7	0.09	0.10	6	0	0	0.09
3	7	0.07	0.09	6	0	0	7	0.08	0.09	6	0	0	0.11
4	7	0.13	0.26	6	0	0	7	0.10	0.11	6	0	0	0.13
5	7	0.10	0.12	6	0	0	7	0.10	0.11	6	0	0	0.12
6	7	0.11	0.15	6	0	0	7	0.13	0.16	6	0	0	0.13
7	7	0.13	0.14	6	0	0	7	0.12	0.13	6	0	0	0.15
8	7	0.13	0.15	6	0	0	7	0.10	0.12	6	0	0	0.14
9	7	0.14	0.17	6	0	0	7	0.11	0.12	6	0	0	0.15
10	7	0.12	0.13	6	0	0	7	0.10	0.11	6	0	0	0.14
11	7	0.11	0.14	6	0	0	7	0.10	0.11	6	0	0	0.13
12	7	0.10	0.11	6	0	0	7	0.11	0.13	6	0	0	0.14
13	7	0.12	0.14	6	0	0	7	0.11	0.13	6	0	0	0.14
14	7	0.11	0.18	6	0	0	7	0.10	0.11	6	0	0	0.11
15	7	0.11	0.17	6	0	0	7	0.09	0.09	6	0	0	0.10
16	7	0.11	0.12	6	0	0	7	0.09	0.11	6	0	0	0.12
17	7	0.09	0.11	6	0	0	7	0.10	0.12	6	0	0	0.15
18	7	0.10	0.12	6	0	0	7	0.10	0.12	6	0	0	0.12
19	7	0.11	0.16	6	0	0	7	0.09	0.10	6	0	0	0.12
20	7	0.10	0.14	6	0	0	7	0.11	0.12	6	0	0	0.11
21	7	0.10	0.11	6	0	0	7	0.11	0.11	6	0	0	0.10
22	7	0.12	0.14	6	0	0	7	0.10	0.12	6	0	0	0.11
23	7	0.09	0.10	6	0	0	7	0.10	0.12	6	0	0	0.10
24	7	0.10	0.11	6	0	0	7	0.10	0.12	6	0	0	0.11
25	7	0.10	0.13	6	0	0	7	0.10	0.12	6	0	0	0.09
26	7	0.10	0.11	6	0	0	7	0.09	0.11	6	0	0	0.10
27	7	0.09	0.12	6	0	0	7	0.11	0.13	6	0	0	0.09
28	7	0.11	0.11	6	0	0	7	0.10	0.12	6	0	0	0.10
29	7	0.10	0.11	6	0	0	7	0.09	0.09	6	0	0	0.09
30	7	0.10	0.11	6	0	0	7	0.09	0.09	6	0	0	0.09
31	7	0.11	0.17	6	0	0	7	0.10	0.12	6	0	0	0.10
Avg.	7	0.11	0.13	6	0	0	7	0.10	0.11	6	0	0	
Max.	7	0.14	0.26	6	0	0	7	0.13	0.16	6	3	0	0.15
Min.	3	0.07	0.09	3	0	0	3	0.08	0.09	3	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.6	0.18	0.78	0.74	2.2	3.6	5.8	0.4	0.6	2.3	2.8	2.0	2.4
2	0.6	0.19	0.84		2.2	4.6	6.8	0.6	0.9	2.3	2.6	2.1	2.4
3	0.6	0.19	0.84		0.9	5.6	6.5	0.2	0.5	2.6	3.0	2.6	3.0
4	0.8	0.19	0.77		0.0	4.9	4.9	0.0	0.0	2.3	2.9	1.2	1.6
5	0.6	0.20	0.77		0.0	5.4	5.4	0.0	0.0	2.3	2.7	1.8	2.1
6	0.8	0.18	0.78	0.76	0.0	5.6	5.6	0.0	0.0	2.5	3.0	2.4	2.9
7	0.6	0.19	0.76		0.0	5.3	5.3	0.0	0.0	2.5	2.0	2.0	2.5
8	0.5	0.19	0.72		0.0	5.3	5.3	0.0	0.0	2.4	2.6	2.0	2.3
9	0.6	0.19	0.78		0.0	5.7	5.7	0.0	0.0	2.4	2.8	2.0	2.3
10	0.6	0.18	0.75		0.0	5.2	5.2	0.0	0.0	2.2	2.5	1.8	2.2
11	0.5	0.19	0.76		0.0	5.8	5.8	0.0	0.0	2.3	2.7	1.1	1.4
12	0.5	0.20	0.78	0.75	0.0	5.3	5.3	0.0	0.0	1.8	2.4	1.6	1.9
13	0.8	0.20	0.76		0.0	5.5	5.5	0.0	0.0	2.3	3.0	2.2	2.8
14	0.6	0.20	0.73		0.0	5.4	5.4	0.0	0.0	2.4	2.9	2.1	2.4
15	0.6	0.18	0.75		0.0	5.6	5.6	0.0	0.0	2.2	2.4	2.0	2.3
16	0.6	0.20	0.75		0.0	5.1	5.1	0.0	0.0	2.6	2.9	1.7	1.9
17	0.6	0.19	0.76		0.0	5.6	5.6	0.0	0.0	2.1	2.3	2.0	2.3
18	0.6	0.17	0.74		0.0	5.1	5.1	0.0	0.0	2.6	2.9	2.4	2.7
19	0.6	0.20	0.78	0.79	0.0	5.2	5.2	0.0	0.0	2.4	2.7	2.2	2.5
20	0.6	0.19	0.74		0.0	5.7	5.7	0.0	0.0	2.4	2.7	1.7	2.1
21	0.6	0.19	0.71		0.0	5.8	5.8	0.0	0.0	2.0	2.4	1.6	1.9
22	0.5	0.21	0.72		0.0	5.2	5.2	0.0	0.0	2.2	2.5	2.0	2.4
23	0.5	0.20	0.72		0.0	5.0	5.0	0.0	0.0	2.2	2.5	1.3	1.5
24	0.6	0.21	0.76		0.0	4.9	4.9	0.0	0.0	2.4	2.7	2.4	2.7
25	0.5	0.18	0.74		0.0	4.8	4.8	0.0	0.0	2.2	2.5	1.8	2.2
26	0.5	0.21	0.75	0.79	0.0	5.0	5.0	0.0	0.0	2.2	2.5	2.0	2.3
27	0.6	0.20	0.79		0.0	5.1	5.1	0.0	0.0	2.7	2.9	2.3	2.7
28	0.5	0.19	0.87		0.0	5.2	5.2	0.0	0.0	2.3	2.5	1.9	2.3
29	0.8	0.20	0.78		0.0	5.1	5.1	0.0	0.0	2.3	2.8	2.3	2.6
30	0.6	0.20	0.79		0.0	4.7	4.7	0.0	0.0	2.3	2.8	2.3	2.6
31	0.5	0.20	0.70		0.0	4.7	4.7	0.0	0.0	2.2	2.5	1.9	2.3
Avg.	0.57	0.19	0.75	0.76	0.2	5.2	5.4	0.0	0.1	2.3	2.7	2.0	2.3
Max.	0.60	0.21	0.84	0.79	2.2	5.8	6.8	0.6	0.9	2.7	3.0	2.6	3.0
Min.	0.50	0.17	0.64	0.74	0.0	3.6	4.7	0.0	0.0	1.8	2.3	1.1	1.4

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.01	7.48	248	160	212	64	36	96	81.8	57.7	10.7	3.9	44	87
2	8.06	7.45	254	142	210	50	44	92	81.8	48.9	12.2	4.9	42	86
3	8.09	7.28	238	126	208	38	30	88	72.9	40.9	13.6	5.8	45	87
4	8.23	7.24	254	126	212	34	42	92	81.0	43.3	12.6	4.4	43	80
5	8.22	7.26	250	130	208	40	42	98	81.0	44.9	11.7	6.3	44	85
6	8.27	7.38	254	128	208	38	46	90	83.4	42.5	11.2	5.3	43	82
7	8.37	7.24	244	130	206	38	38	92	77.0	37.7	12.6	8.7	46	86
8	8.33	7.38	252	128	216	36	38	92	81.8	41.7	10.2	5.8	43	81
9	8.33	7.53	250	122	216	38	44	84	82.6	40.9	13.1	4.9	42	80
10	8.24	7.25	256	124	222	34	34	90	84.2	41.7	11.2	4.9	41	60
11	8.21	7.17	254	128	218	36	36	92	82.6	46.5	11.7	3.9	44	81
12	8.23	7.26	258	132	224	40	34	92	69.7	38.5	20.4	8.7	44	85
13	8.40	7.27	254	130	214	44	40	86	72.9	36.9	17.5	9.2	45	82
14	8.28	7.42	252	128	216	42	36	86	91.4	47.3	5.8	2.4	45	81
15	8.20	7.44	254	134	210	40	44	94	80.2	43.3	13.1	6.3	42	89
16	8.25	7.30	260	136	216	38	44	98	85.0	45.7	11.7	5.3	43	85
17	8.33	7.32	260	138	218	34	42	104	79.4	44.1	15.1	6.8	44	90
18	8.30	7.40	256	128	220	38	36	90	81.0	39.3	13.1	7.3	44	89
19	8.21	7.33	254	134	222	44	32	90	76.2	38.5	15.6	9.2	46	84
20	8.11	7.42	252	128	216	46	36	82	74.5	43.3	16.0	4.9	51	86
21	8.20	7.40	252	124	218	40	34	84	73.7	40.1	16.5	5.8	45	90
22	8.20	7.37	256	132	212	40	44	92	79.4	38.5	14.1	8.7	45	83
23	8.23	7.34	262	130	214	38	48	92	85.0	41.7	12.2	6.3	44	85
24	8.33	7.39	258	126	222	38	36	90	81.0	41.7	13.6	5.8	45	85
25	8.30	7.43	260	138	222	44	38	94	82.6	50.5	13.1	5.3	46	90
26	8.26	7.21	262	130	218	38	44	92	85.0	42.5	12.2	5.8	45	84
27	8.24	7.33	258	134	226	40	30	94	82.6	44.1	12.2	5.8	47	86
28	8.30	7.38	254	134	214	40	40	94	89.0	48.9	7.8	2.9	44	83
29	8.30	7.19	262	128	218	34	44	94	66.6	40.1	11.2	6.8	44	85
30	8.23	7.41	258	132	214	30	44	102	81.8	44.1	13.1	5.3	46	85
31	8.38	7.41	266	134	228	40	38	94	85.8	45.7	12.6	4.9	43	83
Avg.	8.25	7.34	255	132	216	40	39	92	81.1	43.3	12.8	5.9	44	85
Max.	8.40	7.53	266	160	228	64	48	104	91.4	57.7	20.4	9.2	51	90
Min.	8.01	7.17	238	122	208	30	30	82	69.7	36.9	5.8	2.4	41	80

WSSN: 2310

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		3 MG Well		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	9208	1	0	1	0	1660	< 2	0.46	25.3				
2	1	6896	1	0	1	0	1940	< 2	0.39	25.0				
3	1	24066	1	0	1	0	4960	2	0.41	25.1				
4	1	9222	1	0	1	0	2240	< 2	0.38	25.6				
5	1	7746	1	0	1	0	3320	< 2	0.38	24.2				
6	1	4494	1	0	1	0	2080	2	0.40	24.4				
7	1	8152	1	0	1	0	3900	< 2	0.39	25.0				
8	1	6896	6	0	1	0	3660	< 2	0.38	24.7				
9	1	5510	6	0	1	0	3900	< 2	0.38	24.2				
10	1	9222	6	0	1	0	6220	< 2	0.36	24.7				
11	1	4978	6	0	1	0	5140	< 2	0.37	23.6				
12	1	4128	6	0	1	0	4040	< 2	0.38	23.7				
13	1	3348	6	0	1	0	3660	< 2	0.39	26.6				
14	1	5510	6	0	1	0	5140	< 2	0.40	24.4				
15	1	16328	6	0	1	0	12460	< 2	0.42	24.1				
16	1	6510	6	0	1	0	4960	< 2	0.41	24.9				
17	1	8704	6	0	1	0	3540	< 2	0.41	25.7				
18	1	8212	6	0	1	0	3540	< 2	0.40	26.8				
19	1	8212	6	0	1	0	4180	< 2	0.39	25.9				
20	1	17328	5	0	1	0	4460	< 2	0.41	25.1				
21	1	5526	6	0	1	0	2820	< 2	0.41	25.4				
22	1	6510	6	0	1	0	3540	< 2	0.40	23.7				
23	1	6152	6	0	1	0	3420	< 2	0.40	23.5				
24	1	11586	6	0	1	0	3020	< 2	0.41	23.4				
25	1	5618	5	0	1	0	1480	< 2	0.41	22.3				
26	1	20924	6	0	1	0	3220	< 2	0.39	21.8				
27	1	2548	6	0	1	0	2320	< 2	0.41	21.1				
28	1	2878	6	0	1	0	2080	< 2	0.40	20.4				
29	1	5226	6	0	1	0	4040	< 2	0.39	20.9				
30	1	1808	6	0	1	0	960	< 2	0.38	21.3				
31	1	2500	6	0	1	0	1600	< 2	0.40	21.9				
Avg.									0.40	24.0				
Max.		24066					12460	< 2	0.46	26.6				
Min.									0.37	20.4				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	0.9	1.4	1.8	0.1	0.1	0.1	0.5	1.8	0.8	2.0	10
4											0
5	0.4	1.2	1.3	0.2	0.1	0.1	0.5	1.1	0.5	1.5	10
6											0
7											0
8											0
9											0
10											0
11	0.9	1.2	1.2	1.0	0.3	0.2	1.0	1.6	1.1	1.5	10
12	0.1	1.4	1.7	1.2	0.6	0.3	0.5	1.7	1.3	1.9	10
13											0
14											0
15											0
16											0
17											0
18	1.0	1.0	1.4	1.0	0.4	0.2	0.8	1.8	1.0	1.9	10
19	0.1	1.0	1.3	0.9	0.2	0.2	0.1	1.2	1.0	1.5	10
20	0.8	1.3	1.4	0.7	0.6	0.2	0.8	1.3	1.1	1.6	10
21											0
22											0
23											0
24											0
25	0.4	1.2	1.5	0.6	0.4	0.3	0.5	1.5	0.7	1.1	10
26	0.1	1.2	1.3	1.0	0.3	0.1	0.5	1.3	1.4	1.8	10
27	0.1	1.3	1.5	1.0	0.4	0.2	0.2	1.5	1.7	2.3	10
28											0
29											0
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.92

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.3	1.8	2.2	0.4	0.3	0.3	0.7	2.2	1.1	2.3	10
4											0
5	0.6	1.5	1.6	0.4	0.2	0.5	0.8	1.4	0.8	1.8	10
6											0
7											0
8											0
9											0
10											0
11	1.2	1.6	1.5	1.3	0.5	0.3	1.3	1.9	1.3	1.8	10
12	0.1	1.6	1.9	1.4	0.8	0.5	0.7	1.9	1.5	2.1	10
13											0
14											0
15											0
16											0
17											0
18	1.3	1.3	1.7	1.3	0.5	0.3	1.1	2.1	1.3	2.2	10
19	0.2	1.3	1.7	1.2	0.4	0.4	0.3	1.5	1.3	1.7	10
20	1.0	1.5	1.7	1.0	0.9	0.3	1.1	1.5	1.4	1.8	10
21											0
22											0
23											0
24											0
25	0.6	1.5	1.8	0.9	0.5	0.4	0.7	1.8	1.0	1.0	10
26	0.2	1.4	1.5	1.3	0.5	0.2	0.7	1.5	1.8	2.0	10
27	0.2	1.5	1.8	1.3	0.5	0.3	0.4	1.8	2.0	2.6	10
28											0
29											0
30											0
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.2

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow — Operator-in-Charge
July 2016 — Month/Year

F-1R, F-2 — Certification of Operator-in-Charge
F-1 — Water Plant Classification

Signature of Operator-in-Charge
Genesee — County

DEQ
RESOURCE MANAGEMENT DIVISION
AUG 17 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	18.5	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	124	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.5	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.0%	Percent of Treated Water

Chemical Data

Chlorine on hand:	24,000	lb.	Est. supply:	28	days
Primary Coagulant (Ferric Chloride) on hand:	153,000	lb.	Est. supply:	10	days
Lime (CaO) on hand:	197	tons	Est. supply:	17	days
Fluoride on Hand:	6,000	lb.	Est. supply:	13	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	1	0
Number of filter confluence samples collected:	218	218
Percent of filter confluence samples > 0.3 NTU:	0.5%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Cattoinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	14.3	4.3	16.6	125.6	5.0	0.64	7	29.1	66.3	5.14	2.17
2	14.1	3.6	19.1	126.5	5.1	0.64	7	26.5	50.4	5.18	1.47
3	14.5	3.8	18.6	131.9	5.0	0.64	8	18.4	47.8	5.91	2.03
4	14.6	3.2	17.8	129.1	4.9	0.63	8	28.6	107.0	7.01	2.18
5	14.5	3.6	17.9	127.3	5.0	0.65	8	32.1	14.6	6.42	1.66
6	14.6	3.9	17.7	122.6	4.7	0.75	7	22.5	12.1	4.54	2.00
7	15.9	3.1	14.6	113.6	4.2	0.71	7	16.3	38.7	1.69	2.88
8	16.1	4.2	16.6	126.9	4.3	0.69	7	12.0	10.2	2.43	1.48
9	18.1	4.3	15.1	105.1	3.8	0.62	7	17.6	51.9	2.43	1.85
10	17.7	4.4	14.8	116.1	4.2	0.67	7	25.6	88.6	2.24	1.67
11	17.1	4.1	16.5	109.7	4.3	0.68	7	14.8	30.6	2.13	1.54
12	14.9	3.9	16.0	114.4	4.3	0.79	7	11.0	23.8	2.78	1.33
13	14.8	3.9	13.9	116.8	4.5	0.84	7	11.2	34.6	2.13	0.96
14	15.0	3.4	13.0	113.0	4.4	0.74	7	13.2	21.1	2.62	1.41
15	14.6	4.0	13.8	123.4	4.5	0.80	7	39.4	122.0	2.47	1.50
16	14.5	4.1	13.9	120.8	4.5	0.75	7	27.0	126.0	2.14	1.83
17	14.7	3.8	13.1	127.3	4.5	0.82	7	18.0	73.9	1.70	1.62
18	14.3	4.7	13.8	154.2	4.6	0.86	7	14.8	44.6	3.03	1.97
19	14.3	4.2	14.0	177.9	5.0	0.88	7	23.3	109.0	2.55	1.51
20	14.3	4.7	13.3	171.8	5.0	0.83	7	27.9	139.0	2.71	1.65
21	14.6	4.4	13.7	172.3	4.9	0.86	7	29.2	140.0	2.52	1.49
22	15.3	4.5	16.0	203.7	4.7	0.82	7	25.1	89.1	4.17	1.50
23	15.8	4.0	18.8	158.9	4.7	0.80	7	22.2	68.3	4.94	1.99
24	14.5	1.2	19.8	166.3	5.3	0.82	7	15.7	31.9	7.01	1.94
25	13.6	0.0	24.3	195.2	5.5	0.88	7	22.8	81.4	8.62	2.00
26	13.6	0.0	23.4	194.1	5.6	0.90	7	28.6	139.0	7.85	1.79
27	13.9	0.0	23.1	194.9	5.4	0.86	7	18.3	63.5	7.24	1.93
28	13.8	0.0	22.7	195.9	5.4	0.91	7	31.6	165.0	5.89	1.13
29	14.3	0.0	22.2	198.8	5.2	0.82	7	20.0	73.4	4.91	1.61
30	14.7	0.4	21.0	180.6	5.1	0.83	7	16.5	46.3	5.14	1.22
31	15.8	4.2	18.5	181.8	4.9	0.94	7	8.0	9.1	3.97	1.22
Avg.	14.9	3.2	17.2	148.3	4.8	0.78	7	21.5			1.69
Max.	18.1	4.7	24.3	203.7	5.6	0.94	8	39.4	165	8.62	2.88
Min.	13.6	0.0	13.0	105.1	3.8	0.62	7	8.0			0.96
Total	462.8										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point, No.1 (N) North						Confluence Point, No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	7	0.10	0.13	6	0	0	7	0.09	0.12	6	0	0	0.11
2	7	0.11	0.15	6	0	0	7	0.09	0.12	6	0	0	0.09
3	8	0.09	0.11	6	0	0	8	0.09	0.11	6	0	0	0.13
4	8	0.09	0.13	6	0	0	8	0.08	0.09	6	0	0	0.11
5	8	0.08	0.09	6	0	0	8	0.08	0.11	6	0	0	0.09
6	7	0.09	0.12	6	0	0	7	0.08	0.09	6	0	0	0.10
7	7	0.10	0.12	6	0	0	7	0.09	0.10	6	0	0	0.10
8	6	0.11	0.13	6	0	0	6	0.10	0.11	6	0	0	0.09
9	7	0.11	0.15	6	0	0	7	0.10	0.10	6	0	0	0.11
10	7	0.11	0.11	6	0	0	7	0.10	0.12	6	0	0	0.12
11	7	0.12	0.25	6	0	0	7	0.11	0.13	6	0	0	0.10
12	8	0.08	0.11	6	0	0	8	0.10	0.13	6	0	0	0.08
13	7	0.10	0.11	6	0	0	7	0.10	0.12	6	0	0	0.10
14	7	0.18	0.31	6	1	1	7	0.11	0.11	6	0	0	0.11
15	7	0.14	0.20	6	0	0	7	0.12	0.16	6	0	0	0.13
16	7	0.14	0.20	6	0	0	7	0.12	0.15	6	0	0	0.12
17	7	0.13	0.15	6	0	0	7	0.12	0.14	6	0	0	0.18
18	7	0.14	0.20	6	0	0	7	0.12	0.16	6	0	0	0.15
19	7	0.16	0.19	6	0	0	7	0.14	0.18	6	0	0	0.18
20	7	0.13	0.18	6	0	0	7	0.12	0.16	6	0	0	0.12
21	7	0.14	0.17	6	0	0	7	0.14	0.19	6	0	0	0.12
22	7	0.15	0.20	6	0	0	7	0.15	0.19	6	0	0	0.16
23	7	0.14	0.18	6	0	0	7	0.13	0.15	6	0	0	0.15
24	7	0.17	0.19	6	0	0	7	0.17	0.20	6	0	0	0.16
25	7	0.17	0.19	6	0	0	7	0.16	0.19	6	0	0	0.14
26	7	0.14	0.17	6	0	0	7	0.13	0.15	6	0	0	0.13
27	7	0.16	0.22	6	0	0	7	0.15	0.21	6	0	0	0.16
28	7	0.15	0.16	6	0	0	7	0.14	0.18	6	0	0	0.13
29	7	0.13	0.17	6	0	0	7	0.12	0.13	6	0	0	0.12
30	7	0.12	0.14	6	0	0	7	0.13	0.16	6	0	0	0.13
31	7	0.08	0.10	6	0	0	7	0.10	0.13	6	0	0	0.12
Avg.	7	0.12	0.16	6	0	0	7	0.11	0.14	6	0	0	
Max.	8	0.18	0.31	6	1	1	8	0.17	0.21	6	0	0	0.18
Min.	6	0.08	0.09	6	0	0	6	0.08	0.09	6	0	0	

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.17	0.68	0.72	3.2	3.6	6.8	0.5	0.7	2.3	2.7	2.0	2.4
2	0.5	0.18	0.68		3.0	3.3	6.3	0.5	0.8	2.5	2.8	2.4	2.7
3	0.5	0.19	0.66		3.1	3.8	6.9	0.3	0.5	2.1	2.5	1.9	2.2
4	0.5	0.19	0.75		3.2	3.6	6.8	0.2	0.4	2.0	2.3	2.0	2.3
5	0.6	0.20	0.84		3.3	3.3	6.6	0.4	0.7	2.2	2.5	2.1	2.4
6	0.5	0.17	0.72		3.3	3.3	6.6	0.3	0.6	2.0	2.3	2.0	2.3
7	0.5	0.19	0.66		3.2	3.7	6.9	0.3	0.5	1.8	2.1	1.8	2.1
8	0.5	0.18	0.66		3.3	3.4	6.7	0.3	0.6	1.7	2.1	1.8	2.2
9	0.5	0.18	0.73	0.69	3.4	3.6	7.0	0.2	0.5	2.0	2.3	2.0	2.3
10	0.6	0.20	0.74		3.8	3.8	7.6	0.2	0.5	2.1	2.5	2.0	2.4
11	0.6	0.19	0.74		3.9	2.9	6.8	0.3	0.5	2.3	2.6	2.2	2.5
12	0.6	0.20	0.80		4.5	3.3	7.8	0.5	1.0	2.4	2.6	2.6	3.0
13	0.6	0.18	0.67		4.8	3.7	8.5	0.2	0.4	2.1	2.5	2.2	2.6
14	0.6	0.18	0.73		4.8	3.5	8.3	0.4	0.6	2.2	2.5	2.3	2.6
15	0.7	0.18	0.73		4.8	3.7	8.5	0.7	1.1	2.1	2.5	2.0	2.4
16	0.7	0.18	0.78		4.6	3.7	8.3	0.4	0.6	2.5	2.9	2.2	2.5
17	0.7	0.22	0.77		4.6	3.8	8.4	0.3	0.5	2.1	2.4	1.9	2.3
18	0.7	0.20	0.76		4.7	3.9	8.6	0.4	0.6	2.6	2.9	2.2	2.5
19	0.7	0.19	0.76		4.7	3.7	8.4	0.4	0.6	2.5	3.0	2.4	2.8
20	0.7	0.19	0.74		4.6	3.6	8.2	0.4	0.6	2.4	2.8	2.4	2.8
21	0.7	0.19	0.82		4.5	3.7	8.2	0.3	0.5	2.5	3.0	2.5	3.0
22	0.6	0.19	0.78		4.3	3.7	8.0	0.4	0.7	2.6	3.0	0.6	0.9
23	0.6	0.20	0.78	0.75	4.3	3.3	7.6	0.4	0.6	2.6	3.0	2.6	3.0
24	0.6	0.18	0.72		4.7	3.4	8.1	0.3	0.5	1.7	2.1	0.7	1.1
25	0.6	0.20	0.76		5.0	3.6	8.6	0.5	0.8	2.6	3.0	0.6	0.9
26	0.6	0.20	0.77		5.0	3.8	8.8	0.4	0.6	2.2	2.5	2.2	2.5
27	0.6	0.19	0.80		5.3	3.6	8.9	0.3	0.5	2.2	2.5	2.0	2.4
31	0.6	0.19	0.74		4.2	3.5	7.7	0.5	0.7	2.5	3.0	0.6	0.7
Avg.	0.59	0.19	0.74	0.72	4.3	3.6	7.8	0.4	0.6	2.2	2.6	1.9	2.3
Max.	0.70	0.22	0.84	0.75	5.5	4.2	9.7	0.7	1.1	2.6	3.0	2.6	3.0
Min.	0.50	0.17	0.66	0.69	3.0	2.9	6.3	0.2	0.4	1.7	2.1	0.6	0.7

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.37	7.59	232	148	190	56	42	92	67.3	46.5	15.6	7.8	45	84
2	8.12	7.36	260	150	220	54	40	96	77.8	50.5	16.0	5.8	47	87
3	8.40	7.43	260	155	218	55	42	100	89.0	56.9	9.2	2.9	43	89
4	8.35	7.40	252	153	210	52	42	101	80.2	52.1	12.6	3.9	42	86
5	8.18	7.49	258	156	216	54	42	102	89.8	52.1	8.3	6.8	42	86
6	8.19	7.48	264	156	208	56	56	100	85.8	57.7	12.2	2.9	44	88
7	8.06	7.68	258	156	212	50	46	106	87.4	50.5	9.7	7.3	48	85
8	7.98	7.52	252	148	208	54	44	94	85.0	51.3	9.7	4.9	43	77
9	8.18	7.49	246	152	208	52	38	100	80.2	52.9	11.2	4.9	43	82
10	8.22	7.47	244	150	202	52	42	98	84.2	55.3	8.3	2.9	43	77
11	8.30	7.54	250	150	206	62	44	88	85.8	48.9	8.7	6.8	47	81
12	8.21	7.45	256	144	214	48	42	96	79.4	47.3	14.1	6.8	42	89
13	8.36	7.60	242	142	200	50	42	92	79.4	47.3	10.7	5.8	45	83
14	7.83	7.45	250	144	208	50	42	94	75.4	39.3	15.1	11.2	50	84
15	8.13	7.38	250	134	212	48	38	86	81.8	41.7	11.2	7.3	44	81
16	8.16	7.43	252	156	212	48	40	108	78.6	44.1	13.6	11.2	44	79
17	8.05	7.36	256	140	206	52	50	88	82.6	45.7	9.2	8.7	43	78
18	8.07	7.42	248	132	206	42	42	90	80.2	40.1	11.7	7.8	41	80
19	8.13	7.45	252	134	212	44	40	90	80.2	47.3	12.6	3.9	43	76
20	8.21	7.53	248	142	214	46	34	96	78.6	43.3	12.3	8.3	42	79
21	8.15	7.35	250	134	220	54	30	80	82.6	41.7	10.7	7.3	42	79
22	8.31	7.42	252	132	216	44	36	88	76.2	36.9	15.1	9.7	44	80
23	8.33	7.35	252	136	214	36	38	100	81.8	40.1	11.7	8.7	43	84
24	8.28	7.34	246	136	206	34	40	102	79.4	39.3	11.7	9.2	43	83
25	8.24	7.52	248	149	208	47	40	102	76.2	38.5	14.1	8.7	43	81
26	8.15	7.43	254	153	212	51	42	102	85.0	47.3	10.2	7.3	43	89
27	8.14	7.40	258	146	216	48	42	98	77.0	48.9	16.0	5.8	45	88
28	8.19	7.42	248	162	210	58	38	104	79.4	61.7	12.2	1.9	45	96
29	8.03	7.32	242	152	206	50	36	102	79.4	54.5	10.7	3.9	47	100
30	7.97	7.37	240	158	206	60	34	98	70.5	58.5	15.6	2.9	51	98
31	7.91	7.37	248	156	212	52	36	104	75.4	55.3	14.6	4.4	51	99

Avg.	8.17	7.45	251	147	210	50	41	97	80.4	48.2	12.1	6.4	44	85
Max.	8.40	7.68	264	162	220	62	56	108	89.8	61.7	16.0	11.2	51	100
Min.	7.83	7.32	232	132	190	34	30	80	67.3	36.9	8.3	1.9	41	76

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	4884	12	0	1	0	2870	< 2	0.44	22.5				
2	1	3448	12	0	1	0	2020	< 2	0.44	22.3				
3	1	3654	12	0	1	0	2390	< 2	0.45	22.1				
4	1	4611	12	0	1	0	1830	< 2	0.44	23.5				
5	1	5172	12	0	1	0	1830	< 2	0.45	22.5				
6	1	3873	12	0	1	0	1890	< 2	0.45	22.8				
7	1	5794	12	0	1	0	1460	< 2	0.43	23.5				
8	1	3654	12	0	1	0	1950	< 2	0.41	22.0				
9	1	6867	12	0	1	0	2990	< 2	0.43	22.5				
10	1	4106	12	0	1	0	1830	< 2	0.41	23.3				
11	1	3654	12	0	1	0	2090	< 2	0.43	23.5				
12	1	3654	12	0	1	0	1510	< 2	0.42	22.9				
13	1	4884	12	0	1	0	1510	< 2	0.41	24.8				
14	1	11191	12	0	1	0	7380	< 2	0.40	23.3				
15	1	8164	12	0	1	0	3390	< 2	0.40	23.1				
16	1	6867	12	0	1	0	2020	< 2	0.40	25.9				
17	1	3873	12	0	1	0	1460	< 2	0.41	23.8				
18	1	3873	12	0	1	0	5550	< 2	0.39	24.4				
19	1	5794	12	0	1	0	3390	< 2	0.39	24.4				
20	1	6867	12	0	1	0	2870	< 2	0.39	24.4				
21	1	8664	12	0	1	0	2870	< 2	0.39	24.5				
22	1	4884	12	0	1	0	2870	< 2	0.39	25.1				
23	1	6480	12	0	1	0	3550	< 2	0.40	24.9				
24	1	6480	12	0	1	0	3390	< 2	0.40	25.1				
25	1	7270	12	0	1	0	4440	< 2	0.42	25.2				
26	1	8164	12	0	1	0	4140	< 2	0.44	25.1				
27	1	7270	12	0	1	0	2230	< 2	0.43	26.0				
28	1	5172	12	0	1	0	2660	< 2	0.47	27.6				
29	1	6867	12	0	1	0	6230	< 2	0.45	27.2				
30	1	17329	12	0	1	0	3240	< 2	0.48	26.2				
31	1	19863	12	0	1	0	4700	< 2	0.46	25.5				
Avg.									0.42	24.2				
Max.		19863					7380	< 2	0.48	27.6				
Min.									0.39	22.0				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.5	1.0	1.1	0.3	0.2	0.2	0.6	1.3	0.7	1.4	10
2											0
3											0
4											0
5											0
6											0
7	0.1	1.1	1.0	0.2	1.9	0.2	0.5	1.0	1.3	4.0	10
8	1.1	0.3	1.2	0.1	0.8	0.3			0.5	1.2	8
9	0.1	0.7	1.2	0.2	0.1	0.2	0.4	1.1	0.2	1.3	10
10											0
11											0
12											0
13											0
14	0.9	1.0	1.0	0.1	0.2	0.2	0.5	1.3	0.3	1.2	10
15	0.1	0.9	1.0	0.4	0.6	0.1	0.2	1.3	0.6	1.2	10
16											0
17											0
18											0
19											0
20											0
21											0
22	0.5	0.5	0.9	0.2	0.1	0.1	0.3	1.0	0.6	1.6	10
23	0.6	0.7	0.9	0.2	0.1	0.1	0.1	1.2	0.1	1.3	10
24											0
25											0
26											0
27											0
28	0.6	0.9	1.0	0.3	0.3	0.1	0.5	1.0	0.9	1.0	10
29											0
30	0.6	0.7	0.8	0.1	0.1	0.5	0.3	1.7	0.1	1.2	10
31				0.2	0.4	0.2					3

Distribution Sample Summary	
Total # of routine distribution samples analyzed	101
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	1
Percent of routine distribution samples positive	1%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.67

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.9	1.3	1.4	0.6	0.4	0.4	0.9	1.7	1.0	1.7	10
2											0
3											0
4											0
5											0
6											0
7	0.1	1.4	1.2	0.3	2.2	0.4	0.8	1.3	1.6	4.0	10
8	1.4	0.6	1.6	0.4	1.0	0.5			0.8	1.5	8
9	0.2	1.0	1.5	0.4	0.2	0.5	0.6	1.4	0.4	1.6	10
10											0
11											0
12											0
13											0
14											0
15	1.3	1.3	1.3	0.3	0.4	0.4	0.8	1.7	0.5	1.5	10
16	0.2	1.2	1.3	0.7	0.9	0.2	0.5	1.5	0.9	1.5	10
17											0
18											0
19											0
20											0
21											0
22	0.8	0.8	1.3	0.5	0.3	0.2	0.5	1.4	0.9	2.0	10
23	0.9	1.1	1.2	0.5	0.4	0.3	0.3	1.5	0.1	1.6	10
24											0
25											0
26											0
27											0
28	0.8	1.3	1.3	0.5	0.5	0.2	0.8	1.4	1.3	1.3	10
29											0
30	1.0	1.2	1.3	0.3	0.3	0.2	0.6	2.3	0.3	1.5	10
31				0.4	0.6	0.4					3

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.9

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent
7/30/2015	University Market	7/31/2015	University Market	.4 / .6	Absent
		7/31/2015	Consumer Services	.2 / .4	Absent
		7/31/2015	Rube's Bar	.2 / .4	Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	June 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Signature of Operator-in-Charge	Genesee
	County

DEQ
RESOURCE MANAGEMENT DIVISION
JUL 14 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	18.5	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	90	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.0%	Percent of Treated Water

Chemical Data

Chlorine on hand:	12,000	lb.	Est. supply:	13	days
Primary Coagulant (Ferric Chloride) on hand:	220,000	lb.	Est. supply:	13	days
Lime (CaO) on hand:	259	tons	Est. supply:	32	days
Fluoride on Hand:	18,000	lb.	Est. supply:	45	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	211	211
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application — City of Flint Water Treatment Plant — June 2015 — Page 2

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	17.3	2.2	19.7	148.3	4.2	0.66	7	2.3	4.4	1.29	1.35
2	16.5	2.5	20.7	176.0	4.4	0.60	8	6.6	22.8	1.11	2.50
3	16.9	2.4	20.1	155.0	4.3	0.68	7	4.3	20.6	1.13	3.53
4	16.5	2.4	20.8	162.2	4.4	0.58	7	3.4	15.0	0.96	3.24
5	17.5	2.9	20.2	168.8	3.6	0.56	7	1.5	2.4	1.01	2.57
6	18.1	3.5	20.2	157.9	3.6	0.53	8	2.9	8.2	0.88	4.26
7	17.9	3.5	17.8	137.8	3.6	0.58	8	3.3	10.2	0.88	3.15
8	17.0	3.8	18.2	145.0	4.2	0.68	8	6.4	24.9	1.44	2.26
9	17.7	3.0	20.4	178.1	4.4	0.68	7	2.1	7.3	1.36	2.98
10	17.6	3.2	20.4	176.1	4.4	0.69	7	2.5	6.9	1.38	5.40
11	18.0	3.8	20.2	173.1	4.3	0.57	7	5.4	12.3	1.20	3.84
12	18.3	3.6	19.7	168.3	4.0	0.56	7	3.6	7.1	1.34	3.51
13	17.8	3.5	20.2	164.3	4.1	0.60	8	8.5	13.9	1.55	2.88
14	18.3	3.5	20.1	182.3	4.0	0.63	8	6.7	19.6	2.50	2.89
15	16.7	3.5	22.5	206.7	4.4	0.78	7	4.8	18.3	2.50	2.16
16	16.1	3.4	19.8	184.1	3.8	0.82	7	8.1	16.9	2.46	4.04
17	16.2	3.6	21.5	183.5	4.5	0.86	7	8.7	31.5	1.88	4.22
18	15.6	3.6	25.7	219.3	4.9	0.85	7	7.8	22.7	2.75	2.04
19	15.1	3.6	16.2	203.6	5.0	0.87	7	4.9	12.5	1.88	3.7
20	15.4	3.6	15.5	194.9	4.8	0.90	8	11.0	30.4	1.11	2.46
21	14.8	3.8	17.2	223.1	5.0	0.83	7	4.1	15.8	0.93	2.71
22	12.0	3.5	19.5	238.7	5.2	0.93	7	11.0	65.7	1.27	7.41
23	11.6	3.8	22.5	223.9	5.3	0.94	7	12.5	56.3	2.06	7.06
24	12.6	3.8	20.7	177.2	4.7	0.83	7	21.0	103.0	2.67	2.39
25	13.2	3.7	18.7	191.5	5.0	0.73	7	11.7	49.7	2.33	3.89
26	13.5	3.3	19.9	143.1	5.1	0.71	7	4.1	11.4	3.94	5.27
27	13.8	3.7	20.6	123.6	5.0	0.68	7	11.6	63.9	4.51	1.33
28	14.2	3.7	19.8	125.6	4.6	0.68	7	2.0	3.6	5.62	2.24
29	13.9	3.7	17.5	115.2	4.7	0.73	7	3.0	4.4	5.19	2.12
30	14.4	4.3	15.8	122.1	5.2	0.69	7	11.1	21.7	4.84	1.32

Avg.	16.8	3.4	19.7	172.3	4.5	0.71	7	6.5			3.29
Max.	18.3	4.3	25.7	238.7	5.3	0.04	8	21.0	103	5.62	7.41
Min.	11.6	2.2	15.5	115.2	3.6	0.53	7	1.5			1.32
Total	474.9										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	7	0.10	0.13	6	0	0	7	0.09	0.09	6	0	0	0.09
2	8	0.07	0.09	6	0	0	8	0.07	0.08	6	0	0	0.07
3	7	0.09	0.11	6	0	0	7	0.08	0.12	6	0	0	0.09
4	6	0.09	0.11	6	0	0	6	0.08	0.09	6	0	0	0.09
5	7	0.09	0.10	6	0	0	7	0.08	0.09	6	0	0	0.09
6	8	0.08	0.10	6	0	0	8	0.07	0.08	6	0	0	0.08
7	7	0.07	0.08	6	0	0	7	0.07	0.10	6	0	0	0.09
8	8	0.09	0.13	6	0	0	8	0.06	0.08	6	0	0	0.08
9	6	0.09	0.15	6	0	0	7	0.08	0.09	6	0	0	0.07
10	7	0.13	0.23	6	0	0	7	0.07	0.11	6	0	0	0.09
11	7	0.08	0.14	6	0	0	7	0.07	0.10	6	0	0	0.12
12	7	0.08	0.10	6	0	0	7	0.08	0.09	6	0	0	0.08
13	7	0.08	0.11	6	0	0	7	0.08	0.10	6	0	0	0.09
14	8	0.09	0.16	6	0	0	8	0.08	0.10	6	0	0	0.09
15	7	0.08	0.09	6	0	0	7	0.07	0.08	6	0	0	0.08
16	7	0.07	0.11	6	0	0	7	0.08	0.13	6	0	0	0.08
17	7	0.07	0.10	6	0	0	7	0.06	0.07	6	0	0	0.07
18	6	0.08	0.10	6	0	0	6	0.08	0.09	6	0	0	0.07
19	6	0.07	0.08	5	0	0	6	0.06	0.07	5	0	0	0.09
20	8	0.08	0.09	6	0	0	8	0.08	0.11	6	0	0	0.09
21	7	0.09	0.10	6	0	0	7	0.09	0.11	6	0	0	0.10
22	7	0.07	0.09	6	0	0	7	0.08	0.11	8	0	0	0.09
23	7	0.07	0.10	6	0	0	7	0.06	0.08	6	0	0	0.08
24	7	0.09	0.11	6	0	0	7	0.08	0.12	6	0	0	0.08
25	7	0.09	0.10	6	0	0	7	0.08	0.09	6	0	0	0.09
26	6	0.11	0.15	5	0	0	6	0.08	0.10	5	0	0	0.09
27	7	0.10	0.14	6	0	0	7	0.09	0.12	6	0	0	0.10
28	7	0.13	0.17	6	0	0	7	0.09	0.11	6	0	0	0.12
29	7	0.10	0.12	6	0	0	7	0.09	0.10	6	0	0	0.10
30	7	0.12	0.15	6	0	0	7	0.10	0.13	6	0	0	0.09
Avg.	7	0.09	0.12	6	0	0	7	0.08	0.10	6	0	0	
Max.	8	0.13	0.23	6	0	0	8	0.10	0.13	6	0	0	0.12
Min.	6	0.07	0.08	5	0	0	6	0.06	0.07	5	0	0	

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.6	0.20	0.73		2.8	2.6	5.4	0.4	0.7	1.6	1.9	1.4	1.8
2	0.6	0.19	0.81		2.7	2.3	5.0	0.5	0.8	1.7	2.0	1.7	1.9
3	0.6	0.20	0.79		2.7	2.5	5.2	0.4	0.5	1.7	2.0	1.7	2.0
4	0.6	0.20	0.82	0.76	2.8	2.1	4.9	0.5	0.7	1.8	2.0	1.7	1.9
5	0.6	0.20	0.82		2.6	2.2	4.8	0.6	0.8	1.9	2.2	1.4	1.7
6	0.6	0.20	0.74		2.5	2.2	4.7	0.4	0.6	1.9	2.2	1.8	2.1
7	0.6	0.20	0.76		2.1	2.1	4.2	0.3	0.6	1.8	2.1	1.7	1.9
8	0.6	0.19	0.78		2.2	2.3	4.5	0.4	0.5	1.9	2.1	1.8	2.1
9	0.6	0.20	0.70		2.7	2.7	5.4	0.5	0.7	1.6	1.8	1.6	1.8
10	0.6	0.20	0.74	0.70	2.6	2.6	5.2	0.4	0.5	1.9	2.1	1.5	1.8
11	0.6	0.20	0.75		2.6	2.7	5.3	0.3	0.5	1.5	1.7	1.5	1.7
12	0.6	0.20	0.72		2.6	2.6	5.2	0.5	0.8	1.7	2.1	1.6	1.9
13	0.6	0.20	0.70		2.7	2.4	5.1	0.3	0.5	1.7	2.0	1.7	2.0
14	0.6	0.19	0.69		2.8	2.7	5.5	0.3	0.4	1.7	1.9	1.7	1.9
15	0.6	0.20	0.72		2.9	2.8	5.7	0.3	0.5	1.8	2.1	1.7	1.9
16	0.6	0.20	0.80		2.5	2.2	4.7	0.3	0.5	1.8	2.0	1.8	2.0
17	0.5	0.19	0.70		2.9	2.3	5.2	0.5	0.7	1.8	2.0	1.7	2.0
18	0.5	0.20	0.70	0.72	2.8	2.8	5.6	0.4	0.5	1.9	2.3	1.9	2.3
19	0.6	0.20	0.74		2.6	2.5	5.1	0.5	0.7	1.8	2.2	0.7	0.9
20	0.5	0.19	0.71		3.0	2.6	5.6	0.3	0.5	1.7	1.9	1.7	1.9
21	0.6	0.19	0.72		3.1	2.9	6.0	0.3	0.5	1.8	2.1	1.7	2.0
22	0.6	0.19	0.70		3.4	2.6	6.0	0.4	0.7	1.9	2.2	0.7	0.9
23	0.6	0.19	0.81		3.6	2.9	6.5	0.4	0.7	1.7	1.9	1.7	1.9
24	0.6	0.20	0.82		3.4	2.6	6.0	0.5	0.7	1.7	2.0	1.5	1.8
25	0.6	0.19	0.73		3.3	2.5	5.8	0.3	0.5	1.5	1.7	0.5	0.8
26	0.6	0.19	0.72		3.2	3.5	6.7	0.6	0.8	2.5	2.8	2.0	2.2
27	0.5	0.18	0.71		3.1	3.2	6.3	0.5	0.7	2.7	3.0	0.6	0.9
28	0.5	0.18	0.65		3.2	3.6	6.8	0.3	0.5	1.8	2.1	1.7	2.0
29	0.5	0.19	0.70		3.3	3.2	6.5	0.4	0.7	2.4	2.8	2.3	2.6
30	0.5	0.19	0.71		3.2	3.5	6.7	0.3	0.6	1.8	2.1	1.8	2.1

Avg.	0.58	0.19	0.74	0.73	2.9	2.7	5.5	0.4	0.6	1.8	2.1	1.6	1.8
Max.	0.60	0.20	0.82	0.76	3.6	3.6	6.8	0.6	0.8	2.7	3.0	2.3	2.6
Min.	0.50	0.18	0.65	0.70	2.1	2.1	4.2	0.3	0.4	1.5	1.7	0.5	0.8

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.18	7.64	272	180	226	76	46	104	86.6	63.3	13.6	5.3	48	88
2	7.97	7.56	271	177	216	61	55	116	93.0	60.9	10.2	7.8	46	92
3	7.97	7.60	274	178	222	74	52	104	82.6	61.7	16.5	5.8	49	90
4	7.89	7.70	274	160	222	54	52	106	84.2	57.7	15.6	3.9	47	93
5	7.88	7.55	274	190	222	76	52	114	81.0	64.1	17.5	7.3	49	94
6	7.89	7.69	277	176	221	66	56	110	94.6	60.9	10.2	5.8	44	89
7	7.96	7.75	275	185	224	72	51	113	93.8	64.9	9.7	6.3	48	92
8	7.90	7.67	280	185	224	73	56	112	96.2	68.9	9.7	4.4	46	92
9	7.94	7.67	272	164	224	54	48	110	76.2	56.9	19.9	5.3	50	95
10	7.94	7.60	278	148	226	40	52	108	78.6	52.1	19.4	4.4	50	94
11	7.94	7.55	276	172	228	66	48	106	80.2	63.3	18.5	3.4	49	94
12	8.11	7.75	278	190	228	86	50	104	82.6	68.1	17.5	4.9	49	93
13	8.01	7.75	278	197	225	89	53	108	97.8	75.4	8.7	2.9	46	92
14	7.88	7.67	277	196	225	89	52	107	93.0	68.9	11.2	6.3	48	89
15	7.99	7.76	276	206	226	94	50	112	94.6	74.5	9.7	4.9	48	95
16	8.02	7.65	272	194	224	76	48	118	92.2	68.1	12.6	5.3	46	100
17	7.95	7.72	284	202	224	90	40	112	91.4	77.0	8.7	2.4	48	93
18	7.90	7.58	270	174	222	62	48	112	80.2	59.3	17.9	6.3	49	96
19	7.92	7.49	276	182	226	72	50	110	80.2	67.3	18.5	3.4	48	97
20	7.96	7.71	279	193	229	101	50	92	94.6	71.3	11.7	2.9	46	62
21	7.92	7.51	280	173	228	75	52	98	92.2	67.3	12.6	2.9	47	84
22	8.03	7.57	274	176	236	74	38	102	94.6	64.9	9.2	3.4	45	86
23	7.98	7.40	274	210	236	112	38	98	89.0	82.6	12.6	0.9	48	93
24	7.98	7.43	278	214	236	128	42	86	81.8	72.1	17.9	8.3	50	97
25	7.97	7.48	274	194	226	94	48	100	83.4	74.5	15.4	1.9	48	91
26	7.90	7.55	278	200	228	100	50	100	79.4	75.4	21.9	2.9	48	93
27	7.96	7.56	282	186	238	78	44	108	92.2	76.2	12.6	2.9	46	89
28	7.97	7.56	276	164	230	62	46	102	85.0	56.9	15.6	5.3	46	89
29	7.97	7.70	276	167	228	59	48	108	86.6	57.7	14.6	7.3	45	89
30	8.32	7.56	258	160	212	60	46	100	83.4	44.9	12.2	11.7	47	86
Avg.	7.97	7.61	275	183	226	77	49	106	87.4	65.9	14.1	4.9	47	92
Max.	8.32	7.76	282	214	238	128	56	118	97.8	82.6	21.9	11.7	50	100
Min.	7.88	7.40	258	148	212	40	36	86	76.2	44.9	8.7	0.9	44	82

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	2098	12	0	1	0	970	< 2	0.50	18.8				
2	1	295	12	0	1	0	280	< 2	0.50	18.5				
3	1	171	12	0	1	0	230	< 2	0.50	18.8				
4	1	262	12	0	1	0	230	< 2	0.47	18.8				
5	1	768	12	0	1	0	450	< 2	0.51	19.1				
6	1	262	12	0	1	0	300	< 2	0.48	18.7				
7	1	134	12	0	1	0	480	< 2	0.50	18.7				
8	1	98	12	0	1	0	350	< 2	0.50	19.4				
9	1	1733	12	0	1	0	623	< 2	0.47	19.5				
10	1	195	12	0	1	0	280	< 2	0.45	19.9				
11	1	175	12	0	1	0	230	< 2	0.49	20.0				
12	1	546	12	0	1	0	770	< 2	0.52	21.5				
13	1	426	12	0	1	0	260	< 2	0.54	20.5				
14	1	5172	12	0	1	0	800	2	0.52	20.3				
15	1	733	12	0	1	0	260	< 2	0.54	20.5				
16	1	512	12	0	1	0	260	< 2	0.52	21.0				
17	1	404	12	0	1	0	300	< 2	0.54	22.2				
18	1	228	12	0	1	0	1120	< 2	0.50	20.5				
19	1	2247	10	0	1	0	4400	< 2	0.52	21.2				
20	1	326	12	0	1	0	> 738	< 2	0.51	20.9				
21	1	265	12	0	1	0	2160	< 2	0.50	20.6				
22	1	683	12	0	1	0	1770	< 2	0.50	20.9				
23	1	2098	12	0	1	0	1660	< 2	0.56	20.9				
24	1	960	12	0	1	0	1120	< 2	0.60	20.8				
25	1	456	12	0	1	0	1120	< 2	0.54	21.1				
26	1	1246	10	0	1	0	3550	< 2	0.53	20.9				
27	1	395	12	0	1	0	450	< 2	0.49	20.3				
28	1	495	12	0	1	0	450	< 2	0.47	20.5				
29	1	428	12	0	1	0	450	< 2	0.46	20.8				
30	1	4884	12	0	1	0	2760	< 2	0.48	21.9				

Avg.									0.51	20.3				
Max.		5172					4400	< 2	0.60	22.2				
Min.									0.45	18.5				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	0.1	1.0	1.2	0.7	0.3	0.2	0.5	1.0	1.0	1.0	10
4	0.7	0.7	1.0	0.1	0.3	0.4	0.5	1.1	0.1	1.2	10
5											0
6											0
7											0
8											0
9	0.7	0.5	1.0	0.7	0.3	0.3	0.6	1.1	0.2	1.1	10
10	0.1	1.0	1.0	0.7	0.2	0.2	0.4	1.0	0.1	0.8	10
11	0.2	0.7	0.7	0.5	0.2	0.1	0.4	0.9	0.8	0.1	10
12											0
13											0
14											0
15											0
16											0
17	0.1	0.7	1.1	0.8	0.3	0.1	0.2	1.1	0.5	1.2	10
18	0.6	0.9	1.1	0.7	0.2	0.2	0.3	1.0	1.0	1.2	10
19											0
20											0
21											0
22											0
23	0.4	0.7	0.7	0.4	0.3				0.1	0.5	7
24	0.5	0.8	0.8	0.4	0.2	0.2	0.3	0.9	0.1	1.3	10
25						0.3	0.5	0.9	0.5		4
26											0
27											0
28											0
29											0
30	0.7	0.8	1.0	0.5	0.3	0.3	0.7	1.3	0.5	0.9	10

Distribution Sample Summary	
Total # of routine distribution samples analyzed	101
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	1
Percent of routine distribution samples positive	1%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.60

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	0.3	1.2	1.5	1.0	0.5	0.4	0.8	1.2	1.2	1.2	10
4	1.0	1.0	1.3	0.2	0.5	0.5	0.8	1.3	0.2	1.5	10
5											0
6											0
7											0
8											0
9	1.0	0.8	1.3	1.0	0.4	0.5	0.9	1.3	0.3	1.4	10
10	0.1	1.3	1.3	1.0	0.5	0.4	0.6	1.2	0.2	1.0	10
11	0.3	1.0	1.0	0.8	0.4	0.2	0.7	1.1	1.0	0.2	10
12											0
13											0
14											0
15											0
16											0
17	0.2	1.1	1.3	1.1	0.6	0.4	0.5	1.5	0.8	1.5	10
18	0.9	1.2	1.3	1.0	0.5	0.5	0.5	1.4	1.2	1.5	10
19											0
20											0
21											0
22											0
23	0.6	1.0	1.0	0.7	0.5				0.1	0.8	7
24	0.7	1.1	1.1	0.6	0.4	0.4	0.5	1.2	0.2	1.5	10
25						0.4	0.7	1.2	0.7		4
26											0
27											0
28											0
29											0
30	1.0	1.2	1.3	0.7	0.5	0.5	1.0	1.6	0.8	1.1	10

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.8

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent
6/24/2015	Cedar Street Reservoir	6/25/2015	Cedar Street Reservoir	0.5 / 0.7	Absent
		6/25/2015	The Print Shop	0.9 / 1.1	Absent
		6/25/2015	Service Garage	0.1 / 0.1	Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow
Operator-in-Charge

May 2015
Month/Year

F-1R, F-2
Certification of Operator-in-Charge

F-1
Water Plant Classification

Signature of Operator-in-Charge

Genesee
County

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 17 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	20.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	69	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	3.1	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.6%	Percent of Treated Water

Chemical Data

Chlorine on hand:	24,000	lb.	Est. supply:	33	days
Primary Coagulant (Ferric Chloride) on hand:	126,000	lb.	Est. supply:	7	days
Lime (CaO) on hand:	289	tons	Est. supply:	24	days
Fluoride on Hand:	15,000	lb.	Est. supply:	40	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	229	229
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	16.6	2.1	18.7	162.7	4.9	0.73	8	3.8	8.2	1.31	1.72
2	16.6	2.0	17.8	162.2	4.8	0.80	8	3.3	8.6	1.28	1.80
3	16.6	2.2	17.6	156.1	4.0	0.80	7	4.4	12.4	1.07	1.59
4	16.6	2.1	17.6	170.2	4.5	0.80	8	3.7	8.6	1.40	1.43
5	17.0	2.0	17.7	163.9	4.4	0.83	7	2.6	4.4	1.41	1.54
6	17.1	2.2	17.6	144.2	4.3	0.72	7	3.6	10.5	1.38	1.59
7	17.3	2.2	19.6	148.4	4.3	0.64	7	3.4	11.4	1.65	1.14
8	17.6	2.2	17.8	186.8	4.5	0.79	7	2.7	3.6	1.33	1.75
9	16.9	1.8	19.9	200.9	5.2	0.88	8	3.4	8.3	1.46	3.25
10	16.3	2.5	20.8	183.6	6.0	0.94	7	6.3	16.8	1.23	1.88
11	16.4	2.6	20.8	183.5	6.3	0.91	7	8.9	23.5	1.04	2.50
12	16.6	2.7	20.6	175.0	6.4	0.97	7	4.0	5.6	0.93	3.31
13	16.6	2.8	20.4	166.0	5.4	0.87	7	3.7	6.4	1.00	1.83
14	16.8	2.6	20.5	166.8	5.4	0.88	7	3.6	6.9	1.17	2.55
15	17.3	2.2	19.6	176.0	5.4	0.82	7	3.3	7.8	1.45	2.32
16	16.9	2.4	20.2	173.9	5.5	0.85	7	3.5	8.7	1.44	1.36
17	16.7	2.5	20.5	175.4	5.7	0.94	7	3.0	6.4	1.33	1.45
18	16.7	2.3	20.5	188.7	5.8	0.94	7	4.8	19.6	1.17	2.10
19	16.8	2.4	20.3	179.2	5.8	0.91	8	5.4	16.3	1.08	2.3
20	16.5	2.2	21.1	152.5	5.3	0.88	7	3.7	13.4	0.91	4.18
21	16.5	2.2	20.9	168.6	4.7	0.78	8	3.0	10.5	0.76	2.84
22	16.7	1.9	20.6	169.4	4.7	0.71	7	2.1	3.5	0.74	2.40
23	16.7	2.5	20.8	175.2	4.7	0.80	8	4.1	14.4	1.00	2.00
24	16.6	2.4	20.9	173.5	4.8	0.78	7	3.2	6.7	1.06	2.46
25	16.7	2.3	19.2	170.3	4.7	0.76	8	3.0	7.6	1.11	2.72
26	16.7	2.5	20.5	177.9	4.3	0.74	7	2.0	4.7	1.12	1.54
27	16.3	2.3	18.9	167.8	4.0	0.68	7	2.6	4.8	1.00	2.94
28	20.0	2.2	17.1	152.9	3.6	0.59	8	9.4	28.1	1.23	3.62
29	19.7	2.3	17.4	154.6	3.6	0.64	7	3.2	6.4	1.06	2.92
30	17.3	2.1	19.9	181.4	4.1	0.73	8	13.3	39.0	1.06	1.64
31	17.3	2.3	19.7	148.8	4.3	0.71	8	8.7	31.9	0.99	1.55
Avg.	17.0	2.3	19.5	169.6	4.9	0.80	7	4.4			2.20
Max.	20.0	2.8	21.1	200.9	6.4	0.97	8	13.3	39	1.65	4.18
Min.	16.3	1.8	17.1	144.2	3.6	0.59	7	2.0			1.14
Total	528.4										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.07	0.09	6	0	0	8	0.07	0.08	6	0	0	0.07
2	8	0.06	0.09	6	0	0	8	0.06	0.08	6	0	0	0.06
3	8	0.07	0.11	6	0	0	8	0.07	0.08	6	0	0	0.07
4	8	0.08	0.09	6	0	0	8	0.07	0.09	6	0	0	0.07
5	7	0.08	0.09	6	0	0	7	0.07	0.08	6	0	0	0.07
6	7	0.08	0.11	6	0	0	7	0.08	0.12	6	0	0	0.08
7	8	0.09	0.11	6	0	0	6	0.07	0.09	6	0	0	0.07
8	7	0.07	0.08	6	0	0	7	0.08	0.09	6	0	0	0.07
9	8	0.06	0.09	6	0	0	8	0.07	0.08	6	0	0	0.07
10	8	0.06	0.08	6	0	0	8	0.06	0.07	6	0	0	0.06
11	7	0.06	0.06	6	0	0	7	0.06	0.09	6	0	0	0.06
12	7	0.08	0.12	6	0	0	7	0.07	0.09	6	0	0	0.08
13	7	0.07	0.09	6	0	0	7	0.07	0.09	6	0	0	0.06
14	7	0.06	0.08	6	0	0	7	0.07	0.12	6	0	0	0.06
15	8	0.06	0.07	6	0	0	6	0.06	0.11	6	0	0	0.07
16	7	0.07	0.09	6	0	0	7	0.07	0.08	6	0	0	0.07
17	7	0.07	0.09	6	0	0	7	0.06	0.07	6	0	0	0.07
18	4	0.07	0.09	5	0	0	4	0.06	0.07	5	0	0	0.07
19	8	0.07	0.09	5	0	0	8	0.07	0.09	5	0	0	0.08
20	8	0.07	0.08	4	0	0	8	0.07	0.08	4	0	0	0.08
21	7	0.06	0.07	5	0	0	7	0.06	0.07	6	0	0	0.08
22	7	0.07	0.12	6	0	0	7	0.07	0.08	6	0	0	0.07
23	8	0.08	0.16	6	0	0	8	0.07	0.08	6	0	0	0.08
24	8	0.08	0.10	6	0	0	6	0.08	0.11	6	0	0	0.08
25	8	0.07	0.09	6	0	0	8	0.08	0.08	0	0	0	0.07
26	8	0.08	0.10	6	0	0	8	0.06	0.10	6	0	0	0.08
27	8	0.08	0.11	6	0	0	8	0.06	0.09	6	0	0	0.08
28	8	0.09	0.11	6	0	0	8	0.08	0.09	6	0	0	0.11
29	8	0.10	0.18	6	0	0	8	0.08	0.10	6	0	0	0.09
30	7	0.09	0.12	6	0	0	7	0.09	0.13	6	0	0	0.11
31	7	0.08	0.11	6	0	0	7	0.08	0.10	6	0	0	0.10
Avg.	7	0.07	0.10	6	0	0	7	0.07	0.09	6	0	0	
Max.	8	0.10	0.18	6	0	0	8	0.09	0.13	6	0	0	0.11
Min.	4	0.06	0.06	4	0	0	4	0.06	0.07	4	0	0	

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.19	0.69		1.9	2.5	4.4	0.6	0.8	2.0	2.4	1.7	2.0
2	0.6	0.19	0.74		1.4	2.9	4.3	0.2	0.5	1.8	2.0	1.6	1.6
3	0.6	0.20	0.75		1.4	3.1	4.5	0.2	0.4	1.8	2.0	1.8	2.0
4	0.5	0.19	0.74		1.4	3.2	4.6	0.2	0.4	2.1	2.3	2.0	2.3
5	0.5	0.20	0.73		1.4	3.0	4.4	0.3	0.5	2.0	2.2	2.0	2.2
6	0.5	0.21	0.69	0.69	1.2	2.9	4.1	0.4	0.6	1.8	2.1	1.6	1.8
7	0.5	0.19	0.70		1.2	3.1	4.3	0.3	0.5	1.8	2.1	1.7	1.9
8	0.5	0.20	0.69		1.1	3.3	4.4	0.6	0.8	1.7	2.1	1.4	1.7
9	0.6	0.20	0.75		1.1	3.5	4.6	0.5	0.6	1.7	1.9	1.7	1.9
10	0.6	0.18	0.74		1.1	3.2	4.3	0.4	0.7	1.8	2.2	1.3	1.6
11	0.6	0.19	0.78		1.0	3.5	4.5	0.4	0.6	1.5	1.8	1.1	1.4
12	0.6	0.19	0.79		0.7	3.9	4.6	0.4	0.5	1.7	2.1	1.6	2.0
13	0.6	0.19	0.79	0.74	0.7	4.1	4.8	0.4	0.6	2.1	2.4	1.8	2.0
14	0.6	0.20	0.79		0.7	3.4	4.1	0.3	0.4	1.9	2.3	1.8	2.2
15	0.6	0.20	0.82		0.7	3.4	4.1	0.4	0.5	1.6	2.0	1.5	1.9
16	0.6	0.20	0.82		0.7	3.4	4.1	0.4	0.6	1.6	2.1	1.7	2.1
17	0.5	0.17	0.76		0.7	3.2	3.9	0.3	0.5	1.5	1.8	1.5	1.8
18	0.6	0.20	0.76		0.7	3.6	4.3	0.3	0.5	1.8	2.1	1.3	1.5
19	0.6	0.18	0.73		0.7	3.5	4.2	0.5	0.6	1.8	2.0	1.7	1.9
20	0.5	0.18	0.75	0.73	0.9	2.4	3.3	0.4	0.5	1.9	2.2	0.6	0.8
21	0.6	0.19	0.78		1.6	3.2	4.8	0.5	0.7	1.9	2.2	1.9	2.1
22	0.5	0.20	0.78		1.6	3.0	4.6	0.2	0.8	2.0	2.4	0.9	1.1
23	0.5	0.19	0.72		1.7	4.0	5.7	0.5	0.6	1.6	1.9	1.6	1.7
24	0.6	0.19	0.76		2.0	2.8	4.8	0.4	0.6	1.6	1.7	1.6	1.8
25	0.6	0.21	0.79		2.0	2.5	4.5	0.5	0.7	1.9	2.2	1.7	2.0
26	0.6	0.20	0.79		2.2	2.9	5.1	0.3	0.5	1.4	1.6	1.4	1.6
27	0.5	0.18	0.74	0.73	2.1	3.2	5.3	0.6	0.9	1.6	1.8	1.5	1.9
28	0.5	0.20	0.70		2.5	3.1	5.6	0.5	0.6	1.9	2.2	1.8	2.2
29	0.5	0.22	0.75		2.7	2.8	5.5	0.6	0.8	1.8	2.2	1.8	2.2
30	0.6	0.18	0.78		2.9	3.2	6.1	0.4	0.5	1.6	1.8	1.6	1.8
31	0.6	0.18	0.77		2.8	2.8	5.6	0.3	0.5	2.2	2.5	2.3	2.5
Avg.	0.56	0.19	0.76	0.72	1.4	3.2	4.6	0.4	0.6	1.8	2.1	1.6	1.9
Max.	0.60	0.22	0.82	0.74	2.9	4.1	6.1	0.6	0.9	2.2	2.5	2.3	2.5
Min.	0.50	0.17	0.68	0.69	0.7	2.4	3.3	0.2	0.4	1.4	1.6	0.6	0.8

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	7.91	7.88	265	163	214	61	51	102	84.2	48.9	14.1	8.3	47	92
2	7.88	7.82	267	163	214	60	53	103	89.8	54.5	10.7	6.3	45	92
3	7.91	7.75	278	178	219	73	59	105	96.2	64.9	8.3	4.9	50	96
4	7.88	7.75	270	171	218	66	52	105	90.6	55.3	10.2	7.8	50	90
5	7.80	7.68	270	168	218	66	52	100	81.0	60.6	16.5	3.3	51	92
6	7.81	7.70	266	161	216	64	50	97	88.2	57.7	11.2	4.1	48	84
7	7.74	7.67	266	172	216	70	50	102	88.2	60.9	11.2	4.9	50	88
8	7.82	7.68	268	164	218	60	50	104	81.8	54.5	15.6	6.8	49	88
9	7.79	7.51	265	168	214	65	51	103	94.6	59.3	8.7	4.9	46	93
10	7.83	7.58	267	172	216	66	51	106	92.2	64.9	8.7	2.4	47	90
11	7.78	7.48	260	170	217	65	43	105	81.8	59.3	15.6	4.4	49	91
12	7.80	7.53	268	162	216	56	52	106	97.0	63.3	6.3	1.0	48	90
13	7.88	7.35	266	174	216	70	50	104	95.4	60.1	6.8	4.4	46	92
14	7.77	7.56	274	158	216	50	58	108	95.4	60.1	8.7	1.9	44	90
15	7.92	7.57	270	167	220	64	50	103	90.6	64.1	10.7	2.4	46	90
16	7.85	7.56	270	185	220	80	50	105	80.2	72.1	17.0	2.4	46	91
17	7.88	7.55	266	163	220	54	46	109	94.6	56.9	7.3	2.4	44	87
18	7.85	7.43	272	156	222	44	50	112	81.8	66.9	16.5	3.4	47	91
19	7.89	7.54	278	175	219	64	59	111	94.6	83.3	10.7	3.0	46	88
20	7.87	7.63	275	176	218	74	57	102	82.6	69.7	17.5	1.9	45	90
21	7.85	7.53	276	159	220	52	56	107	78.6	56.9	18.9	4.9	46	92
22	7.94	7.45	272	148	218	40	54	108	90.6	54.5	11.2	2.9	47	93
23	7.66	7.44	276	168	217	54	59	114	94.6	60.9	9.7	3.9	46	93
24	7.92	7.51	275	175	215	63	60	112	96.2	65.7	8.7	2.4	46	89
25	7.94	7.65	275	170	221	58	54	112	94.6	64.9	9.7	2.9	46	91
26	7.90	7.57	276	177	224	68	52	109	85.8	81.7	15.1	5.3	47	93
27	7.87	7.61	278	161	224	54	54	107	81.0	57.7	18.4	4.4	47	91
28	8.20	7.60	279	175	233	71	46	104	97.0	60.1	8.3	5.8	46	86
29	8.25	7.60	274	164	220	64	54	100	80.2	56.9	18.0	5.3	51	90
30	8.21	7.68	278	192	222	86	56	106	94.6	64.9	10.2	6.8	47	85
31	8.17	7.69	275	182	220	68	55	114	93.0	60.1	11.2	8.3	45	84

Avg.	7.90	7.60	271	169	219	63	53	106	89.3	60.4	12.0	4.3	47	90
Max.	8.25	7.88	279	192	233	86	60	114	97.0	72.1	18.9	8.3	51	96
Min.	7.74	7.35	260	148	214	40	43	97	78.6	48.9	6.3	1.0	44	84

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	70	12	0	1	0	195	< 2	0.46	11.1				
2	1	61	12	0	1	0	239	< 2	0.45	11.9				
3	1	79	12	0	1	0	248	< 2	0.48	12.7				
4	1	80	12	0	1	0	202	< 2	0.46	14.3				
5	1	67	12	0	1	0	202	< 2	0.46	14.3				
6	1	86	12	0	1	0	231	< 2	0.46	13.9				
7	1	88	12	0	1	0	372	< 2	0.48	14.5				
8	1	142	12	1	1	0	392	< 2	0.46	14.4				
9	1	199	12	0	1	0	555	< 2	0.50	15.7				
10	1	138	12	1	1	0	440	< 2	0.47	15.7				
11	1	548	12	0	1	0	299	< 2	0.46	15.9				
12	1	921	12	3	1	0	738	< 2	0.46	15.4				
13	1	253	12	1	1	0	260	< 2	0.50	14.9				
14	1	225	12	6	1	0	738	< 2	0.44	14.7				
15	1	365	12	6	1	0	> 738	< 2	0.48	14.9				
16	1	722	12	4	1	0	> 738	< 2	0.47	15.1				
17	1	225	12	6	1	0	> 738	< 2	0.41	16.6				
18	1	262	12	2	1	0	2400	< 2	0.44	16.5				
19	1	292	12	2	1	0	1940	< 2	0.46	16.4				
20	1	134	12	0	1	0	830	< 2	0.46	16.2				
21	1	165	12	0	1	0	1160	< 2	0.47	15.8				
22	1	328	12	0	1	0	324	< 2	0.44	15.7				
23	1	199	12	0	1	0	150	< 2	0.48	16.7				
24	1	199	12	0	1	0	400	< 2	0.47	17.6				
25	1	272	12	0	1	0	590	< 2	0.46	17.0				
26	1	218	12	0	1	0	510	< 2	0.46	17.8				
27	1	365	12	0	1	0	470	< 2	0.43	18.3				
28	1	980	12	0	1	0	555	< 2	0.47	20.9				
29	1	909	12	0	1	0	1120	< 2	0.47	21.4				
30	1	5794	12	0	1	0	1040	< 2	0.49	22.7				
31	1	4884	12	0	1	0	1000	< 2	0.49	20.1				

Avg.									0.46	16.1				
Max.		5794					2400	< 2	0.50	22.7				
Min.									0.41	11.1				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4											0
5	0.4	1.0	1.2	1.1	0.8	0.4	0.5	1.5	0.3	1.5	10
6	0.3	1.1	1.2	1.0	0.6	0.3	0.4	1.6	0.7	1.3	10
7	0.5	0.8	1.0	0.8	0.5	0.7	0.4	1.5	0.2	1.2	10
8											0
9											0
10											0
11											0
12	0.6	0.7	1.0	0.6	0.1	0.6	0.7	1.3	0.1	1.2	10
13	0.1	0.8	1.0	0.8	0.6	0.4	0.6	1.1	0.7	1.0	10
14	1.5	1.2	1.0	1.0	0.5	0.4	1.0	1.4	0.1	1.3	10
15											0
16											0
17											0
18	1.2	1.0	0.9	0.7	0.4	0.2	0.7	1.1	0.8	1.1	10
19											0
20	1.0	0.9	1.3	1.0	0.2	0.3	0.9	1.3	0.7	0.1	10
21											0
22											0
23											0
24											0
25											0
26	0.3	0.8	1.0	0.8	0.4	0.3	0.6	1.3	0.6	1.0	10
27	0.2	0.6	1.0	0.7	0.3	0.3	0.5	1.2	0.4	0.3	10
28											0
29											0
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.76

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4											0
5	0.6	1.2	1.5	1.4	1.0	0.7	0.7	1.8	0.5	1.9	10
6	0.5	1.4	1.5	1.3	1.0	0.5	0.6	1.8	1.0	1.6	10
7	0.8	1.0	1.3	1.0	0.8	1.0	0.7	1.7	0.4	1.4	10
8											0
9											0
10											0
11											0
12	0.9	1.0	1.3	1.0	0.2	0.7	0.9	1.5	0.2	1.5	10
13	0.3	1.0	1.3	1.0	0.8	0.6	0.8	1.3	1.0	1.3	10
14	1.8	1.5	1.4	1.3	0.7	0.6	1.3	1.7	0.3	1.7	10
15											0
16											0
17											0
18	1.6	1.4	1.3	1.0	0.6	0.4	0.9	1.5	0.9	1.4	10
19											0
20	1.4	1.3	1.7	1.3	0.5	0.5	1.1	1.5	1.1	0.4	10
21											0
22											0
23											0
24											0
25											0
26	0.4	1.0	1.4	1.1	0.7	0.4	0.9	1.6	0.9	1.4	10
27	0.4	1.0	1.2	1.0	0.5	0.4	0.7	1.4	0.5	0.5	10
28											0
29											0
30											0
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	April 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

DEQ RESOURCE MANAGEMENT DIVISION
MAY 18 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	21.1	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	126	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.4	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.0	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.1%	Percent of Treated Water

Chemical Data

Chlorine on hand:	24,000	lb.	Est. supply:	35	days
Primary Coagulant (Ferric Chloride) on hand:	221,000	lb.	Est. supply:	12	days
Lime (CaO) on hand:	383	tons	Est. supply:	31	days
Fluoride on Hand:	13,300	lb.	Est. supply:	36	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	232	232
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application — City of Flint Water Treatment Plant — April 2015 — Page 2

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	18.0	3.1	17.0	108.8	4.4	0.60	8	6.1	7.4	1.10	0.99
2	18.0	2.9	17.5	108.9	4.4	0.70	8	8.6	19.1	1.09	0.95
3	18.1	3.2	16.6	108.3	4.5	0.56	8	5.2	5.9	1.03	0.84
4	17.9	2.3	17.0	77.2	5.1	0.67	8	5.3	6.2	1.18	1.07
5	18.1	2.6	16.9	76.5	5.0	0.62	8	6.7	15.4	1.19	1.11
6	18.1	3.1	18.0	103.8	4.6	0.59	8	3.4	3.8	1.28	0.84
7	18.1	2.8	18.2	113.2	4.6	0.65	8	3.4	3.7	1.73	1.26
8	18.1	2.9	15.0	117.4	4.6	0.67	8	6.0	14.8	1.60	1.11
9	18.2	3.0	15.1	116.1	4.5	0.65	6	3.9	4.2	1.57	0.98
10	18.1	2.0	15.8	109.7	4.5	0.67	8	4.3	6.1	1.60	1.05
11	17.9	2.0	15.5	109.4	4.7	0.71	8	7.9	19.8	1.76	1.03
12	17.8	2.0	15.3	105.9	4.4	0.63	8	6.9	21.4	1.58	1.11
13	17.8	1.9	15.4	117.8	4.6	0.68	8	8.5	30.1	1.51	1.02
14	17.7	3.5	15.3	142.2	4.7	0.62	7	6.2	20.4	1.44	1.27
15	18.5	2.6	11.4	131.2	4.5	0.60	7	5.4	9.6	1.58	1.29
16	20.3	2.1	13.5	119.1	4.1	0.56	7	11.2	17.9	1.92	1.07
17	20.4	2.3	16.7	118.8	4.0	0.55	7	10.7	17.5	2.16	1.09
18	20.0	2.3	15.0	126.0	4.2	0.57	8	12.9	28.9	1.96	1.52
19	19.8	2.1	15.1	140.1	4.2	0.57	8	14.2	27.7	2.02	1.4
20	19.5	2.0	18.2	136.6	4.2	0.60	8	18.4	42.4	2.29	2.70
21	18.8	1.9	19.5	140.0	4.3	0.56	7	13.7	26.7	2.20	1.19
22	19.1	2.3	18.3	132.5	4.2	0.56	7	11.0	26.2	2.24	0.95
23	17.7	2.8	18.8	143.0	4.6	0.61	8	11.3	29.6	1.98	1.36
24	16.1	2.5	18.3	151.6	5.1	0.68	8	8.4	17.7	1.77	0.99
25	18.3	2.1	16.1	148.0	4.9	0.64	8	5.7	12.6	1.70	1.33
26	16.5	2.0	14.3	154.0	4.7	0.58	8	4.2	11.9	1.61	1.57
27	16.5	2.3	15.9	158.6	4.8	0.58	8	4.5	13.8	1.51	1.40
28	16.5	2.0	16.4	158.9	4.8	0.65	8	4.4	13.8	1.62	1.07
29	16.6	2.2	18.3	162.6	4.8	0.65	7	2.5	5.3	1.56	1.25
30	16.7	2.1	18.2	165.3	4.7	0.64	7	2.8	4.8	1.42	1.29
Avg.	18.0	2.4	16.5	126.7	4.6	0.62	8	7.5			1.20
Max.	20.4	3.5	19.5	165.3	5.1	0.71	8	18.4	42.4	2.29	2.70
Min.	16.1	1.9	11.4	76.5	4.0	0.55	7	2.5			0.84
Total	541.2										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point, No.1 (N) North						Confluence Point, No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.09	0.12	6	0	0	8	0.07	0.09	6	0	0	0.10
2	8	0.09	0.12	6	0	0	8	0.07	0.08	6	0	0	0.09
3	8	0.08	0.10	6	0	0	8	0.08	0.11	6	0	0	0.09
4	8	0.08	0.09	6	0	0	8	0.09	0.10	6	0	0	0.08
5	8	0.08	0.10	6	0	0	8	0.07	0.08	6	0	0	0.08
6	8	0.08	0.10	6	0	0	8	0.08	0.10	6	0	0	0.08
7	8	0.10	0.19	6	0	0	8	0.07	0.09	6	0	0	0.07
8	8	0.10	0.15	6	0	0	8	0.07	0.08	6	0	0	0.07
9	8	0.10	0.14	6	0	0	8	0.07	0.08	6	0	0	0.07
10	8	0.10	0.17	8	0	0	8	0.07	0.10	6	0	0	0.07
11	8	0.08	0.10	6	0	0	8	0.07	0.08	6	0	0	0.08
12	8	0.07	0.11	6	0	0	8	0.07	0.11	6	0	0	0.08
13	8	0.07	0.11	6	0	0	7	0.07	0.11	6	0	0	0.07
14	7	0.07	0.09	6	0	0	7	0.07	0.09	6	0	0	0.07
15	7	0.08	0.11	6	0	0	8	0.08	0.10	6	0	0	0.07
16	8	0.09	0.15	6	0	0	7	0.08	0.11	6	0	0	0.07
17	7	0.09	0.13	6	0	0	8	0.08	0.10	6	0	0	0.08
18	8	0.08	0.10	6	0	0	8	0.07	0.08	6	0	0	0.08
19	8	0.09	0.11	6	0	0	8	0.08	0.10	6	0	0	0.08
20	8	0.09	0.14	6	0	0	8	0.09	0.14	6	0	0	0.08
21	7	0.10	0.13	6	0	0	7	0.08	0.09	6	0	0	0.09
22	7	0.10	0.11	0	0	0	7	0.08	0.10	6	0	0	0.10
23	8	0.08	0.10	6	0	0	8	0.07	0.09	6	0	0	0.07
24	8	0.07	0.09	6	0	0	8	0.07	0.10	6	0	0	0.07
25	8	0.08	0.09	6	0	0	8	0.08	0.09	6	0	0	0.07
26	8	0.07	0.09	6	0	0	8	0.07	0.11	6	0	0	0.08
27	8	0.07	0.10	6	0	0	8	0.07	0.09	6	0	0	0.07
28	8	0.07	0.11	6	0	0	8	0.07	0.08	6	0	0	0.08
29	7	0.09	0.14	6	0	0	7	0.07	0.09	6	0	0	0.07
30	7	0.08	0.09	6	0	0	7	0.07	0.08	6	0	0	0.07
Avg.	8	0.08	0.12	6	0	0	8	0.07	0.09	6	0	0	
Max.	8	0.10	0.19	6	0	0	8	0.09	0.14	6	0	0	0.10
Min.	7	0.07	0.09	6	0	0	7	0.07	0.08	6	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.4	0.17	0.62	0.61	2.1	2.6	4.7	0.6	0.9	2.5	3.1	2.0	2.7
2	0.5	0.16	0.68		1.9	2.5	4.4	0.5	0.7	2.5	2.9	2.0	2.2
3	0.5	0.15	0.66		1.9	2.7	4.6	0.6	0.7	2.5	3.1	2.0	2.6
4	0.5	0.16	0.64		1.9	2.7	4.6	0.6	0.8	2.5	3.1	2.1	2.6
5	0.5	0.15	0.65		1.9	2.7	4.6	0.5	0.7	2.5	2.7	2.4	2.7
6	0.5	0.16	0.65		1.9	2.6	4.5	0.5	0.8	2.8	3.1	2.0	2.5
7	0.5	0.15	0.65		1.9	2.7	4.6	0.4	0.5	2.6	3.0	2.3	2.7
8	0.5	0.17	0.68	0.63	1.9	2.8	4.7	0.5	0.9	2.2	2.5	1.8	2.2
9	0.5	0.15	0.64		1.8	2.6	4.4	0.5	0.7	2.2	2.6	2.1	2.4
10	0.5	0.16	0.65		1.9	2.4	4.3	0.5	0.6	2.3	2.7	1.5	1.8
11	0.5	0.16	0.71		1.9	2.4	4.3	0.5	0.6	2.3	2.7	2.2	2.4
12	0.5	0.15	0.71		1.9	2.0	3.9	0.5	0.7	1.7	1.9	1.8	2.0
13	0.5	0.15	0.67		1.9	2.4	4.3	0.2	0.4	1.8	2.0	1.6	1.9
14	0.5	0.17	0.74		2.0	2.3	4.3	0.6	0.8	2.1	2.3	2.1	2.3
15	0.5	0.16	0.68	0.66	1.9	2.1	4.0	0.5	0.7	1.9	2.2	1.7	2.0
16	0.5	0.19	0.67		1.8	2.3	4.1	0.3	0.5	1.9	2.2	1.7	1.8
17	0.5	0.18	0.69		1.9	2.4	4.3	0.6	0.7	2.1	2.4	1.4	1.7
18	0.5	0.18	0.73		2.0	2.3	4.3	0.3	0.4	1.8	2.1	1.9	2.1
19	0.5	0.18	0.74		2.1	2.3	4.4	0.3	0.5	1.8	2.2	1.9	2.3
20	0.5	0.17	0.65		2.2	2.4	4.6	0.4	0.6	1.9	2.2	1.9	2.2
21	0.5	0.19	0.67		2.2	2.5	4.7	0.4	0.6	2.0	2.4	1.9	2.2
22	0.5	0.18	0.67	0.65	2.2	2.3	4.5	0.4	0.6	2.0	2.2	1.9	2.2
23	0.5	0.19	0.72		2.3	2.4	4.7	0.5	0.8	2.1	2.4	2.0	2.4
24	0.5	0.19	0.67		2.2	2.1	4.3	0.8	1.0	2.0	2.4	1.6	1.8
25	0.5	0.19	0.72		2.2	2.3	4.5	0.5	0.7	2.0	2.3	1.9	2.2
26	0.5	0.17	0.65		2.2	2.3	4.5	0.7	0.9	2.1	2.4	2.1	2.3
27	0.5	0.17	0.72		2.1	2.3	4.4	0.6	0.8	2.0	2.2	1.8	2.1
28	0.5	0.18	0.73		2.1	2.4	4.5	0.6	0.8	2.0	2.2	1.9	2.2
29	0.5	0.19	0.72		2.1	2.4	4.5	0.4	0.7	2.0	2.3	2.0	2.3
30	0.5	0.17	0.70	0.65	2.2	2.3	4.5	0.4	0.6	1.9	2.1	1.8	2.0
Avg.	0.50	0.17	0.68	0.64	2.0	2.4	4.4	0.5	0.7	2.1	2.5	1.9	2.2
Max.	0.50	0.19	0.74	0.66	2.3	2.8	4.7	0.8	1.0	2.8	3.1	2.4	2.7
Min.	0.40	0.15	0.62	0.61	1.8	2.0	3.9	0.2	0.4	1.7	1.9	1.4	1.7

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.07	7.73	227	158	176	64	51	94	80.2	55.3	6.8	4.9	32	69
2	8.16	7.76	232	159	183	61	49	98	72.9	49.7	12.2	8.7	32	71
3	8.17	7.73	228	155	182	59	46	96	79.4	56.1	7.8	3.4	32	70
4	8.12	7.81	228	153	180	60	48	93	81.8	55.3	6.3	2.9	33	70
5	7.98	7.89	230	153	179	68	51	85	75.4	48.9	10.2	7.8	34	76
6	8.05	7.98	228	159	183	60	45	99	85.0	56.1	4.4	4.9	31	71
7	8.05	7.54	229	165	186	59	43	106	80.2	54.5	6.8	8.3	33	76
8	7.86	7.81	231	151	188	57	43	94	72.9	45.7	12.6	9.2	33	68
9	7.94	7.78	229	155	185	60	44	95	77.4	56.9	7.8	3.4	33	67
10	8.04	7.86	230	142	184	69	46	73	80.2	51.3	7.8	3.9	33	67
11	7.99	7.79	231	157	188	64	43	93	71.3	49.7	12.6	9.2	33	69
12	8.03	7.82	237	150	189	55	48	95	77.0	44.9	10.2	9.2	36	71
13	8.02	7.83	242	160	197	66	45	94	77.8	46.6	11.2	9.7	33	69
14	7.95	8.00	242	156	198	64	44	92	81.8	48.9	9.2	8.3	38	74
15	7.95	7.99	252	154	196	68	56	86	78.6	50.5	13.6	6.8	39	70
16	8.36	7.88	271	170	217	81	54	89	92.2	53.7	10.2	7.3	41	67
17	8.35	8.00	270	186	220	90	50	96	85.8	60.9	13.6	8.3	41	77
18	8.36	7.99	274	184	219	84	55	100	90.6	57.7	12.2	9.2	40	76
19	8.34	8.02	272	185	223	78	49	107	81.8	55.3	15.6	10.7	38	75
20	8.30	7.98	268	197	224	92	44	105	90.6	68.1	9.7	5.8	38	80
21	8.26	7.63	264	194	220	94	44	100	91.4	69.7	8.7	4.9	42	82
22	8.32	7.88	274	196	216	90	58	106	95.4	72.1	8.7	3.9	44	85
23	8.39	7.69	267	173	221	68	46	105	91.4	58.5	9.2	5.8	45	85
24	8.36	7.78	274	173	220	75	54	98	90.6	62.5	11.7	4.9	44	83
25	8.25	7.65	267	180	216	61	51	119	89.0	80.1	10.7	9.2	41	82
26	8.14	7.79	268	153	214	52	54	101	93.0	49.7	9.2	6.8	43	77
27	8.03	7.99	272	161	213	64	59	97	89.8	50.5	11.2	7.8	44	76
28	7.95	7.72	266	172	215	64	51	108	90.6	57.7	9.7	6.3	44	86
29	8.08	7.87	268	176	216	74	52	102	88.2	58.5	11.7	7.3	46	84
30	7.93	7.83	268	182	208	64	60	118	89.8	60.9	10.7	7.3	45	92

Avg.	8.13	7.83	251	167	202	69	49	98	84.1	55.5	10.1	6.9	38	76
Max.	8.39	8.02	274	197	224	94	60	119	95.4	72.1	15.6	10.7	46	92
Min.	7.93	7.54	227	142	176	52	43	73	71.3	44.9	4.4	2.9	31	67

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	140	12	0	1	0	372	< 2	0.43	8.5				
2	1	127	12	0	1	0	189	< 2	0.43	6.5				
3	1	79	12	0	1	0	276	< 2	0.38	8.2				
4	1	96	12	0	1	0	299	< 2	0.38	7.3				
5	1	61	12	0	1	0	470	< 2	0.39	7.8				
6	1	59	12	0	1	0	276	< 2	0.39	8.2				
7	1	64	12	0	1	0	339	< 2	0.39	8.2				
8	1	54	12	0	1	0	239	< 2	0.38	8.1				
9	1	201	12	0	1	0	161	< 2	0.39	8.2				
10	1	133	12	0	1	0	137	< 2	0.37	9.1				
11	1	261	12	0	1	0	339	< 2	0.37	8.5				
12	1	613	12	0	1	0	202	< 2	0.39	8.1				
13	1	172	12	0	1	0	507	< 2	0.38	8.9				
14	1	124	12	0	1	0	249	< 2	0.39	9.0				
15	1	67	12	0	1	0	555	< 2	0.42	9.9				
16	1	127	12	0	1	0	470	< 2	0.42	13.1				
17	1	108	12	0	1	0	1020	< 2	0.46	11.7				
18	1	80	12	0	1	0	200	< 2	0.45	12.9				
19	1	210	12	0	1	0	507	< 2	0.43	13.4				
20	1	345	12	0	1	0	555	< 2	0.46	14.2				
21	1	162	12	0	1	0	623	< 2	0.48	12.9				
22	1	73	12	0	1	0	105	< 2	0.49	12.9				
23	1	43	12	0	1	0	60	< 2	0.44	9.9				
24	1	52	12	0	1	0	190	< 2	0.48	10.1				
25	1	46	12	0	1	0	266	< 2	0.44	10.3				
26	1	51	12	0	1	0	287	< 2	0.41	10.4				
27	1	44	12	0	1	0	355	< 2	0.40	10.9				
28	1	50	12	0	1	0	146	< 2	0.41	10.9				
29	1	32	12	0	1	0	171	< 2	0.42	11.3				
30	1	113	12	0	1	0	77	< 2	0.47	11.2				

Avg.									0.42	10.0				
Max.		613					1020	< 2	0.49	14.2				
Min.									0.37	6.5				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	2.0	2.0	1.8	1.7	1.3	0.5	1.5	2.5		2.1	9
2	0.8	1.4	2.2	1.6	1.1	0.7	0.9	2.3		2.3	9
3											0
4											0
5											0
6											0
7	1.1	1.8	1.8	2.0	1.1	0.6	1.4	2.0		1.2	9
8	0.7	0.6	1.7	2.1	1.3	0.6	0.7	2.2		1.7	9
9	0.8	2.4	1.8	1.9	1.2	0.5	1.1	2.0		1.9	9
10											0
11											0
12											0
13											0
14	0.5	1.2	1.2	1.2	0.5	0.5	1.0	1.7		1.6	9
15	0.4	0.5	1.2	1.3	0.8	0.4	1.0	1.6		1.0	9
16											0
17											0
18											0
19											0
20											0
21	0.3	0.3	1.1	1.3	1.0	0.3	0.9	1.4	1.9	1.3	10
22	0.3	0.5	1.0	1.1	0.9	0.3	0.2	1.6	0.8	1.5	10
23											0
24											0
25											0
26											0
27									1.1	1.5	2
28											0
29	0.4	0.5	1.3	1.3	0.8	0.5	1.0	1.8	1.0	1.5	10
30	0.4	1.5	1.5	1.4	0.8	0.9	1.2	1.9	0.6	1.5	10
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	105
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.21

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	2.4	2.3	2.2	2.2	1.6	0.9	1.8	2.8		2.3	9
2	1.3	1.6	2.5	1.8	1.3	0.8	1.2	2.6		2.7	9
3											0
4											0
5											0
6											0
7	1.4	2.1	2.1	2.3	1.4	0.8	1.8	2.4		1.5	9
8	1.1	0.9	2.2	2.5	1.5	0.8	0.9	2.4		2.2	9
9	1.0	2.7	2.1	2.2	1.6	0.8	1.4	2.3		2.2	9
10											0
11											0
12											0
13											0
14	0.7	1.5	1.5	1.5	0.8	0.8	1.3	2.0		1.9	9
15	0.7	0.8	1.5	1.6	1.1	0.6	1.3	1.9		1.3	9
16											0
17											0
18											0
19											0
20											0
21	0.6	0.5	1.5	1.6	1.2	0.5	1.2	1.7	2.1	1.6	10
22	0.6	0.8	1.3	1.4	1.1	0.4	0.4	1.9	1.1	1.8	10
23											0
24											0
25											0
26											0
27									1.3	1.9	2
28											0
29	0.6	0.7	1.6	1.6	1.0	0.8	1.3	2.2	1.2	1.8	10
30	0.8	1.8	1.8	1.7	1.1	1.2	1.4	2.1	0.8	1.8	10
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.5

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow
Operator-in-Charge

March 2015
Month/Year

F-1R, F-2
Certification of Operator-in-Charge

F-1
Water Plant Classification

Michael Glasgow
Signature of Operator-in-Charge

Genesee
County

DEQ
RESOURCE MANAGEMENT DIVISION
APR 24 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	25.4	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	96	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.3%	Percent of Treated Water

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	19	days
Primary Coagulant (Ferric Chloride) on hand:	157,700	lb.	Est. supply:	9	days
Lime (CaO) on hand:	348	tons	Est. supply:	29	days
Fluoride on Hand:	23,300	lb.	Est. supply:	48	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	2	4
Number of filter confluence samples collected:	242	242
Percent of filter confluence samples > 0.3 NTU:	0.8%	1.7%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	24.3	4.9	15.0	121.0	3.8	0.40	8	12.4	47.2	5.63	1.69
2	24.3	4.9	14.6	121.0	4.0	0.41	8	4.4	15.6	5.73	1.61
3	24.3	4.9	14.0	132.1	3.8	0.41	8	4.1	13.3	5.42	1.45
4	24.4	4.9	14.1	123.0	3.9	0.41	8	2.5	3.9	5.54	1.32
5	24.6	4.9	13.7	120.0	3.8	0.43	8	3.2	6.1	5.43	1.47
6	24.9	4.9	14.0	120.4	3.8	0.46	8	2.4	3.0	5.95	1.54
7	24.8	4.9	13.9	117.7	3.7	0.43	8	2.4	3.0	5.89	1.57
8	24.7	4.9	14.4	117.5	3.8	0.40	8	4.6	15.3	5.75	1.62
9	24.8	4.0	14.3	119.3	3.7	0.43	8	4.4	7.5	5.52	1.62
10	24.8	4.7	14.1	116.0	3.7	0.44	8	3.0	8.1	5.31	1.66
11	24.9	4.7	13.6	113.1	3.7	0.44	8	8.9	15.4	4.79	1.87
12	25.1	4.6	14.0	119.2	3.7	0.43	8	4.6	5.5	4.79	1.73
13	25.4	4.9	14.0	108.8	3.7	0.39	8	3.5	4.1	4.79	1.52
14	25.4	4.8	13.2	108.9	3.8	0.39	8	4.6	5.7	6.77	1.52
15	25.4	4.9	13.0	106.0	3.8	0.40	8	15.2	38.1	1.91	2.45
16	24.0	5.0	13.4	104.2	4.0	0.44	8	15.0	21.0	2.87	2.21
17	24.0	4.5	14.2	108.5	4.0	0.43	8	12.5	28.5	2.02	1.60
18	21.9	4.5	14.6	135.0	4.5	0.57	8	10.8	16.0	1.48	1.28
19	21.7	4.6	13.2	104.6	2.1	0.46	8	20.5	35.8	1.96	33.9
20	23.6	4.4	14.8	116.9	1.6	0.35	8	11.6	13.5	2.63	4.11
21	24.0	4.5	16.7	38.4	1.8	0.41	8	11.1	12.3	1.96	2.15
22	24.2	3.8	17.3	41.4	1.5	0.41	8	13.4	19.6	1.98	1.97
23	24.6	3.6	17.5	58.1	1.7	0.34	8	11.8	21.6	1.95	1.65
24	23.9	3.8	16.6	62.6	2.2	0.37	8	9.8	10.7	2.20	1.94
25	24.3	3.5	16.8	64.2	2.2	0.37	8	11.7	17.3	1.79	1.45
26	23.8	3.8	16.6	66.7	2.4	0.34	8	8.2	9.8	1.75	1.40
27	23.3	1.5	17.8	69.3	2.9	0.38	8	8.3	10.8	1.50	1.24
28	22.0	3.0	16.4	74.1	2.6	0.47	8	6.9	8.0	1.52	1.28
29	19.6	4.6	16.1	87.3	4.0	0.53	8	11.0	30.7	1.26	1.08
30	18.1	5.0	16.3	99.2	4.4	0.56	8	9.4	13.6	1.19	1.19
31	18.1	3.0	16.8	106.0	4.4	0.58	8	15.0	42.7	1.14	0.95
Avg.	23.7	4.4	15.0	100.0	3.3	0.43	8	8.7			2.71
Max.	25.4	5.0	17.8	135.0	4.5	0.58	8	20.5	47.2	6.77	33.9
Min.	18.1	1.5	13.2	38.4	1.5	0.34	8	2.4			0.95
Total	733.2										

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point, No.1 (N) North						Confluence Point, No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.15	0.18	6	0	0	8	0.11	0.15	6	0	0	0.10
2	8	0.10	0.15	6	0	0	8	0.09	0.14	6	0	0	0.11
3	8	0.11	0.16	6	0	0	8	0.11	0.18	6	0	0	0.11
4	8	0.14	0.20	6	0	0	8	0.12	0.18	6	0	0	0.14
5	8	0.16	0.20	6	0	0	8	0.11	0.17	6	0	0	0.12
6	8	0.11	0.20	6	0	0	8	0.15	0.29	6	0	0	0.16
7	8	0.09	0.13	6	0	0	8	0.07	0.09	6	0	0	0.12
8	8	0.14	0.19	6	0	0	8	0.11	0.18	6	0	0	0.13
9	8	0.12	0.20	6	0	0	8	0.10	0.14	6	0	0	0.13
10	8	0.10	0.13	6	0	0	8	0.13	0.17	6	0	0	0.12
11	8	0.12	0.18	6	0	0	8	0.09	0.11	6	0	0	0.11
12	8	0.12	0.16	6	0	0	8	0.10	0.13	6	0	0	0.11
13	8	0.10	0.12	6	0	0	8	0.12	0.15	6	0	0	0.11
14	8	0.11	0.15	6	0	0	8	0.08	0.09	6	0	0	0.10
15	8	0.12	0.17	6	0	0	8	0.14	0.20	6	0	0	0.14
16	8	0.15	0.17	6	0	0	8	0.14	0.17	6	0	0	0.17
17	8	0.11	0.18	6	0	0	8	0.09	0.12	6	0	0	0.16
18	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	0.08
19	8	0.14	0.22	6	0	0	8	0.14	0.22	6	0	0	0.19
20	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
21	8	0.15	0.16	6	0	0	8	0.15	0.20	6	0	0	0.33
22	8	0.20	0.23	6	0	0	8	0.18	0.20	6	0	0	0.35
23	8	0.19	0.23	6	0	0	8	0.17	0.23	6	0	0	0.37
24	8	0.19	0.20	6	0	0	8	0.16	0.18	6	0	0	0.23
25	8	0.16	0.21	6	0	0	8	0.12	0.15	6	0	0	0.14
26	8	0.17	0.22	6	0	0	8	0.10	0.12	6	0	0	0.15
27	8	0.13	0.16	6	0	0	8	0.14	0.24	6	0	0	0.13
28	8	0.11	0.17	6	0	0	8	0.10	0.12	6	0	0	0.09
29	8	0.09	0.13	6	0	0	8	0.09	0.12	6	0	0	0.07
30	8	0.09	0.12	6	0	0	8	0.08	0.09	6	0	0	0.10
31	8	0.07	0.09	6	0	0	8	0.08	0.12	6	0	0	0.11
Avg.	8	0.13	0.17	6	0	0	8	0.12	0.16	6	0	0	
Max.	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
Min.	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.3	0.24	0.60		2.3	2.5	4.8	0.6	0.7	2.4	2.7	1.9	2.1
2	0.3	0.25	0.62		2.2	2.6	4.8	0.4	0.6	2.5	2.8	2.0	2.4
3	0.3	0.23	0.57	0.55	2.2	2.8	5.0	0.6	0.7	2.5	2.9	2.0	2.5
4	0.3	0.24	0.59		2.3	2.6	4.9	0.5	0.7	2.3	2.9	2.1	2.3
5	0.3	0.22	0.57		2.2	2.5	4.7	0.5	0.7	2.7	3.1	2.3	2.8
6	0.3	0.25	0.58		2.2	2.3	4.5	0.4	0.6	2.5	3.0	1.9	2.5
7	0.3	0.23	0.56		2.2	2.8	5.0	0.4	0.7	2.3	2.7	1.8	2.3
8	0.3	0.23	0.61		2.2	2.8	5.0	0.6	0.8	2.5	2.8	2.5	2.8
9	0.3	0.26	0.64		2.2	2.8	5.0	0.5	0.7	2.5	2.8	2.5	2.8
10	0.3	0.23	0.56		2.7	2.9	5.6	0.4	0.6	2.6	3.2	2.2	2.7
11	0.3	0.23	0.52		2.2	3.0	5.2	0.6	0.8	2.4	2.7	2.2	2.6
12	0.3	0.23	0.53	0.50	2.3	2.9	5.2	0.4	0.6	2.8	3.1	2.3	2.7
13	0.3	0.24	0.54		2.3	2.9	5.2	0.4	0.7	2.6	3.3	2.0	2.5
14	0.3	0.24	0.52		2.3	2.7	5.0	0.6	0.8	3.2	3.5	2.0	2.4
15	0.3	0.21	0.49		2.3	3.4	5.7	1.0	1.4	1.7	2.0	1.8	2.0
16	0.3	0.19	0.52		2.5	4.9	7.4	1.6	1.9	2.0	2.3	2.0	2.2
17	0.3	0.21	0.54		2.4	4.3	6.7	0.6	1.0	2.8	3.1	2.5	3.1
18	0.3	0.21	0.51	0.52	2.3	3.4	5.7	0.3	0.5	3.0	3.5	3.0	3.5
19	0.3	0.20	0.52		2.4	3.2	5.6	0.6	1.1	3.0	3.3	2.5	2.8
20	0.3	0.17	0.55		2.2	3.9	6.1	0.3	1.0	2.9	3.3	1.3	1.6
21	0.3	0.17	0.48		2.5	4.1	6.6	0.6	1.3	2.6	3.3	1.7	2.3
22	0.3	0.14	0.51		2.7	3.7	6.4	0.5	1.4	2.6	2.9	2.5	2.8
23	0.3	0.16	0.55		2.7	3.6	6.3	0.5	1.3	2.6	3.0	2.6	2.9
24	0.4	0.16	0.58		2.9	3.5	6.4	0.3	0.8	2.7	3.2	2.5	2.9
25	0.4	0.17	0.62	0.53	2.8	3.4	6.2	0.3	0.7	2.5	2.9	2.3	3.0
26	0.4	0.15	0.56		2.8	3.3	6.1	0.3	0.5	2.8	3.3	2.4	2.8
27	0.5	0.19	0.64		2.9	3.1	6.0	0.3	0.5	2.5	3.1	2.0	2.6
28	0.5	0.16	0.66		2.9	2.8	5.7	0.6	0.8	3.0	3.5	2.3	3.0
29	0.5	0.14	0.59		2.9	2.8	5.7	0.5	0.7	2.7	3.1	2.5	3.0
30	0.4	0.18	0.68		2.5	2.5	5.0	0.8	1.0	2.6	3.0	2.6	3.0
31	0.5	0.17	0.65		2.1	2.6	4.7	0.5	0.7	2.4	2.7	2.0	2.3
Avg.	0.34	0.20	0.57	0.53	2.4	3.1	5.6	0.5	0.8	2.6	3.0	2.2	2.6
Max.	0.50	0.26	0.66	0.55	2.9	4.9	7.4	1.6	1.9	3.2	3.5	3.0	3.5
Min.	0.30	0.14	0.48	0.50	2.1	2.3	4.5	0.3	0.5	1.7	2.0	1.3	1.6

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.27	8.09	366	229	297	122	69	107	113.0	72.1	20.4	11.2	51	89
2	7.95	8.06	358	243	295	111	63	132	110.6	68.9	20.4	18.5	52	88
3	7.95	7.74	360	234	297	122	63	112	116.2	71.3	16.5	14.1	52	87
4	7.81	7.82	354	243	285	129	69	114	129.1	89.8	8.3	4.4	54	85
5	7.97	7.77	360	235	290	126	70	109	117.0	71.3	16.5	13.6	54	95
6	7.55	7.69	362	239	288	124	74	115	133.1	89.0	7.3	2.9	55	89
7	7.90	7.94	351	234	288	124	63	110	126.7	87.4	18.0	13.6	54	87
8	7.93	8.26	363	235	288	123	75	112	120.2	74.5	15.6	11.7	48	87
9	7.96	7.84	357	237	286	125	71	112	116.2	74.5	16.5	12.2	57	95
10	8.01	8.08	349	233	273	129	76	104	122.6	81.0	10.7	7.3	64	98
11	7.92	8.29	347	233	281	117	66	116	115.4	72.1	13.6	11.2	61	95
12	8.00	7.94	345	233	279	127	66	106	125.0	84.2	8.7	5.3	54	91
13	8.07	7.92	348	235	282	127	66	108	126.7	84.2	7.8	5.3	54	88
14	7.99	8.11	343	226	273	112	70	114	123.4	81.8	8.7	3.9	54	85
15	8.00	8.15	309	210	236	99	73	111	97.0	65.7	17.5	12.6	51	87
16	8.00	7.97	251	176	198	78	53	98	79.4	50.5	15.1	12.2	42	76
17	7.99	7.66	305	191	242	92	63	99	97.8	55.3	14.1	11.7	46	76
18	8.00	7.95	270	203	223	104	47	99	89.0	72.1	12.6	4.4	46	84
19	7.90	9.90	256	151	204	58	52	93	79.4	38.5	15.6	12.2	41	78
20	7.85	7.30	240	240	189	135	51	105	81.8	87.4	8.7	5.3	38	70
21	7.97	7.34	214	210	175	119	39	91	78.6	81.8	5.3	1.5	34	73
22	7.95	7.37	219	211	173	104	46	107	63.3	60.9	15.6	14.1	33	69
23	8.01	7.53	212	187	173	92	39	95	64.9	59.3	12.6	9.7	34	69
24	7.94	7.45	211	170	171	77	40	93	74.5	59.3	6.3	5.3	33	69
25	8.01	7.80	218	173	172	77	46	96	67.3	56.1	11.7	9.2	32	72
26	8.03	7.72	214	171	173	78	41	93	71.3	59.3	9.7	5.3	31	69
27	8.02	7.67	215	168	174	77	41	91	75.4	60.1	6.8	4.4	31	68
28	8.05	7.73	218	169	174	77	44	92	78.6	63.3	5.8	1.5	30	72
29	8.12	7.95	229	177	182	80	47	97	71.3	53.7	12.6	9.7	31	73
30	8.18	7.85	229	171	182	79	47	92	73.7	53.7	11.7	8.7	34	71
31	8.08	7.80	228	168	183	70	45	98	68.9	52.1	13.6	10.7	33	72
Avg.	7.98	7.89	290	208	233	104	57	104	97.0	68.7	12.4	8.8	45	81
Max.	8.27	9.90	366	243	297	135	76	132	133.1	89.8	20.4	18.5	64	98
Min.	7.55	7.30	211	151	171	58	39	91	63.3	38.5	5.3	1.5	30	68

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	155	12	0	1	0	120	< 2	0.60	2.2				
2	1	135	12	0	1	0	146	< 2	0.60	2.8				
3	1	214	12	0	1	0	83	< 2	0.58	1.0				
4	1	84	12	0	1	0	100	< 2	0.61	2.5				
5	1	118	12	0	1	0	120	< 2	0.64	1.2				
6	1	79	12	0	1	0	43	< 2	0.62	1.5				
7	1	162	12	0	1	0	51	< 2	0.60	1.7				
8	1	86	12	0	1	0	100	< 2	0.62	2.6				
9	1	225	12	0	1	0	189	< 2	0.64	2.0				
10	1	205	12	0	1	0	248	< 2	0.64	2.6				
11	1	387	12	0	1	0	339	< 2	0.61	3.2				
12	1	770	12	0	1	0	440	< 2	0.31	3.7				
13	1	442	12	0	1	0	340	< 2	0.43	4.7				
14	1	4196	12	0	1	0	1120	< 2	0.58	5.7				
15	1	48392	12	0	1	0	> 14760	< 2	0.56	5.7				
16	1	> 48392	12	0	1	0	> 14760	< 2	0.43	4.2				
17	1	39726	12	0	1	0	12460	< 2	0.45	2.8				
18	1	24066	12	0	1	0	> 14760	< 2	0.55	3.6				
19	1	> 48392	12	0	1	0	11100	< 2	0.38	6.5				
20	1	34658	12	0	1	0	7100	< 2	0.56	4.8				
21	1	12262	12	0	1	0	9400	< 2	0.49	6.3				
22	1	4764	12	0	1	0	2920	< 2	0.49	4.5				
23	1	1596	12	0	1	0	1940	< 2	0.45	4.1				
24	1	1182	12	0	1	0	960	< 2	0.41	4.0				
25	1	550	12	0	1	0	1060	< 2	0.41	4.5				
26	1	399	12	0	1	0	560	< 2	0.41	5.6				
27	1	195	12	0	1	0	450	< 2	0.40	6.0				
28	1	122	12	0	1	0	400	< 2	0.41	5.9				
29	1	98	12	0	1	0	480	< 2	0.42	4.9				
30	1	201	12	0	1	0	> 738	< 2	0.40	5.9				
31	1	187	12	0	1	0	507	< 2	0.42	5.2				

Avg.									0.51	3.9				
Max.		48392					12460	< 2	0.64	6.5				
Min.									0.31	1.0				

WSSN: 2310

Date	Free Chlorine Residual of Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.5	1.3	1.8	1.4	1.5	0.3	1.1	1.8		2.6	9
4	1.5	1.3	1.9	1.5	1.5	0.4	1.7	2.1		1.3	9
5	1.0	0.9	1.7	0.9	1.5	0.4	1.0	2.1		1.3	9
6											0
7											0
8											0
9											0
10	1.8	1.2	1.5	1.2	1.4	0.4	1.4	1.9		2.1	9
11	1.4	0.5	1.7	1.3	1.1	0.6	1.5	1.8	1.5	1.1	10
12	1.7	1.0	1.6	1.7	1.6	0.5	1.5	2.0		2.1	9
13											0
14											0
15											0
16											0
17	1.2	1.2	1.6	1.7	1.1	0.6	1.0	2.2	0.7	2.2	10
18	2.0	1.2	2.0	1.9	1.3	0.5	1.7	2.8		0.9	9
19	1.1	1.7	2.2	1.5	0.7	0.5	1.1	0.9		0.9	9
20											0
21											0
22											0
23											0
24	1.9	1.1	2.0	1.9	0.8	0.5	1.7	1.9		2.0	9
25	1.4	1.7	2.1	1.9	1.7	0.6	1.4	1.7		2.0	9
26	1.9	1.4	1.4	1.8	1.3	0.5	1.4	1.9		1.9	9
27											0
28											0
29											0
30											0
31	1.7	0.9	1.6	1.9	1.7	0.7	0.9	1.5		1.0	9

Distribution Sample Summary	
Total # of routine distribution samples analyzed	119
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.42

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.7	1.6	2.2	1.6	1.6	0.4	1.5	2.0		2.8	9
4	1.8	1.6	2.2	1.7	1.8	0.6	2.0	2.3		1.6	9
5	1.7	1.3	2.2	1.2	1.8	0.5	1.7	2.5		1.5	9
6											0
7											0
8											0
9											0
10	2.1	1.5	1.7	1.5	1.6	0.5	1.7	2.2		2.4	9
11	1.7	0.7	2.0	1.6	1.5	0.7	1.7	2.4	1.7	1.4	10
12	2.0	1.2	1.9	2.0	1.9	0.6	1.7	2.3		2.3	9
13											0
14											0
15											0
16											0
17	1.7	1.5	2.0	1.9	1.4	0.7	1.5	2.7	0.9	2.6	10
18	2.3	1.4	2.3	2.2	1.5	0.6	1.9	3.0		1.1	9
19	1.4	1.9	2.7	1.8	1.0	0.7	1.4	1.5		1.1	9
20											0
21											0
22											0
23											0
24	2.4	1.4	2.3	2.3	1.1	0.7	2.0	2.4		2.5	9
25	1.6	2.3	2.7	2.5	1.9	0.8	1.7	1.9		2.5	9
26	2.4	1.8	1.9	2.1	1.6	0.7	1.8	2.2		2.3	9
27											0
28											0
29											0
30											0
31	2.2	1.2	1.9	2.6	1.9	0.9	1.3	1.8		1.3	9

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.7

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	February 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	25.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	86	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.4	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.4%	Percent of Treated Water

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 16 2015
LANSING DISTRICT

Chemical Data

Chlorine on hand:	8,000	lb.	Est. supply:	8	days
Primary Coagulant (Ferric Chloride) on hand:	125,000	lb.	Est. supply:	3	days
Lime (CaO) on hand:	397	tons	Est. supply:	31	days
Fluoride on Hand:	26,600	lb.	Est. supply:	40	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	1	0
Number of filter confluence samples collected:	218	218
Percent of filter confluence samples > 0.3 NTU:	0.5%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application | City of Flint Water Treatment Plant | February 2015 | Page 2

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	15.9	21.6	189.2	4.9	0.98	8	2.8	4.1	2.25	1.53
2	18.1	16.3	169.3	4.3	0.70	8	3.1	7.2	1.57	2.25
3	18.3	15.4	254.4	6.8	0.86	8	2.8	5.9	1.71	2.45
4	18.3	16.0	222.8	5.7	0.82	8	2.9	5.1	1.65	1.69
5	18.2	16.2	188.4	5.9	0.76	8	3.0	5.1	1.58	2.01
6	18.1	18.3	205.7	6.3	0.80	7	3.3	3.8	1.39	1.57
7	18.1	17.9	178.8	6.3	0.81	8	3.0	5.1	1.39	1.20
8	18.0	17.9	175.9	6.4	0.87	8	2.6	4.1	1.36	1.34
9	18.1	17.4	162.4	6.1	0.69	8	2.5	4.8	1.37	1.56
10	18.4	16.5	185.7	6.6	0.88	7	2.1	2.4	1.49	1.97
11	18.5	15.4	179.0	6.3	0.86	8	2.2	2.7	1.39	1.82
12	19.4	16.0	195.7	6.2	0.87	8	2.5	3.1	1.65	1.75
13	20.1	17.5	209.7	6.3	0.87	8	2.6	2.8	2.04	1.59
14	20.0	18.2	198.0	6.2	0.89	7	2.6	2.8	1.74	1.34
15	20.1	17.0	178.9	6.3	0.84	8	2.9	3.7	1.70	1.52
16	20.1	18.1	183.7	6.5	0.82	8	3.0	4.8	1.79	1.85
17	20.6	16.7	192.1	5.6	0.85	8	4.2	8.5	2.18	2.11
18	22.7	15.9	131.2	3.8	0.78	8	2.8	3.4	3.97	2.14
19	23.0	14.9	137.5	3.8	0.50	8	3.7	7.6	3.81	1.80
20	23.2	14.1	138.3	3.9	0.55	8	3.2	7.2	3.66	1.50
21	23.5	14.0	132.4	3.8	0.54	8	2.5	2.7	4.35	1.66
22	23.4	14.8	128.7	3.9	0.54	8	2.9	3.9	4.28	1.51
23	24.1	14.4	121.2	3.7	0.58	8	3.2	6.2	4.98	1.76
24	24.3	15.1	132.0	3.7	0.52	8	2.7	3.5	5.90	2.56
25	24.5	15.1	124.8	3.8	0.64	8	7.1	22.5	6.32	1.64
26	24.5	14.5	124.6	3.8	0.52	8	2.6	3.3	6.03	1.56
27	24.5	15.2	123.2	3.8	0.52	8	2.6	3.3	6.00	1.45
28	24.3	14.6	129.2	3.8	0.42	8	2.5	3.1	5.80	1.64
Avg.	20.7	16.3	167.6	5.2	0.72	8	3.0			1.74
Max.	24.5	21.6	254.4	6.8	0.98	8	7.1	22.5	6.32	2.56
Min.	15.9	14.1	121.2	3.7	0.42	7	2.1			1.20
Total	580.3									

City of Flint Water Treatment Plant

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.07	0.09	6	0	0	8	0.06	0.09	6	0	0	0.07
2	7	0.06	0.10	6	0	0	7	0.06	0.07	6	0	0	0.07
3	8	0.07	0.15	6	0	0	8	0.06	0.07	6	0	0	0.08
4	8	0.05	0.08	6	0	0	8	0.05	0.07	6	0	0	0.07
5	8	0.07	0.10	6	0	0	8	0.06	0.07	6	0	0	0.07
6	7	0.06	0.08	6	0	0	7	0.06	0.08	6	0	0	0.07
7	8	0.06	0.07	6	0	0	8	0.06	0.06	6	0	0	0.07
8	8	0.06	0.07	6	0	0	8	0.06	0.07	6	0	0	0.06
9	8	0.07	0.09	6	0	0	8	0.05	0.06	6	0	0	0.09
10	7	0.06	0.07	6	0	0	7	0.05	0.06	6	0	0	0.08
11	8	0.06	0.07	6	0	0	8	0.05	0.07	6	0	0	0.07
12	8	0.06	0.08	6	0	0	8	0.06	0.08	6	0	0	0.06
13	8	0.06	0.09	6	0	0	8	0.09	0.16	6	0	0	0.08
14	8	0.06	0.09	6	0	0	8	0.06	0.10	6	0	0	0.05
15	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
16	8	0.06	0.08	6	0	0	8	0.05	0.07	6	0	0	0.06
17	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
18	8	0.07	0.09	6	0	0	8	0.07	0.09	6	0	0	0.07
19	8	0.07	0.09	6	0	0	8	0.06	0.08	6	0	0	0.07
20	8	0.07	0.08	6	0	0	8	0.07	0.10	6	0	0	0.07
21	8	0.08	0.14	6	0	0	8	0.08	0.10	6	0	0	0.08
22	8	0.09	0.12	6	0	0	8	0.10	0.13	6	0	0	0.08
23	8	0.13	0.16	6	0	0	8	0.07	0.10	6	0	0	0.10
24	7	0.19	0.36	6	1	1	7	0.14	0.18	6	0	0	0.17
25	8	0.08	0.10	6	0	0	8	0.10	0.12	6	0	0	0.11
26	8	0.13	0.17	6	0	0	8	0.13	0.18	6	0	0	0.14
27	8	0.19	0.29	6	0	0	8	0.15	0.16	6	0	0	0.15
28	8	0.20	0.27	6	0	0	8	0.13	0.18	6	0	0	0.15
Avg.	8	0.08	0.12	6	0	0	8	0.07	0.10	6	0	0	
Max.	8	0.20	0.36	6	1	1	8	0.15	0.18	6	0	0	0.17
Min.	7	0.05	0.07	6	0	0	7	0.05	0.06	6	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.3	0.23	0.53		1.6	3.1	4.7	0.3	0.6	2.6	3.0	2.5	2.9
2	0.3	0.22	0.48		1.8	2.9	4.7	0.3	0.5	2.4	2.7	2.2	2.5
3	0.3	0.23	0.51	0.52	1.9	3.0	4.9	0.8	1.2	2.6	2.9	2.4	2.7
4	0.4	0.22	0.53		1.9	3.0	4.9	0.6	0.8	2.8	3.0	2.7	3.0
5	0.3	0.22	0.53		1.9	2.9	4.8	0.5	0.7	2.6	3.0	2.2	2.5
6	0.4	0.22	0.57		2.0	3.0	5.0	0.8	1.0	2.7	3.0	2.3	2.8
7	0.3	0.22	0.58		2.1	2.7	4.8	0.3	0.6	2.6	2.9	2.1	2.4
8	0.4	0.23	0.56		2.1	2.7	4.8	0.6	0.8	2.7	3.0	2.2	2.5
9	0.4	0.22	0.64		1.9	2.8	4.7	0.4	0.6	2.7	3.0	2.3	2.6
10	0.4	0.24	0.63	0.56	2.2	2.9	5.1	0.5	0.7	2.8	3.1	2.1	2.4
11	0.4	0.21	0.55		2.2	2.8	5.0	0.7	0.9	2.6	2.8	1.9	2.4
12	0.4	0.21	0.58		2.2	2.7	4.9	0.6	0.8	2.5	2.8	2.1	2.5
13	0.4	0.23	0.59		2.2	2.4	4.6	0.4	0.6	2.0	2.5	1.7	2.2
14	0.4	0.22	0.55		2.2	2.2	4.4	0.6	0.8	2.3	2.6	1.5	2.1
15	0.4	0.21	0.60		2.1	2.2	4.3	0.4	0.6	2.0	2.4	1.9	2.2
16	0.4	0.23	0.59		2.1	2.2	4.3	0.4	0.6	2.1	2.4	1.8	2.1
17	0.4	0.21	0.61	0.54	2.1	2.3	4.4	0.8	1.0	2.0	2.4	1.3	1.7
18	0.3	0.23	0.58		2.0	2.2	4.2	0.3	0.6	1.9	2.4	1.5	2.0
19	0.3	0.24	0.64		2.2	2.1	4.3	0.6	0.8	2.0	2.4	1.7	2.2
20	0.4	0.23	0.56		2.2	2.1	4.3	0.7	1.0	2.0	2.5	1.5	1.9
21	0.4	0.24	0.61		2.2	2.1	4.3	0.5	0.7	1.7	2.2	1.5	2.0
22	0.4	0.23	0.55		2.2	2.1	4.3	0.4	0.6	2.0	2.3	1.7	1.9
23	0.3	0.24	0.64		2.2	2.2	4.4	0.5	0.6	2.0	2.1	1.5	1.6
24	0.3	0.24	0.56	0.54	2.3	2.6	4.9	0.4	0.6	2.5	3.3	2.1	2.5
25	0.3	0.23	0.62		2.3	2.6	4.9	0.5	0.7	2.5	2.9	2.4	2.7
26	0.3	0.23	0.54		2.3	2.7	5.0	0.5	0.7	2.7	3.1	2.5	3.0
27	0.3	0.24	0.56		2.3	2.5	4.8	0.6	0.8	2.3	2.9	2.1	2.5
28	0.3	0.24	0.56		2.3	2.5	4.8	0.6	0.8	2.3	2.8	1.8	2.5
Avg.	0.35	0.23	0.57	0.54	2.1	2.6	4.7	0.5	0.7	2.4	2.7	2.0	2.4
Max.	0.40	0.24	0.64	0.56	2.3	3.1	5.1	0.8	1.2	2.8	3.3	2.7	3.0
Min.	0.30	0.21	0.48	0.52	1.6	2.1	4.2	0.3	0.5	1.7	2.1	1.3	1.6

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	7.78	7.91	339	198	273	60	66	138	109.0	56.9	17.5	14.1	51	98
2	7.92	7.64	343	203	274	77	69	126	110.6	60.1	15.6	12.6	52	91
3	7.75	8.69	344	176	276	62	68	114	113.8	54.5	13.6	10.2	57	90
4	8.04	7.88	346	176	277	62	69	114	114.6	54.5	14.6	10.2	49	88
5	7.77	7.56	349	183	284	63	65	120	118.6	60.9	12.6	7.3	55	89
6	7.92	7.63	350	180	276	52	74	128	117.8	52.9	13.6	11.7	54	95
7	8.07	7.76	348	185	282	68	66	117	113.8	54.5	15.6	11.7	52	92
8	8.05	7.57	347	181	278	50	69	131	111.4	51.3	16.5	12.6	51	91
9	8.11	7.66	349	183	280	62	69	121	112.2	52.9	16.5	12.2	53	94
10	7.95	7.65	350	168	284	47	66	121	113.0	57.7	16.5	6.8	56	95
11	7.97	7.76	345	173	274	54	71	119	109.0	49.7	17.9	12.6	51	92
12	7.85	7.66	342	169	274	51	68	118	117.8	59.3	12.2	5.3	55	92
13	7.77	7.70	345	170	267	53	78	117	121.0	57.7	11.2	4.9	54	90
14	7.86	7.54	344	173	269	52	75	121	125.0	63.3	7.3	3.9	56	93
15	8.00	7.73	349	176	280	53	69	123	113.0	50.5	16.0	12.2	50	94
16	7.89	7.68	353	169	285	47	68	122	123.4	53.7	10.7	8.7	55	95
17	8.05	7.92	360	172	281	49	79	123	118.6	48.9	15.6	11.7	53	92
18	7.96	7.97	352	218	282	102	70	116	125.9	78.6	8.7	5.3	54	91
19	8.11	7.82	358	208	291	91	67	117	120.2	59.3	14.6	13.1	53	92
20	7.93	7.90	362	207	286	94	76	113	133.1	76.2	7.3	4.4	55	87
21	8.00	8.06	362	214	284	98	78	116	133.9	76.2	6.8	4.4	54	86
22	7.98	8.03	366	227	294	113	72	114	116.2	67.3	18.5	14.1	52	88
23	8.07	8.31	361	225	293	112	68	113	121.8	68.9	14.1	12.6	52	86
24	7.95	7.85	361	227	289	101	72	126	133.9	78.6	5.8	6.8	54	88
25	8.03	8.14	365	244	295	127	70	117	118.6	77.8	16.5	11.7	55	89
26	7.91	7.88	365	235	288	108	77	127	132.3	86.6	8.3	4.9	55	89
27	7.96	7.85	354	241	291	117	63	124	131.5	91.4	6.3	2.9	57	89
28	7.90	7.72	358	228	228	115	130	113	127.5	84.2	9.7	3.9	54	87
Avg.	7.95	7.84	352	197	280	76	73	120	119.9	63.7	12.9	9.0	54	91
Max.	8.11	8.69	366	244	295	127	130	138	133.9	91.4	18.5	14.1	57	98
Min.	7.75	7.54	339	168	228	47	63	113	109.0	48.9	5.8	2.9	49	86

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	41	12	0	1	0	150	< 2	0.53	4.0				
2	1	117	12	0	1	0	132	< 2	0.55	4.2				
3	1	96	12	0	1	0	146	< 2	0.49	4.3				
4	1	86	12	0	1	0	90	< 2	0.51	4.1				
5	1	105	12	0	1	0	183	< 2	0.51	3.5				
6	1	276	12	0	1	0	128	< 2	0.50	2.4				
7	1	124	12	0	1	0	97	< 2	0.50	3.8				
8	1	120	12	0	1	0	80	< 2	0.48	3.8				
9	1	104	12	0	1	0	90	< 2	0.51	4.2				
10	1	93	12	0	1	0	132	< 2	0.50	4.0				
11	1	115	12	0	1	0	83	< 2	0.47	4.3				
12	1	115	12	0	1	0	93	< 2	0.46	3.8				
13	1	153	12	0	1	0	80	< 2	0.50	4.5				
14	1	154	12	0	1	0	93	< 2	0.48	3.6				
15	1	138	12	0	1	0	83	< 2	0.52	0.5				
16	1	179	12	0	1	0	137	< 2	0.50	0.7				
17	1	365	12	0	1	0	166	< 2	0.50	1.2				
18	1	219	12	0	1	0	177	< 2	0.51	1.7				
19	1	153	12	0	1	0	112	< 2	0.45	2.2				
20	1	192	12	0	1	0	62	< 2	0.56	1.9				
21	1	142	12	0	1	0	116	< 2	0.51	4.1				
22	1	160	12	0	1	0	146	< 2	0.55	2.1				
23	1	129	12	0	1	0	112	< 2	0.58	1.0				
24	1	135	12	0	1	0	100	< 2	0.61	3.4				
25	1	145	12	0	1	0	156	< 2	0.61	2.0				
26	1	115	12	0	1	0	108	< 2	0.61	1.2				
27	1	86	12	0	1	0	74	< 2	0.61	3.3				
28	1	84	12	0	1	0	65	< 2	0.56	3.3				
Avg.									0.52	3.0				
Max.		365					183	0	0.61	4.5				
Min.									0.45	0.5				

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	0.7	1.5	1.5	1.5	1.5	0.2	1.7	1.7	1.3	2.0	10
4											0
5	1.0	1.7	1.7	1.7	1.1	0.2	1.8	2.0	0.7	1.4	10
6											0
7											0
8											0
9											0
10	1.0	1.2	1.5	1.3	1.0	0.2	2.0	1.9	0.7	1.0	10
11	1.0	1.3	1.7	1.7	0.9	0.3	1.7	2.3	0.5	0.9	10
12	0.4	1.4	2.3	1.8	0.7	0.2	1.9	2.2	0.5	1.2	10
13											0
14											0
15											0
16											0
17	1.1	0.7	1.2	1.5	0.7	0.2	1.1	1.3		1.5	9
18	1.2	0.8	1.6	1.2	0.8	0.2	1.8	1.7		1.4	9
19	0.9	0.7	1.3	1.0	0.7	0.2	0.8	1.3		1.0	9
20											0
21											0
22											0
23	1.3	0.8	1.3	1.1	0.6	0.2	0.6	1.5		0.8	9
24	1.5	1.1	1.7	1.2	1.0	0.2	2.5	2.2		2.3	9
25											0
26	1.7	1.4	2.0	1.5	1.1	0.3	1.8	1.8		2.1	9
27											0
28											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	104
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.22

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.0	1.8	1.8	1.9	1.8	0.3	2.0	1.9	1.7	2.4	10
4											0
5	1.3	2.1	2.0	2.0	1.3	0.4	2.1	2.3	1.0	1.6	10
6											0
7											0
8											0
9											0
10	1.3	1.5	1.9	1.6	1.3	0.4	2.4	2.2	1.0	1.3	10
11	1.2	1.5	1.8	1.9	1.1	0.4	1.9	2.6	0.7	1.2	10
12	0.5	1.6	2.4	2.0	0.9	0.4	2.1	2.4	0.6	1.4	10
13											0
14											0
15											0
16											0
17	1.3	1.0	1.4	1.8	0.9	0.3	1.5	1.8		1.7	9
18	1.5	1.0	1.9	1.5	1.0	0.3	2.1	2.0		1.7	9
19	1.3	1.1	1.6	1.5	1.0	0.3	1.0	1.7		1.3	9
20											0
21											0
22											0
23	1.5	1.0	1.6	1.3	0.8	0.3	0.8	1.8		1.2	9
24	1.7	1.3	1.9	1.4	1.2	0.4	2.8	2.4		2.5	9
25											0
26	1.9	1.6	2.4	1.7	1.4	0.5	2.1	2.0		2.5	9
27											0
28											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.5

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	January 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

DEQ
RESOURCE MANAGEMENT DIVISION
FEB 17 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	19.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	76	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.1	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.6	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.2%	Percent of Treated Water

Chemical Data

Chlorine on hand:	12,000	lb.	Est. supply:	18	days
Primary Coagulant (Ferric Chloride) on hand:	110,000	lb.	Est. supply:	10	days
Lime (CaO) on hand:	257	tons	Est. supply:	22	days
Fluoride on Hand:	16,630	lb.	Est. supply:	42	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	244	242
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Catioinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	10.3	20.7	145.0	5.9	0.93	8	5.0	6.0	0.38	3.48
2	17.8	19.4	130.0	4.6	0.85	7	4.7	4.9	1.17	1.32
3	19.0	20.4	115.0	4.5	0.79	8	4.5	4.8	1.21	1.01
4	18.8	18.1	109.0	4.4	0.73	8	5.5	12.3	1.42	1.18
5	18.9	17.6	121.0	4.4	0.73	8	3.8	5.3	1.52	1.54
6	18.9	17.5	122.0	4.7	0.68	8	3.6	4.4	1.51	1.31
7	18.8	16.7	121.0	4.5	0.71	8	3.9	5.6	1.43	1.23
8	16.1	16.6	135.0	5.5	0.88	8	4.9	8.1	1.38	1.10
9	12.3	14.9	151.0	6.9	0.91	8	8.0	8.2	1.36	0.94
10	12.3	16.8	159.0	7.4	0.91	8	8.2	9.0	1.61	1.01
11	12.2	18.0	164.0	6.5	0.78	8	8.0	8.5	1.36	1.17
12	12.6	17.8	149.0	6.2	0.73	8	7.5	8.1	1.44	1.07
13	12.0	20.6	169.0	5.6	0.84	8	7.1	7.7	1.77	1.01
14	13.4	21.0	171.0	5.7	0.81	8	7.5	8.1	1.69	1.30
15	14.3	18.8	172.0	5.5	0.86	8	7.0	7.3	1.44	1.45
16	16.3	17.8	164.0	5.8	0.75	8	6.7	7.0	0.95	1.50
17	18.2	15.8	129.0	4.9	0.71	8	6.3	6.6	1.37	1.96
18	18.6	15.3	137.2	4.8	0.70	8	6.2	8.2	1.41	1.95
19	16.7	15.6	145.0	4.9	0.77	8	5.6	7.2	1.47	1.64
20	18.6	14.1	160.6	4.9	0.75	8	4.9	5.1	1.47	2.94
21	18.7	13.9	150.0	4.9	0.69	8	4.7	6.3	1.49	1.52
22	18.6	15.0	142.0	4.9	0.72	8	3.9	4.4	1.39	1.64
23	18.5	14.4	170.0	5.0	0.71	7	3.7	3.9	1.41	2.28
24	18.5	15.1	191.0	5.0	0.77	8	5.8	19.4	1.53	1.44
25	16.4	16.0	174.0	5.0	0.71	8	3.8	5.5	1.35	1.57
26	18.1	15.6	164.0	5.1	0.71	8	3.7	5.3	1.45	1.72
27	18.5	14.2	180.0	5.1	0.76	7	3.5	5.3	1.59	1.69
28	18.2	13.8	180.0	4.9	0.74	7	4.1	10.2	1.63	1.71
29	18.6	14.4	188.0	5.1	0.70	7	2.8	3.4	1.66	1.58
30	18.5	15.3	168.0	5.2	0.68	8	2.7	3.4	1.72	1.75
31	16.9	19.0	180.0	5.8	0.81	8	2.7	3.5	1.52	1.34
Avg.	16.8	16.8	153.4	5.3	0.77	8	5.17			1.55
Max.	19.0	21.0	191.0	7.4	0.93	8	8.2	19.4	1.77	3.48
Min.	10.3	13.6	109.0	4.4	0.68	7	2.70			0.94
Total	519.5									

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.07	0.08	6	0	0	8	0.06	0.09	6	0	0	0.08
2	7	0.07	0.09	6	0	0	7	0.06	0.07	6	0	0	0.07
3	8	0.06	0.08	6	0	0	8	0.06	0.07	6	0	0	0.08
4	8	0.07	0.09	6	0	0	8	0.07	0.11	6	0	0	0.07
5	8	0.06	0.09	6	0	0	8	0.06	0.09	6	0	0	0.07
6	8	0.08	0.09	6	0	0	8	0.07	0.10	6	0	0	0.07
7	8	0.09	0.15	6	0	0	8	0.07	0.09	6	0	0	0.08
8	8	0.08	0.10	6	0	0	8	0.07	0.11	6	0	0	0.08
9	8	0.06	0.08	6	0	0	8	0.05	0.07	6	0	0	0.07
10	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
11	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
12	8	0.07	0.09	6	0	0	8	0.07	0.10	6	0	0	0.09
13	8	0.06	0.12	6	0	0	8	0.05	0.07	6	0	0	0.06
14	8	0.07	0.09	6	0	0	8	0.06	0.09	6	0	0	0.07
15	8	0.06	0.09	6	0	0	8	0.07	0.09	6	0	0	0.07
16	8	0.07	0.09	6	0	0	8	0.07	0.10	6	0	0	0.09
17	8	0.07	0.08	6	0	0	8	0.07	0.10	6	0	0	0.07
18	8	0.08	0.11	6	0	0	8	0.07	0.08	6	0	0	0.07
19	8	0.07	0.09	6	0	0	8	0.07	0.11	6	0	0	0.07
20	8	0.07	0.08	6	0	0	8	0.07	0.10	6	0	0	0.11
21	8	0.08	0.11	6	0	0	8	0.07	0.08	6	0	0	0.09
22	8	0.09	0.11	6	0	0	8	0.08	0.09	6	0	0	0.09
23	7	0.08	0.10	6	0	0	7	0.07	0.09	6	0	0	0.08
24	8	0.07	0.09	6	0	0	8	0.06	0.10	6	0	0	0.07
25	8	0.06	0.07	6	0	0	8	0.07	0.09	6	0	0	0.07
26	8	0.07	0.09	6	0	0	6	0.08	0.10	6	0	0	0.07
27	7	0.08	0.11	6	0	0	7	0.07	0.10	6	0	0	0.08
28	7	0.07	0.09	6	0	0	7	0.07	0.10	6	0	0	0.07
29	7	0.07	0.10	6	0	0	7	0.07	0.08	6	0	0	0.07
30	8	0.07	0.09	6	0	0	8	0.07	0.08	6	0	0	0.08
31	8	0.06	0.10	6	0	0	8	0.06	0.08	6	0	0	0.07
Avg.	8	0.07	0.09	6	0	0	8	0.07	0.09	6	0	0	
Max.	8	0.09	0.15	6	0	0	8	0.08	0.11	6	0	0	0.11
Min.	7	0.06	0.07	6	0	0	6	0.05	0.07	6	0	0	

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.4	0.24	0.70		1.3	3.5	4.8	0.6	0.9	2.7	3.0	2.1	2.4
2	0.4	0.21	0.62		1.4	3.5	4.9	0.6	0.8	2.6	3.1	2.2	2.6
3	0.3	0.22	0.55		1.8	2.6	4.4	0.5	0.7	2.7	3.3	2.8	3.2
4	0.4	0.20	0.60		1.8	2.5	4.3	0.8	1.0	2.8	3.0	2.9	3.2
5	0.4	0.19	0.23		1.9	2.5	4.4	0.7	1.0	2.8	3.0	2.7	3.0
6	0.3	0.19	0.49	0.39	1.9	2.7	4.6	0.6	0.9	2.7	3.2	2.5	3.2
7	0.3	0.23	0.61		1.9	2.6	4.5	0.7	0.9	2.7	3.0	2.2	2.7
8	0.3	0.19	0.51		1.9	2.6	4.5	0.6	0.9	2.4	3.1	2.1	2.6
9	0.0	0.19	0.51		2.0	3.2	5.2	0.4	0.7	2.8	3.1	2.3	2.8
10	0.0	0.22	0.44		1.8	3.1	4.9	0.4	0.4	2.4	2.9	1.8	2.3
11	0.0	0.20	0.22		1.8	3.0	4.8	0.8	1.1	2.7	3.1	2.5	2.9
12	0.0	0.21	0.21		1.6	3.2	4.8	0.5	0.8	2.8	3.1	2.4	2.8
13	0.0	0.19	0.19	0.35	1.7	3.1	4.8	0.8	1.2	2.8	3.1	2.2	2.6
14	0.0	0.21	0.21		1.6	3.0	4.6	0.4	0.6	2.8	3.1	2.3	2.8
15	0.0	0.22	0.24		1.6	3.0	4.6	0.5	0.9	2.7	3.1	2.0	2.3
16	0.1	0.20	0.20		1.6	3.0	4.6	0.5	0.9	2.3	3.0	2.0	2.5
17	0.3	0.22	0.23		1.7	3.0	4.7	0.4	0.6	2.5	3.0	1.8	2.3
18	0.4	0.19	0.55		1.8	3.2	5.0	0.5	0.8	2.7	3.0	2.5	2.9
19	0.4	0.20	0.64		1.9	3.2	5.1	0.4	0.6	2.8	3.2	2.2	2.6
20	0.0	0.22	0.45	0.31	2.0	3.0	5.0	0.5	0.9	2.9	3.4	2.1	2.7
21	0.2	0.21	0.31		1.9	2.8	4.7	0.5	0.8	2.6	3.0	2.2	2.5
22	0.4	0.20	0.67		1.9	2.9	4.8	0.4	0.7	2.8	3.2	1.9	2.2
23	0.4	0.22	0.41		2.0	3.1	5.1	0.4	0.8	2.6	3.0	1.5	1.8
24	0.4	0.21	0.67		2.0	3.2	5.2	0.7	0.9	2.8	3.0	2.7	3.0
25	0.4	0.23	0.59		2.1	3.1	5.2	0.5	0.8	2.9	3.4	2.4	2.7
26	0.4	0.21	0.57		2.0	3.0	5.0	0.4	0.7	2.7	3.1	2.4	2.7
27	0.4	0.23	0.54	0.55	2.1	3.1	5.2	0.4	0.6	2.7	3.0	2.2	2.5
28	0.4	0.22	0.59		2.0	2.9	4.9	0.8	1.0	2.4	2.7	1.9	2.3
29	0.4	0.25	0.62		2.0	2.9	4.9	0.7	0.9	2.8	3.2	2.2	2.5
30	0.4	0.22	0.63		2.0	3.0	5.0	0.7	0.8	2.5	2.9	2.0	2.5
31	0.3	0.19	0.52		1.9	3.0	4.9	0.6	0.8	2.8	3.2	2.8	3.2
Avg.	0.26	0.21	0.47	0.40	1.8	3.0	4.8	0.6	0.8	2.7	3.1	2.3	2.7
Max.	0.40	0.25	0.70	0.55	2.1	3.5	5.2	0.8	1.2	2.9	3.4	2.9	3.2
Min.	0.00	0.19	0.19	0.31	1.3	2.5	4.3	0.4	0.4	2.3	2.7	1.5	1.8

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.23	7.65	323	185	264	65	59	120	108.2	55.3	13.6	11.7	47	85
2	7.84	7.31	324	193	258	76	66	117	121.0	65.7	6.3	4.9	47	87
3	7.77	7.38	323	212	257	98	66	114	120.0	77.0	5.8	4.9	48	87
4	8.15	7.86	325	218	261	96	64	122	105.8	64.9	14.6	13.1	48	88
5	8.31	7.80	318	206	262	94	56	112	103.4	60.9	14.6	13.6	45	78
6	8.09	7.97	320	208	256	95	64	113	121.0	69.7	4.9	8.7	48	85
7	8.04	7.91	313	194	256	97	57	97	101.8	61.7	15.6	10.7	43	82
8	8.19	8.04	313	202	251	87	62	115	121.0	72.9	2.9	3.9	48	83
9	8.08	7.96	311	205	248	93	63	112	115.4	70.5	5.8	6.3	47	84
10	7.98	7.75	316	181	255	73	61	108	114.6	64.1	6.8	3.4	47	88
11	8.01	8.24	321	174	256	63	65	111	100.2	44.9	17.5	14.6	44	80
12	8.09	7.68	318	177	250	57	68	120	101.0	46.5	16.0	14.6	49	81
13	7.94	7.69	320	165	245	46	75	119	105.8	44.1	14.1	13.1	47	87
14	7.80	7.52	321	172	252	58	69	114	115.4	56.9	7.8	6.8	48	88
15	7.96	7.64	323	173	258	48	65	125	105.8	48.9	14.1	13.1	45	91
16	7.94	7.47	324	172	257	44	67	128	117.8	58.5	6.8	6.8	47	88
17	7.82	7.95	320	174	252	54	68	120	119.4	58.5	4.9	5.3	46	89
18	8.02	7.72	322	185	258	69	64	116	104.2	55.3	15.1	11.2	48	83
19	8.03	7.62	321	184	255	59	66	125	102.6	54.5	16.0	11.7	48	86
20	7.89	7.59	321	184	255	67	66	117	116.2	64.9	7.8	4.9	49	91
21	7.86	7.79	324	183	257	72	67	111	105.0	51.3	15.1	13.1	50	83
22	7.59	7.42	325	193	262	81	63	112	116.2	68.9	8.3	4.9	49	84
23	7.70	7.44	344	186	256	78	88	108	112.2	59.3	15.6	9.2	52	87
24	7.91	7.51	327	187	259	72	68	115	101.0	48.1	18.5	16.0	48	85
25	7.93	7.71	326	188	260	75	66	113	100.2	50.5	18.5	14.6	47	85
26	7.95	7.82	328	194	259	71	69	123	105.8	54.5	15.6	13.6	51	88
27	7.77	7.99	332	191	266	68	66	123	111.4	60.1	13.1	9.2	51	89
28	7.99	7.98	334	188	264	76	70	112	107.4	51.3	16.0	14.6	48	85
29	7.80	7.83	334	196	268	76	66	120	106.6	57.7	16.5	12.6	55	86
30	7.84	7.78	331	193	272	78	59	115	113.0	59.3	13.1	10.7	55	90
31	7.96	7.91	335	197	267	69	68	128	108.2	56.1	15.6	13.6	51	92
Avg.	7.95	7.74	324	189	258	73	66	116	109.9	58.5	12.2	10.2	48	86
Max.	8.31	8.24	344	218	272	98	88	128	121.0	77	18.5	16.0	55	92
Min.	7.59	7.31	311	165	245	44	56	97	100.2	44.1	2.9	3.4	43	78

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	2592	12	0	1	0	800	< 2	0.37	5.6				
2	1	1684	12	0	1	0	600	< 2	0.36	4.5				
3	1	960	12	0	1	0	2400	< 2	0.42	4.0				
4	1	718	12	0	1	0	200	< 2	0.44	3.8				
5	1	1732	12	0	1	0	5980	< 2	0.41	3.0				
6	1	874	12	0	1	0	200	< 2	0.41	4.5				
7	1	2086	12	0	1	0	200	< 2	0.39	4.2				
8	1	960	12	0	1	0	120	< 2	0.39	5.5				
9	1	1146	12	0	1	0	420	< 2	0.40	2.6				
10	1	2994	12	0	1	0	760	38	0.31	2.6				
11	1	978	12	0	1	0	520	10	0.36	2.1				
12	1	1042	12	0	1	0	600	< 2	0.36	1.9				
13	1	862	12	0	1	0	340	< 2	0.37	1.4				
14	1	646	12	0	1	0	200	< 2	0.36	1.9				
15	1	736	12	0	1	0	300	< 2	0.36	3.5				
16	1	2224	12	0	1	0	200	< 2	0.37	1.9				
17	1	320	12	0	1	0	200	< 2	0.36	4.9				
18	1	40	12	0	1	0	200	2	0.38	4.9				
19	1	148	12	0	1	0	120	< 2	0.40	5.2				
20	1	770	12	0	1	0	146	< 2	0.38	4.9				
21	1	148	12	0	1	0	80	< 2	0.37	5.9				
22	1	201	12	0	1	0	190	< 2	0.39	5.8				
23	1	345	12	0	1	0	120	< 2		4.9				
24	1	97	12	0	1	0	150	< 2	0.38	6.4				
25	1	146	12	0	1	0	60	< 2	0.39	4.4				
26	1	181	12	0	1	0	230	< 2	0.40	3.8				
27	1	146	12	0	1	0	120	< 2	0.38	4.9				
28	1	172	12	0	1	0	128	< 2	0.38	4.3				
29	1	261	12	0	1	0	137	< 2	0.49	4.2				
30	1	155	12	0	1	0	93	< 2	0.43	4.0				
31	1	41	12	0	1	0	60	< 2	0.53	4.0				

Avg.									0.39	4.0				
Max.							5980	38	0.53	6.4				
Min.									0.31	1.4				

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.7	0.1	1.3	1.6	0.7	0.2	0.2		1.5	1.4	9
2											0
3											0
4											0
5											0
6	0.6	0.7	1.5	2.0	0.8	0.1	1.4	1.8	1.8	1.8	10
7	0.6	0.7	1.7	1.5	0.7	0.2	1.1	2.0	0.8	1.7	10
8	0.8	0.3	1.0	1.3	0.8	0.1	1.4	1.8	0.8	1.7	10
9											0
10											0
11											0
12											0
13	0.4	1.0	1.7	1.4	0.7	0.2	1.4	1.7	0.4	1.7	10
14	0.2	0.5	1.8	1.6	0.5	0.1	2.1	2.2	0.4	2.0	10
15											0
16											0
17											0
18											0
19											0
20	0.1	1.6	1.7	1.4	0.9	0.3	1.9	2.0	1.3	1.8	10
21											0
22											0
23											0
24											0
25											0
26									1.6	1.8	2
27	0.9	1.3	1.2	1.7	0.7	0.2	1.3	1.8	1.4	0.8	10
28	0.8	0.5	1.4	1.5	0.8	0.2	1.8	1.8	1.5	1.8	10
29	0.9	1.7	1.6	1.7	1.0	0.1	2.0	1.9	0.9	2.0	10
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	101
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.15

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.8	0.2	1.5	1.8	0.9	0.3	0.3		1.7	1.5	9
2											0
3											0
4											0
5											0
6	0.9	0.9	1.4	2.3	1.0	0.2	1.6	2.1	2.2	2.1	10
7	0.8	0.9	1.9	1.8	1.0	0.2	1.3	2.2	1.0	2.0	10
8	1.0	0.5	1.2	1.5	1.1	0.3	1.6	2.0	1.0	2.0	10
9											0
10											0
11											0
12											0
13	0.7	1.5	2.0	1.7	0.9	0.2	1.7	2.3	0.6	2.1	10
14	0.4	1.8	2.1	1.8	0.8	0.3	2.4	2.5	0.5	2.3	10
15											0
16											0
17											0
18											0
19											0
20	0.3	1.9	2.0	1.6	1.2	0.6	2.2	2.3	1.5	2.2	10
21											0
22											0
23											0
24											0
25											0
26									1.9	2.2	2
27	1.3	1.9	1.7	2.1	0.9	0.4	1.7	2.0	1.8	1.0	10
28	1.2	0.8	1.7	1.8	1.2	0.4	2.1	2.3	1.9	2.2	10
29	1.2	2.0	1.9	1.9	1.3	0.2	2.3	2.3	1.1	2.3	10
30											0
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.4

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	**December 2014**
Operator-in-Charge	Month/Year
F-1R, F-2	**F-1**
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	**Genesee**
Signature of Operator-in-Charge	County

DEQ
RESOURCE MANAGEMENT DIVISION
FEB 06 2015
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	23.8	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	74	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.4	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.2	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.9%	Percent of Treated Water

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	30	days
Primary Coagulant (Ferric Chloride) on hand:	54,000	lb.	Est. supply:	18	days
Lime (CaO) on hand:	296	tons	Est. supply:	34	days
Fluoride on Hand:	16,630	lb.	Est. supply:	35	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	226	226
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Catioinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	16.6	12.2	111.7	4.2	1.03	8	5.3	7.8	0.80	3.06
2	16.5	12.4	130.1	4.2	1.03	8	4.4	4.9	0.92	2.02
3	16.2	12.5	130.6	4.4	1.06	8	3.6	3.8	0.75	1.96
4	16.2	12.3	126.7	4.1	1.07	8	3.1	4.1	0.93	2.13
5	19.6	12.3	117.1	3.9	1.04	8	2.2	2.5	1.52	2.19
6	6.4	13.7	117.7	3.7	1.04	3	1.8	1.9	2.50	1.67
7	0.0	0.0	0.0	0.0	0.00	4	3.2	3.7	n/a	n/a
8	0.0	0.0	0.0	0.0	0.00	1	4.0	4.0	n/a	n/a
9	18.4	15.3	116.4	4.2	0.65	8	2.4	2.9	1.24	1.88
10	18.3	15.2	119.7	4.2	0.79	8	2.1	3.7	0.93	1.50
11	18.5	16.2	113.3	4.1	0.86	8	1.7	1.9	0.92	1.54
12	18.6	16.5	113.3	4.1	0.85	8	1.6	1.9	0.91	1.22
13	18.5	16.7	118.1	4.2	0.85	8	1.7	1.8	0.92	1.82
14	18.4	16.6	124.8	4.3	0.86	8	1.9	2.7	0.93	1.73
15	18.5	16.8	119.8	4.3	0.86	8	2.8	3.5	1.06	2.39
16	18.5	16.5	118.5	4.2	0.86	8	2.9	7.2	0.87	1.76
17	18.2	16.6	123.1	4.3	0.87	8	2.0	2.2	0.84	1.88
18	18.3	16.4	130.5	4.3	0.86	8	2.3	4.3	0.87	1.87
19	18.1	16.8	132.8	4.4	0.87	8	1.8	2.0	0.87	1.56
20	16.2	15.1	149.6	4.9	0.84	8	1.8	3.1	0.81	1.65
21	14.9	14.5	116.7	4.9	0.97	8	3.6	5.9	0.80	6.47
22	15.0	14.4	114.9	4.6	0.98	8	3.6	4.0	0.73	2.37
23	15.1	14.3	119.9	5.2	0.96	8	3.7	4.1	0.83	1.59
24	15.1	14.3	136.7	5.1	0.96	8	7.6	17.3	0.75	2.11
25	14.8	14.5	148.3	5.2	1.07	8	9.4	17.1	0.75	2.86
26	15.0	14.2	148.7	5.3	1.06	8	7.9	13.3	0.76	1.36
27	15.0	16.3	145.7	5.2	1.05	8	21.9	23.5	1.05	1.43
28	15.0	17.5	140.0	5.3	1.05	8	21.8	25.6	1.07	1.25
29	15.2	18.2	130.4	5.2	1.04	8	9.7	12.8	0.76	1.08
30	11.8	19.2	139.8	5.6	0.79	8	6.6	7.8	0.53	0.97
31	10.4	19.0	143.9	5.6	0.83	8	5.2	7.1	0.40	1.26
Avg.	15.1	14.4	119.3	4.3	0.87	7	4.95			1.95
Max.	19.6	19.2	149.6	5.6	1.07	8	21.9	25.6	2.50	6.47
Min.	0.0	0.0	0.0	0.0	0.00	1	1.60			0.97
Total	467.3									

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.09	0.11	6	0	0	8	0.09	0.10	6	0	0	0.09
2	8	0.08	0.09	6	0	0	8	0.08	0.09	6	0	0	0.08
3	8	0.08	0.12	6	0	0	8	0.07	0.10	6	0	0	0.07
4	8	0.07	0.10	6	0	0	8	0.07	0.08	6	0	0	0.07
5	8	0.07	0.08	6	0	0	8	0.07	0.09	6	0	0	0.08
6	2	0.10	0.12	2	0	0	2	0.10	0.10	2	0	0	0.08
7	0	n/a	n/a	0	0	0	0	n/a	n/a	0	0	0	0.07
8	0	n/a	n/a	0	0	0	0	n/a	n/a	0	0	0	0.12
9	8	0.09	0.19	6	0	0	8	0.07	0.11	6	0	0	0.08
10	8	0.08	0.14	6	0	0	8	0.06	0.07	6	0	0	0.05
11	8	0.08	0.10	6	0	0	8	0.07	0.10	6	0	0	0.07
12	8	0.09	0.13	6	0	0	8	0.09	0.14	6	0	0	0.07
13	8	0.07	0.10	6	0	0	8	0.07	0.08	6	0	0	0.08
14	8	0.06	0.07	6	0	0	8	0.06	0.07	6	0	0	0.05
15	8	0.06	0.06	6	0	0	8	0.06	0.07	6	0	0	0.06
16	8	0.07	0.08	6	0	0	8	0.06	0.06	6	0	0	0.06
17	8	0.07	0.08	6	0	0	8	0.07	0.08	6	0	0	0.08
18	8	0.07	0.11	6	0	0	8	0.06	0.07	6	0	0	0.07
19	8	0.08	0.13	6	0	0	8	0.06	0.09	6	0	0	0.07
20	8	0.07	0.10	6	0	0	8	0.07	0.09	6	0	0	0.06
21	8	0.06	0.07	6	0	0	8	0.06	0.09	6	0	0	0.07
22	8	0.06	0.07	6	0	0	8	0.07	0.16	6	0	0	0.06
23	8	0.07	0.09	6	0	0	8	0.07	0.12	6	0	0	0.07
24	8	0.06	0.10	6	0	0	8	0.06	0.10	6	0	0	0.06
25	8	0.06	0.09	6	0	0	8	0.06	0.10	6	0	0	0.06
26	8	0.08	0.16	6	0	0	8	0.07	0.15	6	0	0	0.08
27	8	0.08	0.12	6	0	0	8	0.07	0.11	6	0	0	0.07
28	8	0.07	0.11	6	0	0	8	0.05	0.07	6	0	0	0.07
29	8	0.07	0.09	6	0	0	8	0.06	0.07	6	0	0	0.08
30	8	0.06	0.08	6	0	0	8	0.05	0.06	6	0	0	0.06
31	8	0.07	0.09	6	0	0	8	0.06	0.08	6	0	0	0.08
Avg.	7	0.07	0.10	5	0	0	7	0.07	0.09	5	0	0	
Max.	8	0.10	0.19	6	0	0	8	0.10	0.16	6	0	0	0.12
Min.	0	0.06	0.06	0	0	0	0	0.05	0.06	0	0	0	

WSSN: 2310

Date	Fluoride Applied as F- mg/L.	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.22	0.71		2.0	3.8	5.8	0.5	0.8	3.0	3.5	3.0	3.5
2	0.5	0.21	0.72		2.0	3.6	5.6	0.7	1.0	3.0	3.5	2.7	3.2
3	0.5	0.23	0.72		2.1	3.0	5.1	0.7	1.0	2.7	3.2	2.5	2.9
4	0.5	0.21	0.73	0.64	2.0	3.0	5.0	0.6	0.8	3.0	3.5	2.4	2.8
5	0.4	0.21	0.68		1.9	3.0	4.9	0.6	0.8	2.7	3.2	2.2	2.5
6	0.5	0.22	0.77		1.9	3.0	4.9	0.4	0.6	3.1	3.5	2.1	2.5
7	0.0	0.22	0.70		0.0	0.0	0.0	n/a	n/a	3.0	3.5	2.4	2.8
8	0.0	0.22	0.71		0.0	0.0	0.0	n/a	n/a	2.9	3.2	2.6	2.9
9	0.4	0.24	0.67	0.65	2.0	2.3	4.3	0.6	0.8	2.2	2.9	2.7	3.1
10	0.4	0.22	0.71		1.8	2.7	4.5	0.5	0.8	2.6	2.9	2.4	2.7
11	0.4	0.24	0.69		1.8	2.8	4.6	0.5	0.7	2.5	3.1	2.4	2.8
12	0.4	0.21	0.64		1.8	2.7	4.5	0.6	0.8	2.4	2.9	2.0	2.3
13	0.4	0.21	0.63		2.0	2.6	4.6	0.6	0.8	3.0	3.5	2.6	2.9
14	0.4	0.20	0.64		2.0	2.6	4.6	0.7	1.0	2.9	3.2	2.9	3.1
15	0.4	0.24	0.64		2.0	2.6	4.6	0.7	0.9	2.8	3.0	2.6	2.9
16	0.4	0.24	0.63	0.60	2.0	2.6	4.6	0.7	0.9	2.8	3.0	2.3	2.5
17	0.4	0.22	0.63		2.0	2.6	4.6	0.7	0.9	2.7	3.0	2.4	3.0
18	0.4	0.21	0.59		2.0	2.7	4.7	0.6	0.8	2.6	3.0	2.1	2.4
19	0.4	0.21	0.58		2.1	2.6	4.7	0.7	0.9	3.0	3.3	2.6	3.1
20	0.4	0.20	0.61		1.9	2.6	4.5	0.6	0.8	2.6	3.1	2.0	2.5
21	0.4	0.22	0.62		1.3	2.4	3.7	0.6	0.8	2.8	3.0	2.6	2.8
22	0.4	0.22	0.63		2.0	2.6	4.6	0.9	1.1	2.7	3.1	2.6	3.0
23	0.4	0.23	0.63	0.64	1.9	3.1	5.0	0.6	0.9	2.9	3.2	2.5	2.9
24	0.4	0.20	0.63		1.9	3.0	4.9	0.9	1.1	2.8	3.0	2.3	2.7
25	0.4	0.21	0.63		1.9	3.1	5.0	0.5	0.7	2.6	3.0	1.7	2.2
26	0.4	0.23	0.69		2.0	2.8	4.8	0.6	0.7	2.8	3.1	2.3	2.6
27	0.4	0.19	0.60		2.1	2.8	4.9	0.7	0.9	2.9	3.5	1.9	2.5
28	0.4	0.20	0.67		1.9	3.0	4.9	0.6	0.9	2.7	3.0	2.4	2.7
29	0.4	0.21	0.62		1.9	3.0	4.9	0.6	0.9	2.7	3.0	2.7	3.0
30	0.4	0.20	0.60	0.54	1.9	3.1	5.0	0.6	0.9	2.7	2.9	1.9	2.5
31	0.4	0.22	0.63		1.9	3.3	5.2	0.8	1.1	2.7	3.1	2.8	3.1
Avg.	0.39	0.22	0.66	0.61	1.8	2.7	4.5	0.6	0.9	2.8	3.2	2.4	2.8
Max.	0.50	0.24	0.77	0.65	2.1	3.8	5.8	0.9	1.1	3.1	3.5	3.0	3.5
Min.	0.00	0.19	0.58	0.54	0.0	0.0	0.0	0.4	0.6	2.2	2.9	1.7	2.2

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.25	7.82	303	204	248	109	55	95	97.8	63.3	14.6	11.7	47	77
2	8.12	8.27	303	193	248	97	55	96	98.6	54.5	14.1	13.6	47	77
3	8.21	8.25	307	192	243	96	64	96	113.8	64.1	5.8	7.8	47	75
4	8.42	7.84	312	193	257	97	55	96	103.4	55.3	13.6	13.6	48	76
5	8.21	8.23	314	197	257	98	57	99	109.0	65.7	9.7	7.8	45	74
6	8.27	8.34	314	210	254	115	60	95	109.8	69.7	9.7	8.3	47	74
7	8.43	8.08	326	203	265	102	61	101	103.4	58.5	16.5	13.6	47	78
8	8.35	8.00	326	197	268	93	58	104	107.4	56.9	14.1	13.1	48	77
9	8.33	7.95	324	200	263	97	61	103	121.0	71.3	6.3	5.8	48	77
10	8.23	7.95	329	190	269	81	60	109	106.6	53.7	15.1	12.6	48	82
11	8.17	7.95	321	190	261	88	60	102	111.4	68.1	10.2	4.9	48	79
12	8.13	8.33	324	197	260	95	64	102	116.2	70.5	8.3	2.9	49	81
13	8.13	7.41	322	208	261	100	61	108	119.4	75.4	6.3	4.9	48	83
14	8.18	8.16	334	206	270	97	64	109	101.0	55.3	20.4	16.5	48	81
15	8.24	8.18	328	207	269	102	59	105	97.0	59.3	19.9	14.1	50	83
16	8.29	8.37	324	200	269	95	55	105	103.4	55.3	16.0	14.6	48	82
17	8.22	8.18	321	201	261	89	60	112	107.4	65.7	12.2	9.2	44	85
18	8.24	8.15	325	203	264	91	61	112	108.2	60.9	13.6	12.2	48	82
19	7.99	8.03	319	199	258	91	61	108	117.0	69.7	6.8	5.8	48	84
20	8.23	7.90	318	196	252	90	66	106	116.2	70.5	7.3	4.9	48	83
21	8.31	8.20	317	173	260	77	57	96	99.4	51.3	17.0	9.7	45	78
22	8.31	8.35	319	177	266	72	53	105	102.6	48.1	15.1	14.1	47	80
23	8.25	8.22	322	168	263	71	59	97	121.0	52.9	15.1	7.8	49	79
24	8.27	8.49	323	179	264	72	59	107	108.2	54.5	12.6	10.2	46	79
25	8.28	8.12	312	183	255	72	57	111	109.0	63.3	10.2	6.3	49	82
26	8.25	8.18	307	182	248	79	59	103	109.0	65.7	9.7	3.9	46	81
27	8.21	8.07	289	173	232	76	57	97	102.6	64.1	8.3	4.9	44	80
28	8.26	8.03	290	174	235	67	55	107	95.4	52.1	13.1	10.7	42	82
29	8.29	7.62	313	184	251	75	62	109	101.0	53.7	15.1	11.7	43	83
30	8.17	7.77	319	197	257	84	62	113	107.4	60.9	12.2	10.7	46	84
31	8.17	7.67	320	181	260	60	60	121	117.8	69.7	7.3	1.9	48	87
Avg.	8.24	8.07	317	192	258	88	59	104	107.8	61.3	12.1	9.3	47	80
Max.	8.43	8.49	334	210	270	115	66	121	121.0	75.4	20.4	16.5	50	87
Min.	7.99	7.41	289	168	232	60	53	95	95.4	48.1	5.8	1.9	42	74

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	24066	12	0	1	0	> 14760	4	0.38	5.1				
2	1	18416	12	0	1	0	2320	2	0.38	6.4				
3	1	6152	12	0	1	0	1360	4	0.37	5.6				
4	1	2324	12	0	1	0	1020	< 2	0.38	5.4				
5	1	852	12	0	1	0	340	< 2	0.38	6.1				
6	1	518	4	0	1	0	40	2	0.40	7.2				
7	1	194	0	0	1	0	80	< 2	0.38	1.4				
8	1	350	0	0	1	0	240	< 2	0.38	3.3				
9	1	342	12	0	1	0	120	< 2	0.40	4.8				
10	1	346	12	0	1	0	240	< 2	0.38	6.5				
11	1	62	12	0	1	0	120	< 2	0.38	4.9				
12	1	40	12	0	1	0	< 2	< 2	0.39	6.0				
13	1	82	12	0	1	0	160	< 2	0.32	6.4				
14	1	40	12	0	1	0	80	2	0.39	5.6				
15	1	20	12	0	1	0	40	< 2	0.40	5.9				
16	1	219	12	0	1	0	> 14760	< 2	0.40	6.0				
17	1	83	12	0	1	0	166	< 2	0.39	6.3				
18	1	88	12	0	1	0	161	< 2	0.40	5.8				
19	1	56	12	0	1	0	116	2	0.39	6.4				
20	1	68	12	0	1	0	156	< 2	0.35	7.0				
21	1	248	12	0	1	0	137	< 2	0.36	3.9				
22	1	308	12	0	1	0	216	< 2	0.36	3.4				
23	1	1300	12	0	1	0	324	< 2	0.35	4.5				
24	1	1300	12	0	1	0	324	< 2	0.36	6.4				
25	1	687	12	0	1	0	470	< 2	0.37	7.4				
26	1	1986	12	0	1	0	392	< 2	0.36	5.1				
27	1	> 2419	12	0	1	0	> 738	< 2	0.37	5.6				
28	1	> 48392	12	0	1	0	9400	2	0.36	4.5				
29	1	39732	12	0	1	0	2640	< 2	0.37	4.0				
30	1	4286	12	0	1	0	560	< 2	0.37	2.2				
31	1	1976	12	0	1	0	300	< 2	0.37	2.6				

Avg.									0.38	5.2				
Max.							9400	4	0.40	7.4				
Min.									0.32	1.4				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1									2.8	0.7	2
2	0.2	2.0	1.9	1.8	1.2	0.1	1.2	2.1	1.6	1.8	10
3	0.9	1.7	1.9	1.6	1.0	0.1	1.5	1.8	1.8	2.0	10
4	0.6	1.1	1.6	1.7	0.9	0.1	1.4	1.8	1.3	1.7	10
5											0
6											0
7											0
8									0.4	0.4	2
9	0.9	0.1	1.4	0.2	0.1	0.2	1.7	2.5	0.3	1.2	10
10	0.7	0.2	1.8	1.7	0.2	0.2	1.5	1.9	1.6	0.8	10
11	0.6	0.5		1.4	0.8	0.1	1.5	1.8	1.5	0.9	9
12											0
13											0
14											0
15									0.8	1.6	2
16	0.7	1.7	1.5	1.6	0.7	0.2	0.8	1.8	1.3	2.1	10
17	0.6	0.8	1.4	1.5	0.7	0.1	0.8	1.8	1.1	1.4	10
18	0.8	1.5	1.5	1.5	0.5	0.2	1.5	1.8	1.2	1.3	10
19	0.5	1.7	1.7	1.3	0.8	0.1			0.9	1.0	8
20											0
21											0
22											0
23	0.7	1.5	1.3	1.5	0.8	0.3	1.5	1.8	1.8	0.3	10
24	0.6	1.1	2.1	0.6	0.5	0.5	1.0	2.0	0.7	1.2	10
25											0
26											0
27											0
28											0
29											0
30	0.6	0.4	1.7	1.5	0.8	0.3	1.2	2.0		1.4	9
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	132
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.1

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1									3.2	1.0	2
2	0.4	2.6	2.5	2.1	1.5	0.2	1.5	2.5	2.1	2.0	10
3	1.2	2.0	2.1	1.9	1.3	0.4	1.8	2.1	2.1	2.3	10
4	1.0	1.4	1.9	2.0	1.3	0.2	1.7	2.1	1.5	1.9	10
5											0
6											0
7											0
8									0.5	0.6	2
9	1.3	0.2	1.6	0.4	0.3	0.4	1.9	2.7	0.5	1.5	10
10	1.1	0.3	2.1	2.0	0.3	0.3	1.7	2.2	1.9	1.1	10
11	1.0	0.5	1.5	2.0	0.8	0.3	2.1	1.9	2.0	2.0	10
12	0.9	0.8		1.6	1.0	0.3	1.7	2.0	1.8	1.2	9
13											0
14											0
15									1.1	1.9	2
16	0.9	2.1	1.8	1.8	1.0	0.3	1.0	2.3	1.5	2.4	10
17	0.8	1.1	1.7	1.8	1.0	0.3	1.0	2.1	1.4	1.8	10
18	1.0	1.7	1.7	1.8	0.8	0.2	1.7	2.0	1.4	1.6	10
19	0.8	1.9	1.9	1.5	1.1	0.3			1.2	1.3	8
20											0
21											0
22											0
23	1.0	1.7	1.6	1.7	1.1	0.5	1.7	2.1	2.0	0.6	10
24	0.8	1.2	2.3	0.8	0.7	0.8	1.2	2.3	0.9	1.4	10
25											0
26											0
27											0
28											0
29											0
30	0.8	0.5	1.9	1.7	1.1	0.5	1.4	2.4		1.6	9
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.4

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow
Operator-in-Charge

November 2014
Month/Year

F-1R, F-2
Certification of Operator-in-Charge

F-1
Water Plant Classification

Michael Glasgow
Signature of Operator-in-Charge

Genesee
County

DEQ
RESOURCE MANAGEMENT DIVISION
DEC 15 2014
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	18.7	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	76	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.1	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.2	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.2%	Percent of Treated Water

Chemical Data

Chlorine on hand:	12,000	lb.	Est. supply:	15	days
Primary Coagulant (Ferric Chloride) on hand:	194,500	lb.	Est. supply:	22	days
Lime (CaO) on hand:	393	tons	Est. supply:	38	days
Fluoride on Hand:	15,000	lb.	Est. supply:	40	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	227	227
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

CONFIDENTIAL

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Catioinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	17.9	8.1	141.8	3.0	0.88	8	7.3	8.5	0.67	1.13
2	17.7	8.7	135.0	2.9	0.89	8	12.1	33.4	1.04	1.47
3	15.9	9.8	141.5	3.0	0.90	8	7.7	11.3	0.63	1.69
4	14.1	9.1	162.2	3.4	0.94	8	7.5	9.2	0.51	1.61
5	13.7	9.1	167.6	3.6	0.98	8	7.0	8.1	0.47	1.39
6	13.7	8.7	160.9	3.5	0.98	8	8.1	9.3	0.52	1.42
7	13.6	8.7	144.6	3.7	0.98	8	7.1	7.4	0.51	1.48
8	13.6	8.7	147.9	4.0	0.98	8	7.3	8.1	0.55	1.81
9	13.5	8.8	136.8	4.0	0.99	8	7.8	11.2	0.54	1.16
10	13.3	9.0	140.0	4.0	1.00	8	7.9	12.2	0.68	1.77
11	12.6	9.3	148.5	4.0	1.03	8	6.7	7.7	0.51	7.80
12	12.5	9.4	133.0	4.2	0.87	8	7.9	18.8	0.47	4.48
13	13.3	8.9	138.5	4.0	0.81	8	5.9	6.6	0.58	2.42
14	14.3	8.0	139.0	3.8	0.77	8	5.3	5.8	0.80	2.29
15	14.4	8.4	142.4	3.9	0.77	8	4.9	5.4	1.01	1.11
16	14.5	8.8	135.2	3.7	0.75	8	6.5	14.1	1.02	1.81
17	12.0	8.6	126.8	3.2	0.65	8	7.4	16.6	0.69	3.78
18	6.0	8.4	132.8	2.9	0.52	8	9.1	36.3	0.81	5.92
19	17.8	10.0	104.7	3.3	0.61	8	4.0	4.4	1.09	2.33
20	17.8	10.7	102.7	3.4	0.61	8	4.1	6.8	1.15	1.83
21	17.6	10.9	104.7	3.6	0.69	8	2.9	3.7	0.89	1.42
22	17.7	10.7	100.9	3.6	0.86	8	2.5	2.9	0.93	2.24
23	17.7	10.9	97.8	3.0	0.59	8	4.5	6.2	1.16	3.32
24	17.7	10.7	88.8	3.0	0.55	8	8.5	27.2	1.13	2.92
25	17.1	11.0	94.1	3.5	0.49	8	4.5	5.1	0.76	3.20
26	16.8	10.0	95.9	3.4	0.39	8	3.7	5.9	0.77	2.31
27	10.9	10.4	92.1	3.7	0.78	8	4.3	9.3	0.84	7.47
28	16.8	9.9	99.7	4.1	1.03	8	3.1	3.3	0.92	1.45
29	16.8	12.2	100.4	4.0	1.03	8	3.8	4.2	0.88	1.15
30	16.7	12.3	96.5	4.3	1.03	8	5.8	16.0	1.00	2.23
Avg.	14.9	9.6	125.1	3.6	0.81	8	6.17			2.55
Max.	17.9	12.3	167.6	4.3	1.03	8	12.1	36.3	1.16	7.80
Min.	6.0	8.0	88.8	2.9	0.39	8	2.50			1.11
Total	448.0									

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.09	0.14	6	0	0	8	0.10	0.12	6	0	0	0.11
2	8	0.10	0.13	6	0	0	8	0.09	0.11	6	0	0	0.10
3	8	0.10	0.13	6	0	0	8	0.10	0.13	6	0	0	0.11
4	8	0.10	0.11	6	0	0	8	0.11	0.13	6	0	0	0.12
5	8	0.08	0.11	6	0	0	8	0.08	0.09	6	0	0	0.09
6	8	0.09	0.11	6	0	0	8	0.09	0.11	6	0	0	0.11
7	8	0.10	0.12	6	0	0	8	0.10	0.12	6	0	0	0.12
8	8	0.10	0.17	6	0	0	8	0.09	0.12	6	0	0	0.11
9	8	0.11	0.13	6	0	0	8	0.10	0.13	6	0	0	0.11
10	8	0.11	0.15	6	0	0	8	0.10	0.15	6	0	0	0.12
11	8	0.10	0.18	6	0	0	8	0.09	0.14	6	0	0	0.11
12	8	0.10	0.14	6	0	0	8	0.08	0.10	6	0	0	0.10
13	8	0.08	0.09	6	0	0	8	0.07	0.09	6	0	0	0.09
14	8	0.07	0.09	6	0	0	8	0.07	0.09	6	0	0	0.09
15	8	0.07	0.08	6	0	0	8	0.07	0.09	6	0	0	0.08
16	8	0.07	0.09	6	0	0	8	0.08	0.13	6	0	0	0.08
17	5	0.07	0.09	5	0	0	5	0.07	0.09	5	0	0	0.07
18	2	0.10	0.12	2	0	0	2	0.08	0.10	2	0	0	0.07
19	8	0.08	0.10	6	0	0	8	0.07	0.09	6	0	0	0.07
20	8	0.08	0.10	6	0	0	8	0.06	0.07	6	0	0	0.07
21	8	0.08	0.09	6	0	0	8	0.07	0.09	6	0	0	0.08
22	8	0.08	0.12	6	0	0	8	0.07	0.09	6	0	0	0.07
23	8	0.08	0.08	6	0	0	8	0.08	0.09	6	0	0	0.07
24	8	0.08	0.12	6	0	0	8	0.08	0.09	6	0	0	0.08
25	8	0.09	0.12	6	0	0	8	0.08	0.10	6	0	0	0.07
26	8	0.09	0.10	6	0	0	8	0.08	0.10	6	0	0	0.07
27	4	0.08	0.09	4	0	0	4	0.07	0.09	4	0	0	0.07
28	8	0.08	0.09	6	0	0	8	0.08	0.11	6	0	0	0.06
29	8	0.08	0.08	6	0	0	8	0.08	0.15	6	0	0	0.06
30	8	0.09	0.11	6	0	0	8	0.09	0.11	6	0	0	0.08
Avg.	8	0.09	0.11	6	0	0	8	0.08	0.11	6	0	0	
Max.	8	0.11	0.18	6	0	0	8	0.11	0.15	6	0	0	0.12
Min.	2	0.07	0.08	2	0	0	2	0.06	0.07	2	0	0	

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.50	0.18	0.64		2.4	3.6	6.0	0.8	1.1	3.2	3.5	2.4	2.9
2	0.50	0.21	0.73		2.2	3.3	5.4	0.9	1.3	3.2	3.5	3.0	3.5
3	0.50	0.21	0.76		2.4	3.5	5.9	0.9	1.3	3.2	3.5	3.2	3.5
4	0.45	0.22	0.72	0.69	2.5	3.5	6.0	0.8	1.1	3.2	3.5	2.9	3.3
5	0.45	0.22	0.70		2.4	3.2	5.6	0.9	1.1	3.2	3.5	2.1	2.5
6	0.45	0.22	0.72		2.3	3.6	5.9	0.7	1.0	3.2	3.5	2.4	2.8
7	0.45	0.22	0.75		2.4	4.1	6.5	0.8	1.1	2.5	3.1	1.8	2.4
8	0.40	0.23	0.69		2.3	3.9	6.2	0.9	1.1	3.0	3.5	2.5	2.9
9	0.40	0.23	0.67		2.2	3.8	6.0	0.8	1.0	3.0	3.5	3.0	3.5
10	0.40	0.22	0.63		2.2	4.1	6.3	0.7	1.0	3.0	3.5	3.0	3.5
11	0.45	0.26	0.71	0.68	1.6	4.2	5.8	0.8	1.1	3.0	3.5	3.0	3.5
12	0.40	0.21	0.63		1.7	3.6	5.3	0.8	1.0	2.6	3.0	2.1	2.5
13	0.35	0.21	0.55		2.1	3.6	5.7	0.8	1.1	3.0	3.5	2.9	3.2
14	0.40	0.22	0.58		2.0	3.7	5.7	0.8	1.1	3.2	3.5	2.3	3.0
15	0.40	0.23	0.61		1.8	3.7	5.5	0.7	0.9	3.0	3.5	2.5	3.0
16	0.35	0.21	0.54		1.8	3.7	5.5	0.5	0.8	3.2	3.5	2.7	3.0
17	0.35	0.22	0.63		1.6	3.5	5.1	0.5	0.8	3.2	3.5	2.9	3.2
18	0.35	0.22	0.61	0.59	1.9	2.9	4.8	0.2	0.3	3.0	3.2	2.8	3.3
19	0.30	0.22	0.46		1.9	2.9	4.8	0.5	0.8	2.5	3.0	2.2	2.8
20	0.40	0.22	0.60		1.9	3.0	4.9	0.5	0.7	3.0	3.4	2.1	2.4
21	0.45	0.21	0.66		1.8	2.9	4.7	0.6	0.9	2.7	3.1	2.2	2.6
22	0.40	0.20	0.61		2.0	3.0	5.0	0.5	0.8	2.5	3.0	2.0	2.5
23	0.35	0.21	0.59		2.1	2.8	4.9	0.6	0.9	3.0	3.5	2.7	3.2
24	0.40	0.21	0.62		2.0	2.7	4.7	0.8	1.1	2.8	3.2	2.7	3.2
25	0.40	0.23	0.64		2.2	2.8	5.0	0.7	1.0	2.6	3.1	2.4	3.0
26	0.40	0.22	0.63		2.0	2.7	4.7	0.7	1.0	2.9	3.4	2.5	2.9
27	0.40	0.22	0.63		1.5	2.6	4.1	0.7	1.0	3.0	3.5	2.8	3.2
28	0.40	0.20	0.61		2.0	2.9	4.9	0.7	0.9	2.7	3.3	2.1	2.6
29	0.40	0.21	0.62		2.1	3.3	5.4	0.6	0.8	2.4	3.1	2.2	2.5
30	0.40	0.21	0.69		2.1	3.8	5.9	0.6	0.9	3.0	3.5	3.0	3.5
Avg.	0.41	0.22	0.64	0.65	2.0	3.4	5.4	0.7	1.0	2.9	3.4	2.5	3.0
Max.	0.50	0.26	0.76	0.69	2.5	4.2	6.5	0.9	1.3	3.2	3.5	3.2	3.5
Min.	0.30	0.18	0.46	0.59	1.5	2.6	4.1	0.2	0.3	2.4	3.0	1.8	2.4

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.32	7.75	281	168	225	91	56	77	101.8	64.1	6.8	1.0	45	67
2	8.43	8.17	286	163	238	81	48	82	89.8	47.3	15.1	10.7	44	67
3	8.41	8.11	285	175	230	84	55	91	93.0	49.7	12.6	11.7	45	70
4	8.39	7.29	285	172	233	78	52	94	93.0	54.5	13.1	9.2	46	70
5	8.41	7.61	290	162	240	81	50	81	90.6	51.3	15.6	8.7	49	72
6	8.40	7.72	288	160	235	81	53	79	89.0	46.5	15.6	9.2	46	69
7	8.41	7.71	289	167	236	82	53	85	102.6	59.9	8.3	4.9	45	68
8	8.41	7.77	291	164	232	78	59	86	102.6	60.1	8.3	3.4	47	69
9	8.46	7.80	297	160	236	78	61	82	86.6	42.5	19.4	13.1	48	71
10	8.44	7.82	294	166	241	83	53	83	93.0	43.3	14.6	14.1	47	70
11	8.52	8.09	296	168	237	84	59	84	107.4	60.1	7.3	3.4	48	70
12	8.50	7.81	297	167	244	81	53	86	96.2	50.5	13.1	9.2	45	71
13	8.51	7.39	300	163	241	78	59	85	112.2	59.3	4.9	4.4	48	70
14	8.53	7.59	301	148	241	60	60	88	115.4	59.3	3.4	1.5	46	69
15	8.54	7.77	302	146	235	64	67	82	109.0	52.1	7.8	4.9	47	68
16	8.54	8.13	301	149	247	64	54	85	100.2	41.7	11.7	10.2	49	72
17	8.57	7.57	313	152	249	64	64	88	101.8	40.9	13.6	11.2	47	71
18	8.48	7.53	307	152	254	70	53	82	95.4	44.9	17.5	8.7	47	72
19	8.51	7.59	308	183	248	90	60	93	104.2	65.7	11.7	3.9	47	68
20	8.42	7.50	313	187	248	95	65	92	104.2	64.9	12.2	5.8	47	73
21	8.31	8.14	310	191	251	100	59	91	113.8	70.5	6.8	2.9	47	72
22	8.31	7.92	308	202	249	113	59	89	103.4	68.9	12.2	6.8	48	74
23	8.38	7.97	321	213	252	122	69	91	101.0	64.1	17.0	12.6	48	76
24	8.36	8.34	312	211	246	121	66	90	85.0	56.1	23.8	18.0	50	75
25	8.25	7.85	311	209	250	111	61	98	105.0	70.1	11.2	6.8	50	75
26	8.22	8.29	311	196	251	108	60	88	107.4	71.3	10.2	4.4	47	72
27	8.40	8.24	310	189	255	100	55	89	99.4	54.5	14.6	12.6	48	72
28	8.32	8.23	304	179	248	100	56	79	116.2	64.9	3.9	1.0	48	69
29	8.16	8.45	302	192	245	102	57	90	109.8	64.1	7.3	7.3	47	72
30	8.20	8.04	309	197	149	102	160	95	102.6	61.7	12.6	10.2	46	77
Avg.	8.40	7.87	301	175	240	88	61	87	101.1	56.8	11.7	7.7	47	71
Max.	8.57	8.45	321	213	255	122	160	98	116.2	71.3	23.8	18.0	50	77
Min.	8.16	7.29	281	146	149	60	48	77	85.0	40.9	3.4	1.0	44	67

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	564	12	0	1	0	860	< 2	0.39	10.8				
2	1	654	12	0	1	0	1060	< 2	0.38	8.8				
3	1	296	12	0	1	0	190	< 2	0.39	8.9				
4	1	218	12	0	1	0	160	< 2	0.36	9.6				
5	1	486	12	0	1	0	3780	< 2	0.36	9.0				
6	1	194	12	0	1	0	3660	< 2	0.36	9.8				
7	1	268	12	0	1	0	1770	< 2	0.40	10.2				
8	1	194	12	0	1	0	4180	< 2	0.37	9.3				
9	1	296	12	0	1	0	3420	< 2	0.39	8.1				
10	1	172	12	0	1	0	4460	2	0.40	8.8				
11	1	296	12	0	1	0	1720	< 2	0.40	8.3				
12	1	218	12	0	1	0	1600	< 2	0.37	7.7				
13	1	40	12	0	1	0	1420	< 2	0.39	7.0				
14	1	126	12	0	1	0	800	< 2	0.37	6.4				
15	1	104	12	0	1	0	420	< 2	0.37	6.3				
16	1	82	12	0	1	0	560	< 2	0.36	5.5				
17	1	104	10	0	1	0	340	< 2	0.37	4.7				
18	1	104	4	0	1	0	160	< 2	0.33	4.0				
19	1	40	12	0	1	0	40	< 2	0.40	4.9				
20	1	40	12	0	1	0	520	< 2	0.41	5.3				
21	1	20	12	0	1	0	80	2	0.42	5.4				
22	1	82	12	0	1	0	80	< 2	0.44	5.9				
23	1	168	12	0	1	0	340	2	0.46	5.8				
24	1	768	12	0	1	0	660	< 2	0.46	6.4				
25	1	596	12	0	1	0	420	< 2	0.46	6.2				
26	1	1008	12	0	1	0	340	< 2	0.43	5.6				
27	1	1240	8	0	1	0	460	2	0.36	5.1				
28	1	7308	12	0	1	0	2240	< 2	0.37	5.4				
29	1	9768	12	0	1	0	3120	< 2	0.38	6.3				
30	1	19608	12	0	1	0	5140	< 2	0.37	6.5				

Avg.									0.39	7.1				
Max.							5140	2	0.46	10.8				
Min.									0.33	4.0				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4	0.4	1.6	1.2	1.5	0.8	0.1	0.3	1.9	0.8	1.8	10
5											0
6	0.3	1.2	1.1	1.6	1.0	0.1	0.2	1.5	1.5	1.0	10
7											0
8											0
9											0
10											0
11	0.5	1.4	1.7	1.8	0.9	0.1	0.5	1.8	1.2	2.0	10
12	0.1	1.0	1.1	1.6	0.5	0.1	0.1	2.7	0.8	0.7	10
13	0.5	1.1	1.5	1.8	0.3	0.1	0.5	2.2	1.7	0.5	10
14									0.6	1.8	2
15											0
16											0
17										1.3	1
18	0.1	0.3	1.7	0.4	0.4	0.1	0.2	1.7	0.3	0.7	10
19	0.5	0.3	1.3	1.8	0.5	0.1	1.0	1.8	3.5	1.5	10
20	0.7	1.3	1.4	1.9	0.5	0.1	0.7	1.7	1.7	1.8	10
21											0
22											0
23											0
24									1.1	0.5	2
25	0.5	1.6	1.6	0.9	0.3	0.1	1.5	1.5	0.9	1.6	10
26	0.6	0.7	1.9	1.7	1.0	0.2	0.6	1.7	1.8	1.7	10
27											0
28	0.1	0.8	1.5	1.4	0.6	0.6	1.5	1.7	0.7	1.4	10
29											0
30											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	115
Total # of routine distribution samples required	100

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	97%
Average disinfectant residual this month	1.0

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4	0.7	1.8	1.4	1.7	1.0	1.5	0.5	2.3	1.2	2.1	10
5											0
6	0.5	1.5	1.5	1.9	1.3	0.2	0.3	2.0	1.8	1.4	10
7											0
8											0
9											0
10											0
11	0.9	1.7	2.2	2.1	1.3	0.2	0.8	2.2	1.5	2.3	10
12	0.3	1.3	1.4	1.9	0.8	0.2	0.3	3.2	1.1	1.0	10
13	0.8	1.5	1.8	2.0	0.5	0.2	0.9	2.5	2.0	0.8	10
14									0.8	2.1	2
15											0
16											0
17										1.6	1
18	0.2	0.5	2.0	0.6	0.6	0.2	0.3	2.2	0.5	1.0	10
19	0.8	0.5	1.7	2.3	0.8	0.4	1.4	2.2	3.5	1.8	10
20	1.0	1.6	1.7	2.2	0.8	0.2	1.1	2.1	1.9	2.4	10
21											0
22											0
23											0
24									1.4	0.8	2
25	0.8	1.9	2.0	1.3	0.6	0.3	1.8	1.8	1.3	2.0	10
26	1.1	1.0	1.7	2.1	1.3	0.3	0.9	2.1	2.1	2.0	10
27											0
28	0.2	1.2	1.8	1.7	0.9	0.9	1.8	2.1	1.1	1.7	10
29											0
30											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.3

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow
Operator-in-Charge

October 2014
Month/Year

F-1R, F-2
Certification of Operator-in-Charge

F-1
Water Plant Classification

Michael Glasgow
Signature of Operator-in-Charge

Genesee
County

DEQ
RESOURCE MANAGEMENT DIVISION
NOV 17 2014
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	23.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	84	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	1.9	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.7%	Percent of Treated Water

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	25	days
Primary Coagulant (Ferric Chloride) on hand:	133,600	lb.	Est. supply:	16	days
Lime (CaO) on hand:	239	tons	Est. supply:	24	days
Fluoride on Hand:	10,000	lb.	Est. supply:	27	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	246	246
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

COMPLETED

Backentered

Coagulation Parameters & Softening Chemical Application | City of Flint Water Treatment Plant | October 2014 | Page 2

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Catioinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	15.6	7.3	140.2	3.3	0.82	7	10.9	21.4	0.50	1.28
2	14.2	6.6	142.1	2.8	0.84	8	10.4	14.5	0.48	1.80
3	13.8	6.4	133.2	3.3	0.90	8	11.9	17.9	0.53	0.77
4	14.1	6.2	132.1	3.3	0.84	8	13.1	31.4	0.50	1.11
5	13.8	6.9	149.7	3.2	0.86	8	13.1	29.3	1.29	1.07
6	13.8	7.1	131.5	3.5	0.88	8	12.2	18.9	0.75	1.59
7	13.9	8.3	133.2	3.4	0.85	8	10.4	17.1	0.62	0.72
8	13.8	8.3	137.5	3.3	0.86	8	9.7	13.1	0.61	0.80
9	13.8	8.2	131.8	3.3	0.86	8	8.5	12.3	0.65	0.96
10	13.6	8.5	119.8	3.4	0.87	8	8.4	10.9	0.67	1.34
11	13.5	8.5	126.0	3.4	0.88	8	7.5	8.8	0.74	1.70
12	13.7	8.4	118.0	3.4	0.87	8	8.3	11.1	0.80	1.55
13	13.7	8.4	126.3	3.4	0.87	8	10.5	30.2	0.82	1.03
14	13.6	8.4	126.8	3.4	0.87	8	7.3	9.0	0.76	0.93
15	13.4	8.5	129.5	3.4	0.89	7	11.1	16.1	0.80	1.21
16	13.3	8.6	130.2	3.5	0.89	7	7.9	9.3	0.77	0.91
17	16.6	9.1	132.7	3.2	0.88	8	7.8	10.2	1.15	0.74
18	19.5	10.8	126.2	3.3	1.02	8	6.8	9.6	0.87	1.57
19	18.7	11.7	127.7	3.3	1.02	8	7.2	16.9	0.60	1.17
20	18.3	11.7	125.9	3.1	1.04	8	6.1	7.9	0.61	0.77
21	18.3	11.6	128.1	3.0	1.04	7	8.8	18.2	0.76	0.59
22	18.4	10.8	131.0	2.9	0.93	8	6.1	7.3	0.84	0.85
23	18.3	11.4	154.3	2.9	0.94	8	8.6	24.6	0.79	1.20
24	18.5	11.3	155.8	2.8	0.93	8	5.7	6.0	0.77	0.99
25	18.5	10.9	153.2	2.9	0.93	8	5.8	6.1	0.80	1.45
26	15.6	10.1	143.5	3.1	0.90	8	9.9	18.8	0.56	1.56
27	13.9	6.3	149.3	3.3	0.86	8	15.7	48.2	0.51	1.10
28	13.7	5.9	130.6	3.3	0.86	8	9.3	10.7	0.49	0.91
29	13.7	6.0	150.6	3.3	0.87	8	11.6	25.3	0.48	1.03
30	18.0	8.3	126.8	2.7	0.81	8	8.9	11.3	0.52	1.53
31	18.3	8.2	129.4	2.7	0.79	8	6.7	7.1	0.54	1.28
Avg.	15.5	8.7	134.6	3.2	0.89	8	9.23			1.15
Max.	19.5	11.7	155.8	3.5	1.04	8	15.7	48.2	1.29	1.80
Min.	13.3	5.9	118.0	2.7	0.79	7	5.70			0.59
Total	479.9									

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.11	0.14	6	0	0	8	0.08	0.12	6	0	0	0.09
2	8	0.09	0.12	6	0	0	8	0.08	0.11	6	0	0	0.08
3	7	0.08	0.09	6	0	0	7	0.07	0.09	6	0	0	0.07
4	8	0.09	0.10	6	0	0	8	0.09	0.12	6	0	0	0.08
5	8	0.10	0.12	6	0	0	8	0.09	0.11	6	0	0	0.09
6	8	0.10	0.14	6	0	0	8	0.10	0.13	6	0	0	0.09
7	8	0.08	0.08	6	0	0	8	0.08	0.11	6	0	0	0.08
8	8	0.09	0.11	6	0	0	8	0.08	0.10	6	0	0	0.09
9	8	0.09	0.12	6	0	0	8	0.10	0.13	6	0	0	0.10
10	8	0.09	0.12	6	0	0	8	0.08	0.10	6	0	0	0.09
11	8	0.09	0.13	6	0	0	8	0.09	0.12	6	0	0	0.10
12	8	0.09	0.12	6	0	0	8	0.09	0.14	6	0	0	0.09
13	8	0.09	0.12	6	0	0	8	0.07	0.08	6	0	0	0.07
14	8	0.09	0.11	6	0	0	8	0.09	0.10	6	0	0	0.08
15	8	0.08	0.09	6	0	0	8	0.07	0.09	6	0	0	0.08
16	7	0.10	0.12	6	0	0	7	0.09	0.11	6	0	0	0.09
17	8	0.08	0.09	6	0	0	8	0.08	0.09	6	0	0	0.08
18	8	0.08	0.09	6	0	0	8	0.07	0.08	6	0	0	0.08
19	8	0.07	0.09	8	0	0	8	0.07	0.08	6	0	0	0.07
20	8	0.08	0.11	6	0	0	8	0.09	0.15	6	0	0	0.08
21	8	0.08	0.10	6	0	0	8	0.08	0.10	6	0	0	0.09
22	8	0.08	0.10	6	0	0	8	0.09	0.10	6	0	0	0.09
23	8	0.08	0.14	6	0	0	8	0.07	0.08	6	0	0	0.09
24	8	0.07	0.09	6	0	0	8	0.07	0.10	6	0	0	0.09
25	8	0.07	0.10	6	0	0	8	0.07	0.09	6	0	0	0.11
26	8	0.07	0.12	6	0	0	8	0.07	0.09	6	0	0	0.08
27	8	0.07	0.11	6	0	0	8	0.06	0.08	6	0	0	0.09
28	8	0.08	0.11	6	0	0	8	0.08	0.10	6	0	0	0.08
29	8	0.09	0.10	6	0	0	8	0.09	0.10	6	0	0	0.11
30	8	0.11	0.14	6	0	0	8	0.10	0.13	6	0	0	0.11
31	8	0.10	0.14	6	0	0	8	0.09	0.11	6	0	0	0.12
Avg.	8	0.09	0.11	6	0	0	8	0.08	0.10	6	0	0	
Max.	8	0.11	0.14	6	0	0	8	0.10	0.15	6	0	0	0.12
Min.	7	0.07	0.08	6	0	0	7	0.06	0.08	6	0	0	

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.20	0.68		2.6	4.0	6.6	0.7	1.1	3.2	3.5	2.5	3.2
2	0.5	0.21	0.70		2.7	4.0	6.7	0.7	0.9	3.0	3.5	2.5	3.1
3	0.5	0.21	0.72		2.9	4.1	7.0	0.5	0.7	2.7	3.5	2.5	3.1
4	0.4	0.22	0.72		2.7	3.9	6.6	0.7	1.1	3.2	3.5	2.4	2.9
5	0.4	0.20	0.67		2.9	4.2	7.1	1.1	1.4	3.2	3.7	1.9	2.4
6	0.5	0.21	0.70		2.6	3.9	6.5	0.6	0.9	3.2	3.5	2.3	2.8
7	0.5	0.20	0.71	0.62	2.6	3.9	6.5	0.6	0.8	3.2	3.5	2.4	2.7
8	0.4	0.23	0.69		2.6	4.0	6.6	0.8	1.0	3.2	3.5	2.5	3.1
9	0.4	0.19	0.66		2.5	3.9	6.4	0.7	1.0	3.2	3.5	2.5	3.0
10	0.4	0.20	0.62		2.4	3.8	6.2	0.7	0.9	3.0	3.5	2.4	3.1
11	0.4	0.21	0.63		2.3	3.9	6.2	0.7	0.9	3.0	3.5	2.7	3.1
12	0.4	0.21	0.66		2.3	3.8	6.1	0.6	0.8	2.8	3.5	1.9	2.5
13	0.4	0.20	0.63		2.4	4.1	6.5	0.8	1.1	3.2	3.5	3.2	3.5
14	0.4	0.22	0.68		2.5	4.0	6.5	0.6	0.9	2.9	3.5	2.8	3.2
15	0.4	0.21	0.64		2.5	3.9	6.4	0.7	1.1	3.2	3.5	2.8	3.5
16	0.4	0.21	0.74		2.5	4.0	6.5	0.7	1.0	3.0	3.5	3.0	3.5
17	0.4	0.20	0.70	0.68	2.6	4.0	6.6	0.5	0.8	3.1	3.5	3.2	3.5
18	0.5	0.21	0.62		2.7	3.3	6.0	0.6	1.1	3.0	3.5	3.2	3.5
19	0.4	0.21	0.63		2.6	3.4	6.0	0.9	1.2	3.0	3.5	3.0	3.5
20	0.4	0.21	0.59		2.4	3.7	6.1	0.6	0.9	3.0	3.5	3.0	3.5
21	0.4	0.20	0.66	0.62	2.4	3.7	6.1	0.5	0.9	3.0	3.5	2.7	3.1
22	0.4	0.22	0.65		2.4	3.8	6.2	0.5	0.8	2.6	3.5	2.1	2.6
23	0.4	0.20	0.64		2.5	3.6	6.1	0.7	0.9	3.0	3.5	2.8	3.0
24	0.4	0.22	0.67		2.4	3.5	5.9	0.7	1.0	2.9	3.5	2.2	2.7
25	0.5	0.21	0.68		2.3	3.6	5.9	0.6	0.9	2.8	3.5	2.2	2.7
26	0.4	0.20	0.66		2.2	3.7	5.9	0.8	1.0	3.0	3.5	3.0	3.5
27	0.4	0.20	0.64		2.1	4.5	6.6	0.7	1.0	3.0	3.5	2.9	3.3
28	0.4	0.21	0.67	0.65	2.1	3.9	6.0	0.5	0.8	2.7	3.5	2.7	3.2
29	0.5	0.21	0.67		2.3	4.1	6.4	0.6	0.8	3.0	3.5	2.3	2.8
30	0.5	0.20	0.66		2.2	3.4	5.6	0.6	1.1	3.0	3.5	3.0	3.5
31	0.5	0.18	0.71		2.2	3.4	5.6	0.6	0.8	2.9	3.5	2.1	2.6
Avg.	0.43	0.21	0.67	0.64	2.5	3.8	6.3	0.7	1.0	3.0	3.5	2.6	3.1
Max.	0.50	0.23	0.74	0.68	2.9	4.5	7.1	1.1	1.4	3.2	3.7	3.2	3.5
Min.	0.40	0.18	0.59	0.62	2.1	3.3	5.6	0.5	0.7	2.6	3.5	1.9	2.4

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.00	7.81	254	144	219	72	35	72	81.8	45.7	12.6	7.8	41	65
2	8.19	7.85	249	147	209	68	40	79	81.8	49.7	10.2	5.8	42	62
3	8.17	7.91	254	157	206	74	48	83	85.8	54.5	10.7	4.3	44	62
4	8.13	7.43	249	160	205	83	44	77	84.2	55.2	10.7	5.8	43	61
5	8.28	7.83	253	157	210	82	43	75	77.0	51.3	15.1	6.8	43	61
6	8.26	7.89	255	152	208	74	47	78	79.4	49.7	13.6	6.3	42	62
7	8.28	7.45	259	162	210	87	49	75	77.8	48.1	15.6	9.7	41	64
8	8.26	7.65	253	162	202	76	51	86	87.4	57.7	8.2	4.9	42	64
9	8.27	7.90	252	157	209	77	43	80	79.4	47.3	13.1	8.7	42	64
10	8.26	7.60	256	166	205	84	51	82	85.8	54.5	9.7	6.3	42	65
11	8.31	7.45	254	175	203	86	51	89	86.0	63.3	7.8	4.3	43	64
12	8.25	7.69	255	156	204	71	51	85	81.0	51.3	13.1	7.3	44	65
13	8.38	7.79	256	152	210	76	46	76	72.9	48.1	17.5	6.8	45	66
14	8.34	7.53	255	155	203	73	52	82	89.0	56.9	8.3	2.9	45	65
15	7.97	7.88	249	148	206	70	43	78	71.3	48.9	18.0	5.3	43	67
16	8.32	7.90	256	156	212	80	44	76	84.2	47.3	11.2	9.2	45	68
17	8.36	7.68	260	160	210	83	50	77	69.7	45.7	21.4	10.7	43	67
18	8.24	7.96	252	167	210	79	42	88	81.8	53.7	11.7	5.8	42	70
19	8.31	8.11	262	174	211	82	51	92	83.4	54.5	13.1	8.7	42	71
20	8.21	7.60	264	182	212	93	52	89	81.0	60.1	14.6	7.8	43	72
21	8.26	7.59	262	197	215	107	47	90	83.4	60.9	12.6	10.2	43	72
22	8.26	7.53	266	186	216	90	50	96	86.6	63.3	11.7	6.8	44	69
23	8.24	7.43	267	180	222	91	45	89	84.2	58.5	14.6	8.7	42	70
24	8.19	7.82	271	162	220	71	51	91	83.4	55.3	15.6	5.8	45	69
25	8.21	7.88	273	160	221	74	52	86	85.8	56.9	14.1	3.4	43	70
26	8.04	7.76	270	161	224	70	46	91	82.6	52.1	16.0	7.3	43	70
27	8.25	7.61	278	157	233	72	45	85	87.4	49.7	14.6	9.2	42	70
28	8.33	7.41	278	164	237	76	41	88	84.2	56.1	17.1	5.3	44	62
29	8.28	7.48	276	160	230	85	46	75	86.6	46.5	16.0	10.2	43	64
30	8.40	7.88	278	158	225	75	53	83	86.6	52.9	15.1	4.4	44	62
31	8.37	7.75	280	172	223	92	57	80	87.4	53.7	15.1	8.7	47	65
Avg.	8.25	7.71	261	163	214	80	47	83	82.5	53.2	13.5	6.9	43	66
Max.	8.40	8.11	280	197	237	107	57	96	89.0	63.3	21.4	10.7	47	72
Min.	7.97	7.41	249	144	202	68	35	72	69.7	45.7	7.8	2.9	41	61

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	6152	12	0	1	0	> 14760	< 2	0.39	12.9				
2	1	15402	12	0	1	0	4960	< 2	0.38	18.4				
3	1	15402	12	0	1	0	3660	< 2	0.35	18.2				
4	1	2878	12	0	1	0	4040	< 2	0.39	18.5				
5	1	2092	12	0	1	0	4620	< 2	0.39	17.2				
6	1	1498	12	0	1	0	5320	< 2	0.39	15.3				
7	1	900	12	0	1	0	200	< 2	0.38	14.3				
8	1	1646	12	0	1	0	1240	< 2	0.39	14.3				
9	1	766	12	0	1	0	1720	< 2	0.38	14.0				
10	1	1262	12	0	1	0	1940	< 2	0.38	13.6				
11	1	378	12	0	1	0	340	< 2	0.40	13.3				
12	1	524	12	0	1	0	2000	< 2	0.42	13.8				
13	1	672	12	0	1	0	2240	< 2	0.39	12.4				
14	1	728	12	0	1	0	2560	< 2	0.37	15.1				
15	1	4718	12	0	1	0	8800	< 2	0.36	15.6				
16	1	462	12	0	1	0	4180	< 2	0.36	15.3				
17	1	590	12	0	1	0	7100	< 2	0.38	15.0				
18	1	626	12	0	1	0	1600	< 2	0.38	15.7				
19	1	342	12	0	1	0	2400	< 2	0.39	14.8				
20	1	218	12	0	1	0	1300	< 2	0.43	13.1				
21	1	498	12	0	1	0	1800	< 2	0.44	13.8				
22	1	634	12	0	1	0	3780	< 2	0.44	13.3				
23	1	350	12	0	1	0	1540	< 2	0.43	14.3				
24	1	268	12	0	1	0	960	< 2	0.42	11.7				
25	1	312	12	0	1	0	860	< 2	0.39	11.4				
26	1	264	12	0	1	0	1940	< 2	0.38	12.2				
27	1	690	12	0	1	0	1180	< 2	0.38	11.9				
28	1	256	12	0	1	0	1120	< 2	0.38	11.7				
29	1	518	12	0	1	0	800	< 2	0.39	12.9				
30	1	148	12	0	1	0	660	< 2	0.38	13.2				
31	1	170	12	0	1	0	700	< 2	0.39	11.3				

Avg.									0.39	14.1				
Max.							8800	0	0.44	18.5				
Min.									0.35	11.3				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.3	1.4	0.1	0.6	0.2	0.1	0.5	1.8	1.0	1.3	10
2	0.4	1.1	0.1	0.5	0.3	0.1	0.6	1.9	1.2	1.3	10
3											0
4											0
5											0
6	0.3	1.8	0.1	0.6	0.4	0.1	0.1	1.9	1.1	2.0	10
7	0.3	0.1	0.1	0.3	0.1	0.1	0.2	1.8	0.5	0.2	10
8	0.4	0.0	0.1	0.3	0.1	0.1	0.3	1.9	1.5	0.5	10
9	0.3	0.0	0.1	0.5	0.1	0.2	0.1	2.2	0.5	1.5	10
10	0.4	0.0	0.1	0.5	0.2	0.1	0.6	2.3	1.5	1.5	10
11											0
12											0
13											0
14	0.6	0.0	0.1	0.7	0.1	0.1	0.5	2.2	0.7	1.2	10
15	0.3	0.0	0.1	0.5	0.1	0.1	0.3	2.2	0.6	1.0	10
16	0.5	0.0	0.1	0.5	0.3	0.1	0.2	2.6	1.7	0.6	10
17											0
18											0
19											0
20											0
21	0.4	0.2	0.2	0.4	0.3	0.1	0.2	1.5	1.0	1.5	10
22	0.6	0.8	0.4	0.6	0.1	0.1	0.6	2.2	1.9	1.4	10
23	0.4	1.7	0.4	1.0	0.7	0.1	0.5	1.7	1.7	1.7	10
24											0
25											0
26											0
27									1.3	1.0	2
28	0.4	1.7	0.9	0.8	0.7	0.1	0.6	2.0	1.5	1.4	10
29	0.2	1.1	0.1	1.0	0.6	0.1	0.1	1.8	1.4	1.2	10
30	0.1	0.6	0.6	0.7	0.9	0.1	0.3	2.1	1.5	1.1	10
31									1.5	1.3	2

Distribution Sample Summary	
Total # of routine distribution samples analyzed	164
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	5
Percent of routine distribution samples positive	3%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	96%
Average disinfectant residual this month	0.72

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1	0.6	1.7	0.3	0.9	0.4	0.2	0.7	2.2	1.3	1.5	10
2	0.7	1.4	0.3	0.8	0.6	0.2	0.8	2.4	1.6	1.6	10
3											0
4											0
5											0
6	0.6	2.3	0.3	1.0	0.6	0.2	0.2	2.1	1.4	2.3	10
7	0.6	0.2	0.2	0.5	0.2	0.2	0.4	2.1	0.7	0.3	10
8	0.8	0.1	0.2	0.5	0.2	0.3	0.5	2.3	2.0	0.8	10
9	0.5	0.1	0.2	0.8	0.2	0.2	0.2	2.5	0.8	1.7	10
10	0.6	0.1	0.3	0.9	0.4	0.3	0.8	2.7	1.8	1.8	10
11											0
12											0
13											0
14	1.0	0.0	0.3	1.1	0.3	0.4	0.9	2.5	1.0	1.6	10
15	0.6	0.0	0.3	0.7	0.2	0.2	0.5	2.7	0.9	1.4	10
16	0.9	0.0	0.3	0.9	0.5	0.3	0.4	3.0	2.0	1.0	10
17											0
18											0
19											0
20											0
21	0.7	0.4	0.5	0.7	0.5	0.2	0.4	1.7	1.2	1.8	10
22	1.1	1.2	0.6	1.0	0.1	0.1	0.9	2.5	2.3	2.0	10
23	0.7	2.3	0.7	1.3	0.9	0.2	0.7	2.2	2.2	1.9	10
24											0
25											0
26											0
27									1.5	1.3	2
28	0.7	2.0	1.2	1.1	1.0	0.2	0.9	2.3	1.8	1.7	10
29	0.4	1.5	0.3	1.4	0.9	0.2	0.3	2.3	1.7	1.5	10
30	0.1	1.0	1.0	1.1	1.4	0.2	0.6	2.5	1.8	1.5	10
31									1.8	1.7	2

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent
10/2/2014	3606 Corunna Rd	10/3/2014	3606 Corunna Rd	0.5 / 0.8	Absent
			3521 Corunna Rd	0.8 / 1.1	Absent
			3614 Corunna Rd	0.4 / 0.6	Absent
10/10/2014	3606 Corunna Rd	10/11/2014	3606 Corunna Rd	0.4 / 0.6	Absent
			3521 Corunna Rd	1.2 / 1.6	Absent
			3809 Corunna Rd	0.1 / 0.2	Absent
10/14/2014	822 S. Dort Hwy	10/15/2014	822 S. Dort Hwy	0.0 / 0.0	Present
			810 S. Dort Hwy	0.1 / 0.1	Absent
			2838 E. Court St.	0.1 / 0.3	Absent
		10/16/2014	822 S. Dort Hwy	0.0 / 0.0	Absent
			810 S. Dort Hwy	0.0 / 0.1	Absent
			2838 E. Court St.	0.1 / 0.2	Absent
10/16/2014	3606 Corunna Rd	10/17/2014	3606 Corunna Rd	0.4 / 0.7	Absent
			3521 Corunna Rd	0.7 / 1.0	Absent
			3614 Corunna Rd	0.5 / 0.7	Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	**September 2014**
Operator-in-Charge	Month/Year
F-1R, F-2	**F-1**
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	**Genesee**
Signature of Operator-in-Charge	County

DEQ
RESOURCE MANAGEMENT DIVISION
OCT 20 2014
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	24.5	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	97	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.1	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.4	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.9%	Percent of Treated Water

Chemical Data

Chlorine on hand:	16000	lb.	Est. supply:	15	days
Primary Coagulant (Ferric Chloride) on hand:	234,000	lb.	Est. supply:	27	days
Lime (CaO) on hand:	223	tons	Est. supply:	22	days
Fluoride on Hand:	16,630	lb.	Est. supply:	45	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	180	180
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

COMPLETED

Coagulation Parameters & Softening Chemical Application City of Flint Water Treatment Plant September 2014 Page 2

WSSN: 2310

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	15.8	5.2	98.7	3.8	0.99	8	6.9	10.8	0.57	1.26
2	14.6	5.0	109.9	3.8	0.99	8	6.8	10.9	0.52	1.08
3	14.7	4.8	110.7	3.8	0.99	8	5.7	6.9	0.50	3.83
4	15.4	5.0	109.9	3.8	0.99	8	6.2	7.8	0.49	2.04
5	14.6	5.1	116.2	4.3	0.99	8	5.5	6.6	0.48	0.90
6	14.7	5.0	125.5	3.5	0.99	8	5.6	6.4	0.51	0.89
7	21.0	5.4	103.6	2.7	0.73	8	5.9	10.1	0.53	1.35
8	24.1	6.1	119.6	2.5	0.67	8	8.2	18.2	0.63	1.25
9	24.3	5.9	115.4	2.5	0.80	8	8.2	18.2	0.76	1.49
10	24.0	5.9	110.5	2.7	0.85	8	8.2	18.2	0.63	0.93
11	23.3	6.1	112.6	3.0	0.88	8	8.2	18.2	0.63	1.36
12	23.3	6.1	109.6	2.9	0.88	8	8.2	18.2	0.62	0.48
13	19.2	5.9	115.2	3.4	0.78	8	8.6	18.2	0.65	0.73
14	14.9	5.6	129.2	3.9	0.74	8	9.4	20.7	0.45	0.62
15	14.8	5.4	129.0	3.8	0.75	8	9.1	16.9	0.50	1.97
16	14.9	5.4	124.0	3.9	0.80	8	12.1	28.6	0.50	1.25
17	14.9	5.4	114.9	3.7	0.86	8	7.9	10.1	0.45	1.56
18	19.0	5.8	105.6	2.6	0.81	8	12.1	30.6	0.57	1.25
19	24.1	5.8	94.2	2.1	0.67	8	6.4	8.3	0.67	1.26
20	23.4	6.2	94.1	2.2	0.84	8	6.5	7.8	0.66	0.69
21	20.1	6.3	99.4	2.4	0.92	8	8.9	24.3	0.88	0.99
22	16.8	7.2	111.1	2.7	0.99	8	10.1	23.9	0.99	0.84
23	14.6	7.3	129.8	3.1	0.99	8	12.0	19.3	0.59	0.64
24	14.5	7.4	128.2	3.1	0.94	8	12.0	15.5	0.47	1.30
25	17.4	7.2	120.6	2.9	0.94	8	16.2	49.5	0.85	0.55
26	18.9	7.1	125.9	2.7	0.91	8	9.7	28.4	0.68	0.55
27	18.7	7.1	134.2	2.9	0.92	8	8.9	26.2	0.68	0.80
28	18.6	7.3	129.0	2.8	0.94	8	10.6	41.5	0.57	0.78
29	18.2	6.9	129.0	2.8	0.94	8	8.2	30.6	0.55	0.74
30	18.4	7.1	125.2	3.0	0.92	8	21.7	73.4	0.54	0.48

Avg.	18.4	6.1	116.0	3.1	0.88	8	9.13			1.13
Max.	24.3	7.4	134.2	4.3	0.99	8	21.7	73.4	0.99	3.83
Min.	14.5	4.8	94.1	2.1	0.67	8	5.50			0.48
Total	551.1									

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.13	0.18	6	0	0	8	0.13	0.15	6	0	0	0.13
2	8	0.13	0.19	6	0	0	8	0.13	0.15	6	0	0	0.12
3	8	0.13	0.20	6	0	0	8	0.12	0.17	6	0	0	0.12
4	8	0.10	0.13	6	0	0	8	0.10	0.13	6	0	0	0.11
5	8	0.08	0.10	6	0	0	8	0.08	0.10	6	0	0	0.11
6	8	0.09	0.13	6	0	0	8	0.09	0.10	6	0	0	0.11
7	8	0.11	0.15	6	0	0	8	0.11	0.14	6	0	0	0.11
8	8	0.12	0.17	6	0	0	8	0.13	0.20	6	0	0	0.14
9	8	0.12	0.16	6	0	0	8	0.12	0.15	6	0	0	0.12
10	8	0.11	0.12	6	0	0	8	0.12	0.17	6	0	0	0.13
11	8	0.11	0.14	6	0	0	8	0.12	0.14	6	0	0	0.13
12	8	0.09	0.11	6	0	0	8	0.11	0.14	6	0	0	0.12
13	8	0.10	0.11	6	0	0	8	0.10	0.11	6	0	0	0.10
14	8	0.09	0.11	6	0	0	8	0.10	0.13	6	0	0	0.09
15	8	0.08	0.10	6	0	0	8	0.08	0.10	6	0	0	0.08
16	8	0.08	0.09	6	0	0	8	0.08	0.10	6	0	0	0.07
17	8	0.10	0.17	6	0	0	6	0.09	0.12	6	0	0	0.09
18	8	0.11	0.14	6	0	0	8	0.11	0.13	6	0	0	0.10
19	8	0.09	0.11	6	0	0	8	0.11	0.20	6	0	0	0.10
20	8	0.11	0.14	6	0	0	8	0.10	0.12	6	0	0	0.09
21	8	0.10	0.11	6	0	0	8	0.10	0.12	6	0	0	0.09
22	8	0.08	0.10	6	0	0	8	0.07	0.10	6	0	0	0.09
23	8	0.07	0.08	6	0	0	8	0.07	0.08	6	0	0	0.07
24	8	0.08	0.14	6	0	0	8	0.07	0.10	6	0	0	0.08
25	8	0.08	0.09	6	0	0	8	0.09	0.10	6	0	0	0.08
26	8	0.10	0.12	6	0	0	8	0.10	0.12	6	0	0	0.12
27	8	0.09	0.12	6	0	0	8	0.10	0.13	6	0	0	0.09
28	8	0.10	0.11	6	0	0	8	0.09	0.11	6	0	0	0.10
29	8	0.11	0.13	6	0	0	8	0.19	0.10	6	0	0	0.10
30	8	0.13	0.16	6	0	0	8	0.11	0.14	6	0	0	0.11
Avg.	8	0.10	0.13	6	0	0	8	0.10	0.13	6	0	0	
Max.	8	0.13	0.20	6	0	0	8	0.19	0.20	6	0	0	0.14
Min.	8	0.07	0.08	6	0	0	8	0.07	0.08	6	0	0	

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.50	0.19	0.72		3.6	3.6	7.2	0.3	0.6	2.7	3.3	1.5	1.9
2	0.50	0.18	0.70	0.63	3.7	3.5	7.2	0.4	0.8	2.5	3.2	1.2	1.8
3	0.50	0.19	0.69		3.6	3.6	7.2	0.4	0.7	1.9	2.4	1.2	1.9
4	0.50	0.19	0.69		3.6	3.6	7.2	0.5	0.9	2.6	3.2	1.7	2.2
5	0.50	0.20	0.69		3.6	3.3	6.9	0.5	0.8	2.0	2.6	1.6	1.9
6	0.50	0.21	0.65		3.6	3.6	7.2	0.3	0.7	2.2	2.7	1.4	1.8
7	0.40	0.20	0.62		3.2	3.5	6.7	0.2	0.5	2.2	2.7	1.2	1.8
8	0.50	0.19	0.57		3.6	4.1	7.7	0.5	0.8	2.5	3.0	1.7	2.2
9	0.50	0.20	0.69	0.69	3.8	4.1	7.9	0.6	0.9	3.1	3.4	3.0	3.3
10	0.50	0.19	0.69		3.8	3.9	7.7	0.6	0.9	3.2	3.5	1.8	2.1
11	0.50	0.19	0.69		3.9	4.0	7.9	0.5	0.9	2.7	3.2	3.1	3.5
12	0.50	0.18	0.70		3.7	3.8	7.5	0.5	0.8	2.9	3.5	2.1	2.7
13	0.50	0.16	0.69		3.5	3.8	7.3	0.4	0.7	2.9	3.5	2.1	2.9
14	0.40	0.20	0.69		3.6	4.2	7.8	0.6	0.9	3.0	3.5	3.0	3.5
15	0.40	0.19	0.64		3.4	3.7	7.1	0.9	1.4	3.2	3.5	3.0	3.5
16	0.40	0.20	0.64	0.65	3.0	3.6	6.6	0.8	1.1	2.6	3.2	1.9	2.4
17	0.50	0.17	0.65		2.9	3.9	6.8	0.6	1.2	2.8	3.5	2.4	3.1
18	0.40	0.18	0.65		2.4	3.5	5.9	0.6	1.0	3.2	3.5	3.0	3.3
19	0.40	0.18	0.66		2.4	3.4	5.8	0.4	0.8	2.6	3.2	2.1	2.8
20	0.50	0.24	0.65		2.5	4.2	6.7	0.4	0.7	2.7	3.3	1.9	2.3
21	0.50	0.18	0.70		2.4	4.2	6.6	0.5	0.9	3.1	3.5	3.2	3.4
22	0.40	0.19	0.66		3.0	4.8	7.8	0.9	1.3	3.2	3.5	3.3	3.5
23	0.40	0.20	0.60	0.63	2.9	3.7	6.6	0.7	1.1	3.2	3.5	2.3	2.6
24	0.40	0.20	0.64		2.9	3.6	6.5	1.0	1.5	2.9	3.5	3.1	3.3
25	0.40	0.19	0.64		2.5	3.7	6.2	0.7	1.0	3.2	3.5	2.2	2.6
26	0.40	0.21	0.65		2.5	4.2	6.7	0.6	1.0	2.7	3.2	2.2	2.6
27	0.40	0.19	0.65		2.5	4.1	6.6	0.6	0.9	3.0	3.5	2.0	2.6
28	0.40	0.23	0.71		2.6	4.0	6.6	0.9	1.3	3.1	3.5	3.1	3.5
29	0.50	0.21	0.70		2.6	4.0	6.6	0.8	1.2	3.1	3.5	3.0	3.5
30	0.50	0.21	0.67	0.65	2.5	4.3	6.8	0.7	1.0	2.9	3.5	2.4	2.7
Avg.	0.46	0.19	0.67	0.65	3.1	3.9	7.0	0.6	0.9	2.8	3.3	2.3	2.7
Max.	0.50	0.24	0.72	0.69	3.9	4.8	7.9	1.0	1.5	3.2	3.5	3.3	3.5
Min.	0.40	0.16	0.57	0.63	2.4	3.3	5.8	0.2	0.5	1.9	2.4	1.2	1.8

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.06	7.47	248	170	200	104	48	66	72.1	61.7	14.6	3.4	41	60
2	7.90	7.79	235	160	200	97	35	63	71.3	54.5	14.1	4.4	44	61
3	8.00	7.92	240	165	196	97	44	68	82.6	64.1	7.8	1.9	40	66
4	8.04	7.93	238	160	200	97	38	63	74.5	56.9	12.6	3.9	40	59
5	8.09	7.61	241	146	198	81	43	65	76.2	57.7	11.7	1.0	42	57
6	7.95	7.94	239	148	198	79	41	69	79.4	57.7	10.2	1.0	40	57
7	8.09	7.77	238	153	202	97	36	56	65.7	48.1	18.5	2.9	41	58
8	7.97	7.88	240	169	203	94	37	75	77.0	54.5	11.7	8.3	42	59
9	7.88	7.89	241	170	203	103	38	67	73.7	57.5	13.6	6.3	43	62
10	7.78	7.95	242	170	202	95	40	75	81.8	60.1	16.5	6.3	42	60
11	7.91	7.92	244	169	204	96	40	73	80.2	64.9	10.2	4.4	43	59
12	8.00	7.66	240	168	197	101	43	67	81.0	65.7	9.7	1.0	42	60
13	8.04	7.61	245	175	199	96	46	79	76.2	63.3	13.6	3.9	43	59
14	8.18	7.44	247	162	206	85	41	77	79.4	55.3	12.2	5.8	42	59
15	8.24	7.62	246	150	204	81	42	69	72.9	45.7	15.6	6.3	41	61
16	8.22	7.61	246	153	206	83	40	70	68.5	46.5	18.2	8.3	42	61
17	8.23	7.89	246	142	197	72	49	70	81.8	53.7	11.2	2.4	42	59
18	8.29	7.99	246	147	208	76	38	71	76.2	44.9	13.6	7.3	41	60
19	8.29	8.11	251	145	205	71	46	74	79.4	52.7	10.7	2.4	42	56
20	8.26	8.02	248	156	202	89	46	67	79.4	55.3	12.2	3.4	43	58
21	8.23	7.84	247	162	209	93	38	69	77.0	49.7	13.6	9.2	43	61
22	8.22	8.05	245	160	206	79	40	81	78.6	52.9	12.2	8.3	43	62
23	8.35	7.88	249	144	204	64	45	80	70.5	38.5	17.5	11.2	42	63
24	8.41	7.96	243	120	199	51	44	69	65.0	40.1	8.3	4.9	44	62
25	8.40	7.77	239	138	202	66	37	72	72.1	41.7	12.6	7.8	40	61
26	8.35	7.90	242	139	197	60	45	79	89.0	49.7	11.2	3.9	42	60
27	8.23	7.85	240	133	192	60	48	73	92.2	50.5	9.7	2.4	42	61
28	8.23	7.85	246	128	204	62	42	66	72.9	40.9	15.6	5.3	41	63
29	8.15	7.84	242	144	202	68	40	76	72.9	43.3	14.6	7.8	41	63
30	8.01	7.52	247	153	205	68	42	85	93.8	56.1	11.2	3.9	42	62
Avg.	8.13	7.82	243	153	202	82	42	71	77.8	52.8	12.8	5.0	42	60
Max.	8.41	8.11	251	175	209	104	49	85	93.8	65.7	18.5	11.2	44	66
Min.	7.78	7.44	235	120	192	51	35	56	65.7	38.5	7.8	1.0	40	56

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	8212	12	0	1	0	3780	2	0.42	24.0				
2	1	12262	12	0	1	0	4620	< 2	0.42	24.0				
3	1	3912	12	0	1	0	1360	< 2	n.t.	23.8				
4	1	2749	12	0	1	0	1600	< 2	0.42	26.1				
5	1	1918	12	0	1	0	1720	< 2	0.39	24.1				
6	1	8212	12	0	1	0	2160	< 2	0.39	23.9				
7	1	5510	12	0	1	0	2640	< 2	0.41	23.5				
8	1	2910	12	0	1	0	2480	< 2	0.44	23.0				
9	1	2708	12	0	1	0	6980	< 2	0.44	23.4				
10	1	7308	12	0	1	0	> 14760	< 2	n.t.	23.5				
11	1	6510	12	0	1	0	8800	< 2	0.43	22.1				
12	1	8704	12	0	1	0	8800	< 2	0.43	21.4				
13	1	3570	12	0	1	0	3120	< 2	0.44	20.9				
14	1	8212	12	0	1	0	1360	< 2	0.38	20.0				
15	1	6510	12	0	1	0	3540	< 2	0.37	18.1				
16	1	12262	12	0	1	0	1660	< 2	0.37	17.7				
17	1	9222	12	0	1	0	1940	< 2	0.38	17.5				
18	1	10950	12	0	1	0	2400	< 2	0.36	17.4				
19	1	6152	12	0	1	0	6220	< 2	0.37	17.0				
20	1	5818	12	0	1	0	6780	< 2	0.37	18.0				
21	1	4028	12	0	1	0	2740	< 2	0.40	18.4				
22	1	12282	12	0	1	0	3900	< 2	0.39	18.0				
23	1	10950	12	0	1	0	4780	< 2	0.39	17.5				
24	1	10344	12	0	1	0	2560	< 2	0.36	17.6				
25	1	8704	12	0	1	0	2640	< 2	0.35	18.2				
26	1	15402	12	0	1	0	5740	< 2	0.36	18.6				
27	1	5226	12	0	1	0	7440	< 2	0.36	18.5				
28	1	7746	12	0	1	0	6780	< 2	0.35	19.4				
29	1	3578	12	0	1	0	5320	< 2	0.37	19.5				
30	1	31062	12	0	1	0	3320	< 2	0.38	19.2				

n.t.= not tested

Avg.									0.39	20.5				
Max.							8800	2	0.44	26.1				
Min.									0.35	17.0				

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2	0.1	0.4	0.1	0.2	0.0	0.1	0.1	0.8	0.4	0.9	10
3	0.1	0.3	0.1	0.2	0.0	0.1	0.1	0.7	0.5	0.5	10
4	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.8	0.2	0.8	10
5											0
6											0
7											0
8	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.7	0.6	0.7	10
9	0.3	0.6	0.1	0.1	0.1	0.1	0.2	1.5	1.5	0.5	10
10	0.3	0.8	0.1	0.1	0.2	0.1	0.2	1.5	3.5	1.2	10
11	0.3	0.9	0.1	0.4	0.2	0.1	0.1	1.3	1.4	1.6	10
12											0
13											0
14											0
15											0
16	0.2	0.6	0.1	0.4	0.1	0.2	0.1	1.3	0.9	1.3	10
17	0.3	1.2	0.1	1.0	0.2	0.0	0.1	1.7	2.7	1.5	10
18	0.2	0.7	0.1	0.4	0.2	0.2	0.2	1.7	0.8	1.4	10
19											0
20											0
21											0
22											0
23	0.3	1.6	0.1	0.8	0.2	0.2	0.3	2.3	1.1	0.9	10
24	0.5	1.5	0.2	0.7	0.6	0.1	1.0	2.1	1.7	2.1	10
25	0.3	0.1	0.1	0.7	0.2	0.1	0.2	1.7	3.5	2.3	10
26	0.5	0.1	0.1	0.9	0.5	0.1	0.4	2.2	3.5	1.7	10
27											0
28											0
29											0
30	0.5	0.1	0.1	0.7	0.1	0.1	0.6	2.4	1.8	1.7	10

Distribution Sample Summary	
Total # of routine distribution samples analyzed	150
Total # of routine distribution samples required	100

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	15
Percent of routine distribution samples positive	10%

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	97%
Average disinfectant residual this month	0.64

See page 9 for positive sample information.

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2	0.3	0.7	0.2	0.4	0.1	0.2	0.2	1.2	0.7	1.2	10
3	0.3	0.7	0.2	0.5	0.2	0.4	0.3	1.2	0.9	1.0	10
4	0.3	0.6	0.2	0.3	0.2	0.2	0.2	1.1	0.3	1.1	10
5											0
6											0
7											0
8	0.2	0.4	0.1	0.2	0.2	0.1	0.1	1.0	0.9	1.0	10
9	0.6	1.3	0.3	0.3	0.3	0.2	0.4	1.8	1.8	0.8	10
10	0.5	1.1	0.2	0.2	0.4	0.2	0.4	1.8	3.5	1.4	10
11	0.6	1.2	0.3	0.8	0.4	0.3	0.3	1.6	1.8	2.0	10
12											0
13											0
14											0
15											0
16	0.4	1.0	0.2	0.7	0.3	0.3	0.3	1.7	1.2	1.7	10
17	0.5	1.6	0.3	1.4	0.5	0.2	0.3	2.1	3.5	2.0	10
18	0.3	1.0	0.2	0.7	0.3	0.4	0.3	2.1	1.0	1.7	10
19											0
20											0
21											0
22											0
23	0.5	1.9	0.3	1.1	0.3	0.3	0.5	2.5	1.6	1.1	10
24	0.9	0.2	0.4	1.3	1.0	0.3	1.5	2.5	2.0	1.7	10
25	0.6	0.2	0.2	0.9	0.5	0.2	0.4	2.2	3.5	3.0	10
26	0.9	0.3	0.3	1.4	1.1	0.3	0.7	2.7	3.5	2.0	10
27											0
28											0
29											0
30	0.6	0.3	0.3	1.1	0.3	0.2	1.1	2.7	2.2	2.1	10

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.9

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent
9/2/2014	2501 Flushing Rd	9/3/2014	2501 Flushing Rd	0.0 / 0.2	Present
			1117 N. Chevrolet	0.0 / 0.2	Present
			2740 Flushing Rd	0.1 / 0.3	Absent
		9/4/2014	2501 Flushing Rd	0.1 / 0.2	Present
			2205 N. Chevrolet	0.1 / 0.2	Present
			2740 Flushing Rd	0.1 / 0.3	Present
		9/5/2014	2501 Flushing Rd	0.1 / 0.2	Present
			2205 N. Chevrolet	0.1 / 0.3	Absent
			2740 Flushing Rd	0.1 / 0.2	Present
		9/6/2014	2501 Flushing Rd	0.2 / 0.3	Absent
			2205 Flushing Rd.	0.2 / 0.3	Absent
			1274 Ballenger Hwy	0.1 / 0.2	Absent
		9/7/2014	2501 Flushing Rd	0.2 / 0.3	Absent
			2205 Flushing Rd.	0.2 / 0.3	Absent
			1274 Ballenger Hwy	0.0 / 0.2	Present
		9/8/2014	2501 Flushing Rd	0.1 / 0.2	Absent
			1274 Ballenger Hwy	0.1 / 0.1	Absent
9/4/2014	3216 MLK Blvd.	9/5/2014	3216 MLK Blvd.	0.2 / 0.3	Absent
			3317 MLK Blvd.	0.1 / 0.2	Present
			3110 MLK Blvd.	0.1 / 0.2	Present
		9/6/2014	104 E. Pasadena Ave.	0.1 / 0.2	Absent
			3317 MLK Blvd.	0.2 / 0.3	Absent
			3110 MLK Blvd.	0.0 / 0.1	Absent
		9/7/2014	104 E. Pasadena Ave.	0.1 / 0.3	Absent
			3317 MLK Blvd.	0.1 / 0.3	Absent
			3110 MLK Blvd.	0.2 / 0.3	Absent
9/10/2014	3606 Corunna Rd.	9/11/2014	3606 Corunna Rd.	0.4 / 0.8	Absent
			3521 Corunna Rd.	0.3 / 0.5	Absent
			3614 Corunna Rd.	0.7 / 1.0	Absent
9/16/2014	3606 Corunna Rd.	9/17/2014	3606 Corunna Rd.	1.0 / 1.4	Absent
			3521 Corunna Rd.	0.7 / 1.0	Absent
			3614 Corunna Rd.	1.5 / 2.0	Absent
9/17/2014	3302 S. Dort Hwy	9/18/2014	3302 S. Dort Hwy	0.1 / 0.2	Absent
			3124 S. Dort Hwy	0.1 / 0.2	Absent
			3316 S. Dort Hwy.	0.1 / 0.2	Absent

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	**August 2014**
Operator-in-Charge	Month/Year
F-1R, F-2	**F-1**
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	**Genesee**
Signature of Operator-in-Charge	County

DEQ
RESOURCE MANAGEMENT DIVISION
SEP 17 2014
LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	24.4	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	70	Hours
Averege Head Loss:		Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.2	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.8%	Percent of Treated Water

Chemical Data

Chlorine on hand:	12000	lb.	Est. supply:	10	days
Primary Coagulant (Ferric Chloride) on hand:	209,000	lb.	Est. supply:	23	days
Lime (CaO) on hand:	78	tons	Est. supply:	8	days
Fluoride on Hand:	23,280	lb.	Est. supply:	38	days
Cost of All Chemicals per Million Gallons:		dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	186	186
Percent of filter confluence samples > 0.3 NTU:	0.00%	0.00%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

COMPLETED

Coagulation Parameters & Softening Chemical Application City of Flint Water Treatment Plant **WSSN: 2310** August 2014

Date	Million Gallons Treated	Ferric as Fe_3+ mg/L	Lime Dosage (mg/L)	PW-340 Catioinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	14.50	16.4	124.4	2.6	0.20	6	7.3	8.4	1.77	1.45
2	14.45	14.2	117.6	2.5	0.19	6	5.8	6.0	1.75	0.97
3	14.40	13.8	119.8	2.7	0.20	6	4.8	5.5	0.42	0.97
4	20.07	9.7	113.4	2.3	0.16	6	4.8	6.1	0.62	1.07
5	23.58	9.5	124.1	1.9	0.12	6	6.2	7.1	0.71	3.10
6	20.82	11.0	124.6	2.2	0.14	6	6.2	7.0	0.64	3.23
7	22.15	9.9	107.7	2.2	0.17	6	6.2	7.0	0.87	2.36
8	17.36	9.6	113.9	2.5	0.24	6	5.2	5.6	0.57	3.83
9	14.43	7.8	110.0	2.7	0.20	6	4.7	5.6	0.52	4.84
10	14.49	7.4	127.3	3.3	0.20	6	5.0	5.6	0.48	1.44
11	14.51	6.3	115.0	3.3	0.15	6	6.2	10.6	0.49	3.64
12	16.56	7.8	118.9	4.0	0.14	6	11.3	19.3	0.96	9.76
13	16.83	8.2	104.6	3.3	0.17	6	6.0	15.4	0.80	5.19
14	17.02	8.1	97.7	3.3	0.15	6	6.2	7.0	0.50	2.53
15	17.60	7.6	94.1	3.2	0.27	8	6.2	8.6	0.58	5.06
16	16.43	7.4	94.1	3.1	0.27	6	6.2	8.0	0.56	2.89
17	17.95	6.8	94.1	3.1	0.26	6	6.2	8.0	0.56	1.40
18	18.05	6.8	107.7	3.1	0.26	6	6.2	7.9	0.53	0.97
19	16.89	7.0	107.8	3.3	0.34	6	6.2	13.7	0.49	2.40
20	14.69	7.0	117.4	3.8	0.39	6	8.1	11.7	0.54	1.20
21	15.22	7.0	110.8	3.8	0.39	6	6.7	7.6	0.45	0.74
22	15.24	7.0	117.3	3.6	0.39	6	7.1	12.4	0.44	0.97
23	14.60	6.8	116.5	3.9	0.39	6	5.8	6.9	0.41	4.19
24	14.64	6.8	110.5	3.8	0.39	6	6.6	10.4	0.41	0.90
25	14.55	6.7	108.6	3.8	0.39	6	6.1	9.4	0.40	1.49
26	14.58	6.7	119.2	3.8	0.39	6	6.2	10.6	0.40	0.62
27	14.54	6.7	108.0	3.9	0.39	6	7.1	11.7	0.46	0.98
28	20.09	6.8	101.5	3.0	0.31	6	5.5	6.3	0.52	1.26
29	23.80	7.1	94.3	2.4	0.24	6	5.4	6.2	0.57	1.66
30	21.68	7.0	97.2	2.4	0.24	6	5.4	6.2	0.57	3.88
31	15.63	3.6	110.4	3.7	0.37	6	6.4	10.3	0.53	4.15
Avg.	17.0	8.2	110.6	3.1	0.26	6	6.23			2.55
Max.	23.8	16.4	127.3	4.0	0.39	6	11.3	19.3	1.77	9.76
Min.	14.4	3.6	94.1	1.9	0.12	6	4.70			0.62
Total	527.3									

2310

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow — Operator-in-Charge
July 2014 — Month/Year

F-1R, F-2 — Certification of Operator-in-Charge
F-1 — Water Plant Classification

Signature of Operator-in-Charge
Genesee — County

DEQ
RESOURCE MANAGEMENT DIVISION
AUG 1 4 2014

Treatment Rate and Filter Data

Maximum Treatment Rate:	24.5	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	65	Hours
Average Head Loss:	*	Feet *(filter head loss m[illegible]
Average Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.8	Gallons Per Square Feet per Minute
Average Wash Water Use:	2.6%	Percent of Treated Water

Chemical Data

Chlorine on hand:	21000	lb.	Est. supply:	16	days
Primary Coagulant (Ferric Chloride) on hand:	174,603	lb.	Est. supply:	23	days
Lime (CaO) on hand:	219	tons	Est. supply:	21	days
Fluoride on Hand:	16,348	lb.	Est. supply:	27	days
Cost of All Chemicals per Million Gallons:		dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	186	186
Percent of filter confluence samples > 0.3 NTU:	0.00%	0.00%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

COMPLETED

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	21.93	19.4	127.3	1.8	0.05	6	10.2	20.6	0.60	2.80
2	21.04	19.1	128.0	1.8	0.05	6	6.2	7.1	0.77	4.92
3	20.96	19.8	122.0	1.8	0.05	6	7.7	22.7	0.62	3.45
4	21.33	18.5	115.7	1.8	0.05	6	5.2	6.3	0.62	3.25
5	21.34	19.0	113.3	1.8	0.05	6	4.9	5.7	0.84	1.56
6	22.92	18.2	109.7	1.7	0.04	6	6.7	14.3	0.83	2.55
7	21.18	25.8	128.7	1.9	0.05	6	10.9	20.1	1.28	5.19
8	20.80	22.4	146.7	1.9	0.05	6	9.9	20.6	1.20	11.04
9	20.99	22.7	128.1	1.8	0.05	6	19.7	49.5	1.51	4.63
10	21.57	21.1	105.0	1.8	0.05	6	16.9	20.3	1.40	6.27
11	24.46	18.5	98.4	1.6	0.04	6	8.1	12.9	1.90	1.75
12	24.17	19.1	116.6	1.6	0.04	6	7.6	8.1	2.29	2.28
13	23.78	20.0	121.2	1.6	0.04	6	9.4	10.1	2.51	2.05
14	16.55	22.4	153.0	2.4	0.07	6	9.6	13.9	1.36	4.97
15	14.25	17.9	167.5	2.7	0.07	6	10.6	12.6	0.52	2.09
16	14.60	16.9	160.2	2.6	0.07	6	10.5	11.5	0.49	2.52
17	14.45	16.7	159.3	2.6	0.07	6	11.6	14.7	0.57	1.01
18	14.34	16.7	162.7	2.7	0.07	6	10.9	12.8	0.46	3.11
19	14.65	15.0	148.9	2.6	0.07	6	8.2	12.8	0.36	2.63
20	14.80	15.5	145.5	2.6	0.07	6	6.1	12.0	0.40	5.06
21	14.86	16.3	140.2	2.6	0.07	6	5.8	7.4	0.64	3.05
22	20.74	13.8	128.0	1.9	0.06	6	5.1	6.3	0.45	3.40
23	23.50	12.6	122.2	1.6	0.04	6	6.1	6.8	0.63	2.96
24	22.23	12.6	118.5	1.7	0.04	6	6.2	6.5	0.80	1.93
25	21.20	15.0	117.4	1.9	0.06	6	6.4	6.7	0.87	2.01
26	14.39	18.6	132.9	2.6	0.07	6	6.1	7.0	0.30	3.21
27	14.47	18.3	133.9	2.6	0.07	6	6.6	7.9	0.33	1.19
28	14.59	17.6	125.9	2.6	0.07	6	6.6	7.3	0.33	1.17
29	14.62	16.7	133.5	2.6	0.07	6	6.7	7.8	0.40	0.67
30	14.68	14.7	133.6	2.6	0.07	6	7.5	10.0	0.57	0.84
31	14.63	14.2	133.7	2.6	0.07	6	6.7	7.6	1.20	1.70
Avg.	18.7	17.9	131.5	2.1	0.06	6	8.41			3.07
Max.	24.5	25.8	167.5	2.7	0.07	6	19.7	49.5	2.51	11.04
Min.	14.3	12.6	98.4	1.6	0.04	6	4.90			0.67
Total	580.0									

Date	Turbidity, Units												
	Confluence Point, No.1 (N) North						Confluence Point, No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	6	0.07	0.10	6	0	0	6	0.07	0.10	6	0	0	0.11
2	6	0.08	0.10	6	0	0	6	0.07	0.11	6	0	0	0.21
3	6	0.08	0.10	6	0	0	6	0.08	0.12	6	0	0	0.11
4	6	0.08	0.09	6	0	0	6	0.08	0.10	6	0	0	0.11
5	6	0.07	0.08	6	0	0	6	0.07	0.08	6	0	0	0.11
6	6	0.07	0.09	6	0	0	6	0.06	0.08	6	0	0	0.11
7	6	0.06	0.10	6	0	0	6	0.07	0.11	6	0	0	0.09
8	6	0.07	0.10	6	0	0	6	0.07	0.12	6	0	0	0.20
9	6	0.08	0.11	6	0	0	6	0.07	0.13	6	0	0	0.14
10	6	0.07	0.10	6	0	0	6	0.07	0.11	6	0	0	0.11
11	6	0.08	0.10	6	0	0	6	0.07	0.10	6	0	0	0.08
12	6	0.06	0.10	6	0	0	6	0.08	0.17	6	0	0	0.08
13	6	0.08	0.14	6	0	0	6	0.07	0.11	6	0	0	0.08
14	6	0.07	0.09	6	0	0	6	0.07	0.08	6	0	0	0.08
15	6	0.06	0.08	6	0	0	6	0.07	0.10	6	0	0	0.08
16	6	0.06	0.08	6	0	0	6	0.06	0.09	6	0	0	0.08
17	6	0.07	0.10	6	0	0	6	0.05	0.07	6	0	0	0.08
18	6	0.06	0.07	6	0	0	6	0.05	0.06	6	0	0	0.08
19	6	0.06	0.07	6	0	0	6	0.06	0.08	6	0	0	0.08
20	6	0.06	0.09	6	0	0	6	0.06	0.09	6	0	0	0.08
21	6	0.11	0.10	6	0	0	6	0.08	0.15	6	0	0	0.08
22	6	0.09	0.10	6	0	0	6	0.07	0.09	6	0	0	0.08
23	6	0.09	0.10	6	0	0	6	0.09	0.09	6	0	0	0.08
24	6	0.09	0.10	6	0	0	6	0.09	0.09	6	0	0	0.08
25	6	0.09	0.10	6	0	0	6	0.09	0.11	6	0	0	0.08
26	6	0.08	0.10	6	0	0	6	0.07	0.09	6	0	0	0.08
27	6	0.07	0.10	6	0	0	6	0.08	0.10	6	0	0	0.08
28	6	0.09	0.11	6	0	0	6	0.08	0.09	6	0	0	0.08
29	6	0.08	0.09	6	0	0	6	0.07	0.09	6	0	0	0.08
30	6	0.08	0.11	6	0	0	6	0.08	0.09	6	0	0	0.08
31	6	0.08	0.09	6	0	0	6	0.08	0.10	6	0	0	0.08
Avg.	6	0.07	0.10	6	0	0	6	0.07	0.10	6	0	0	
Max.	6	0.11	0.14	6	0	0	6	0.09	0.17	6	0	0	0.21
Min.	6	0.06	0.07	6	0	0	6	0.05	0.06	6	0	0	

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.00	0.15	0.14		4.1	3.3	7.4	0.7	1.0	1.3	1.7	1.3	1.6
2	0.04	0.15	0.56	0.15	4.0	4.0	8.0	0.9	1.1	2.5	3.2	1.9	2.2
3	0.04	0.19	0.54		3.9	4.1	8.0	0.5	0.6	3.2	3.5	1.8	1.9
4	0.04	0.19	0.56		3.8	4.1	7.9	0.5	0.8	1.9	2.4	1.4	1.7
5	0.04	0.17	0.59		3.7	4.5	8.2	0.6	0.8	2.0	2.5	1.5	1.7
6	0.30	0.17	0.58		3.5	4.6	8.1	0.6	0.9	2.0	2.4	1.7	1.9
7	0.40	0.17	0.61		3.9	5.2	9.1	0.8	1.2	2.4	3.0	1.8	2.3
8	0.50	0.15	0.64		3.6	4.7	8.3	0.5	0.7	2.9	3.5	2.1	2.3
9	0.40	0.17	0.64		3.3	4.8	8.1	0.2	0.6	2.8	3.2	1.9	2.2
10	0.50	0.17	0.73		3.4	4.6	8.0	0.6	1.0	2.7	3.5	1.5	2.0
11	0.30	0.20	0.59	0.65	2.9	4.3	7.2	0.3	0.7	1.9	2.6	1.5	1.9
12	0.40	0.15	0.66		2.8	4.3	7.1	0.3	0.6	2.0	2.4	1.5	1.9
13	0.40	0.19	0.68		2.8	4.3	7.1	0.4	0.6	1.9	2.3	1.6	1.8
14	0.40	0.20	0.72		4.3	5.1	9.4	0.7	1.0	2.1	2.6	1.9	2.2
15	0.40	0.19	0.70		4.6	4.2	8.8	0.7	1.0	2.5	3.0	2.2	2.5
16	0.40	0.19	0.71	0.66	4.3	3.6	7.9	0.7	0.9	2.2	2.7	1.9	2.2
17	0.40	0.19	0.69		4.1	3.7	7.8	0.5	0.7	2.8	3.2	1.9	2.2
18	0.40	0.22	0.65		4.5	3.6	8.1	0.8	1.1	2.5	3.0	1.9	2.3
19	0.40	0.17	0.67		4.4	3.1	7.5	0.8	1.1	2.4	2.8	1.8	2.0
20	0.40	0.21	0.66		4.3	3.1	7.4	0.7	1.0	2.5	2.9	1.8	2.1
21	0.50	0.18	0.75		4.0	2.7	6.7	0.8	1.1	2.4	2.8	1.7	2.0
22	0.40	0.19	0.65		3.4	3.4	6.8	0.6	0.8	1.8	2.2	1.4	1.7
23	0.40	0.19	0.59	0.66	3.5	4.2	7.7	0.8	1.0	2.3	2.9	1.9	2.2
24	0.40	0.19	0.64		3.6	4.1	7.7	0.6	0.8	2.2	2.8	2.1	2.6
25	0.40	0.21	0.62		4.1	4.2	8.3	0.5	0.7	2.4	2.8	1.9	2.2
26	0.60	0.21	0.88		5.3	2.7	8.0	1.4	1.7	2.5	3.1	1.9	2.3
27	0.50	0.17	0.79		4.6	2.6	7.2	0.9	1.2	2.7	3.1	1.7	1.9
28	0.50	0.19	0.72		4.7	2.7	7.4	0.9	1.1	2.1	2.6	1.6	1.8
29	0.50	0.19	0.70		4.8	2.6	7.4	1.1	1.3	2.2	2.6	1.7	2.0
30	0.50	0.19	0.28	0.62	4.5	2.7	7.2	1.1	1.5	2.2	2.6	1.8	2.1
31	0.50	0.18	0.61		3.2	3.9	7.1	0.5	0.8	2.1	2.4	1.7	2.0
Avg.	0.37	0.18	0.63	0.55	3.9	3.8	7.8	0.7	0.9	2.3	2.8	1.8	2.1
Max.	0.60	0.22	0.88	0.66	5.3	5.2	9.4	1.4	1.7	3.2	3.5	2.2	2.6
Min.	0.00	0.15	0.14	0.15	2.8	2.6	6.7	0.2	0.6	1.3	1.7	1.3	1.6

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.04	7.81	260	158	214	58	46	100	88.2	55.4	9.7	5.3	43	88
2	8.08	7.59	258	150	24	54	234	96	89.8	50.5	8.3	5.8	45	90
3	8.25	7.51	260	176	224	54	36	122	93.0	63.3	8.6	4.4	44	87
4	8.21	7.67	273	190	222	84	51	106	81.0	64.1	15.6	5.8	45	87
5	8.23	7.66	272	193	226	75	46	118	88.2	65.7	13.1	7.3	45	91
6	8.24	7.62	273	171	225	71	48	100	85.8	57.7	14.6	4.9	45	91
7	8.17	7.43	241	173	204	43	37	130	81.8	60.9	5.8	5.1	45	89
8	8.27	7.49	247	179	209	35	38	144	95.4	68.1	5.3	4.4	45	101
9	8.11	7.49	246	164	208	64	38	100	85.0	60.1	8.3	3.4	46	96
10	7.92	7.35	232	150	187	31	45	119	69.7	48.9	13.6	7.8	41	98
11	7.96	7.63	227	160	182	52	45	108	81.8	56.9	5.8	4.4	43	85
12	7.68	7.85	248	190	198	85	50	105	77.0	60.9	11.2	8.3	41	88
13	7.89	7.69	242	180	201	81	41	99	83.4	59.3	8.3	7.8	42	87
14	8.16	7.61	262	175	225	63	37	112	85.0	65.7	12.6	5.3	46	89
15	8.14	7.56	254	172	223	60	31	112	65.7	56.9	22.8	8.3	45	88
16	8.16	7.58	253	152	211	38	42	114	93.0	52.9	5.8	3.9	44	83
17	8.17	7.41	251	169	212	59	39	110	89.0	59.3	8.3	3.4	43	84
18	8.14	7.61	251	151	204	40	47	111	88.2	57.7	7.0	2.0	40	82
19	8.30	7.74	251	157	202	44	49	113	90.6	58.5	6.3	2.4	39	82
20	8.51	7.62	254	147	195	45	59	102	88.2	49.7	8.7	2.6	41	78
21	8.28	7.60	243	154	203	59	40	95	80.2	54.5	10.7	4.4	42	81
22	8.24	7.54	246	162	198	62	48	100	89.0	58.5	6.3	3.4	42	71
23	8.00	7.78	244	162	198	80	46	82	84.2	53.7	7.8	5.3	39	68
24	7.87	7.75	241	175	199	74	42	101	90.6	61.7	3.9	4.4	40	74
25	7.92	7.88	242	169	198	68	44	101	85.8	60.9	7.3	4.9	40	71
26	8.31	7.94	241	178	199	73	42	105	89.0	63.3	4.9	6.3	42	79
27	8.25	7.60	241	183	199	80	42	103	92.2	62.5	8.3	5.8	45	83
28	8.13	7.56	237	176	200	77	37	99	57.7	57.7	7.3	7.3	82	82
29	8.09	7.55	243	181	198	80	45	101	89.8	67.3	8.7	2.0	41	79
30	8.11	7.47	236	172	200	76	36	96	89.9	57.3	2.9	1.0	42	73
31	8.19	7.68	240	166	194	68	46	98	90.6	64.1	3.9	2.4	41	76
Avg.	8.13	7.62	249	169	199	62	49	107	86.1	59.5	8.8	4.8	44	84
Max.	8.51	7.94	273	193	226	85	234	144	95.4	68.1	22.8	8.3	82	101
Min.	7.68	7.35	227	147	24	31	31	82	57.7	48.9	2.9	1	39	68

205 AVE
182 min

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap		Raw	Raw	Tap	Raw	Tap
1	1	39726	12	0	1	0	10140	< 2	0.50	25.4				
2	1	5510	12	0	1	0	1940	< 2	0.50	25.2				
3	1	4764	12	0	1	0	1600	< 2	0.60	25.4				
4	1	4564	12	0	1	0	8280	< 2	0.60	25.4				
5	1	3316	12	0	1	0	7440	< 2	0.60	24.3				
6	1	2752	12	0	1	0	3540	< 2	0.50	26.1				
7	1	14540	12	0	1	0	2080	< 2	0.60	24.6				
8	1	4962	12	0	1	0	2480	< 2	0.60	24.8				
9	1	9222	12	0	1	0	14760	< 2	0.50	24.3				
10	1	15402	12	0	1	0	14760	< 2	0.50	23.8				
11	1	3130	12	1	1	0	4460	2	0.50	24.0				
12	1	3700	12	1	1	0	4620	< 2	0.60	24.0				
13	1	6152	12	0	1	0	7440	< 2	0.60	24.4				
14	1	5446	12	0	1	0	3780	< 2	0.42	24.6				
15	1	7746	12	0	1	0	5980	< 2	0.50	24.6				
16	1	5226	12	0	1	0	14760	< 2	0.50	24.0				
17	1	6152	12	0	1	0	2160	< 2	0.50	23.7				
18	1	3578	12	0	1	0	7440	< 2	0.50	23.0				
19	1	5206	12	0	1	0	2640	< 2	0.50	23.2				
20	1	4764	12	0	1	0	7100	< 2	0.50	24.3				
21	1	4978	12	0	1	0	1180	< 2	0.42	23.9				
22	1	3316	12	0	1	0	14760	< 2	0.50	24.5				
23	1	1866	12	0	1	0	14760	< 2	0.50	25.0				
24	1	10950	12	0	1	0	10140	< 2	0.50	24.5				
25	1	48329	12	0	1	0	14760	< 2	0.50	24.8				
26	1	4620	12	0	1	0	6780	< 2	0.50	25.3				
27	1	5510	12	0	1	0	7100	< 2	0.60	24.2				
28	1	16328	12	0	1	0	4460	< 2	0.47	23.3				
29	1	15402	12	0	1	0	4180	< 2	0.50	23.6				
30	1	7746	12	0	1	0	4620	< 2	0.50	22.7				
31	1	5818	12	0	1	0	14760	< 2	0.50	22.4				
Avg.									0.52	24.3				
Max.							14760	2	0.60	26.1				
Min.									0.42	22.4				

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Samples
1									0.6	0.5	2
2	1.0	1.3	0.5	0.5	0.3	0.9	0.4	1.4	0.2	1.4	10
3	0.9	1.4	0.8	0.8	0.1	1.2	0.3	1.6			8
4											0
5											0
6											0
7									0.9	1.5	2
8									3.0	1.8	2
9	1.4	1.6	1.1	1.2	0.4	1.2	0.8	1.1	0.9	1.0	10
10	1.3	1.5	1.1	1.4	0.8	1.1	0.9	1.7	1.0	1.0	10
11									0.9	1.1	2
12											0
13											0
14									0.5	1.1	2
15	1.1	1.3	0.9	1.1	0.3	0.6	0.5	1.5	1.0	0.2	10
16	0.8	1.1	0.7	0.1	0.1	0.9	0.4	1.6	0.1	0.5	10
17	0.8	1.3	0.6	0.2	0.2	0.9	0.4	1.5	0.1	0.9	10
18									0.3	0.1	2
19											0
20											0
21									0.3	0.1	2
22									0.1	1.1	2
23	0.8	1.3	0.8	0.9	0.1	0.7	0.3	1.6	0.8	0.1	10
24	0.8	0.6	0.7	0.8	0.1	0.8	0.3	1.3	1.3	0.0	10
25									0.5	1.2	2
26											0
27											0
28									0.5	0.0	2
29	0.2	1.1	0.4	0.7	0.1	0.6	0.2	1.3	0.3	1.0	10
30	0.5	0.8	0.5	0.3	0.0	0.3	0.2	1.2	0.1	0.0	10
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	128
Total # of routine distribution samples required	100

Distribution Disinfectant Free Residual Summary	
Percent samples with a detectable disinfectant residual	98%
Average disinfectant residual this month	0.8

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	2
Percent of routine distribution samples positive	2%

Positive Distribution Samples					
Date	Monitoring Station	Date	Repeat Monitorong Stations	Residual	Positive or Negative
7/22/2014	Cedar Street Reservoir	7/23/2014	Cedar Street Reservoir	0.8 / 1.2	Negative
	1100 Cedar St.	7/23/2014	1035 Ann Arbour St.	0.4 / 0.7	Negative
		7/23/2014	705 W. 12th St.	0.1 / 0.3	Negative
7/30/2014	University Market	7/31/2014	Unversity Market	0.1 / 0.3	Negative
	2501 Flushing Rd.	7/31/2014	1117 N. Chevrolet	0.0 / 0.1	Negative
		7/31/2014	1128 N. Chevrolet	0.0 / 0.1	Negative

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Samples
1									0.9	0.8	2
2	1.3	1.7	0.8	0.8	0.6	1.3	0.6	1.6	0.3	0.8	10
3	1.1	1.7	1.0	1.2	0.3	1.8	0.5	2.0			8
4											0
5											0
6											0
7									1.1	1.8	2
8									3.4	2.2	2
9	1.6	1.9	1.4	1.6	0.7	1.8	1.0	1.4	1.2	1.3	10
10	1.7	2.0	1.4	1.6	1.1	1.5	1.1	2.0	1.5	1.3	10
11									1.1	1.3	2
12											0
13											0
14									0.8	1.4	2
15	1.5	1.7	1.3	1.4	0.5	1.0	0.7	1.8	1.5	0.3	10
16	1.1	1.4	1.2	0.3	0.2	1.3	0.8	1.6	0.3	0.7	10
17	0.9	1.6	0.9	0.3	0.3	1.3	0.6	1.8	0.3	1.3	10
18									0.4	0.2	2
19											0
20											0
21									0.5	0.3	2
22									0.2	1.4	2
23	1.0	1.6	0.9	1.1	0.1	0.9	0.5	2.0	1.2	0.2	10
24	1.2	1.1	1.1	1.0	0.2	1.2	0.6	1.8	1.7	0.1	10
25									0.7	1.6	2
26											0
27											0
28									0.7	0.2	2
29	0.4	1.4	0.6	1.0	0.3	0.8	0.8	1.6	0.5	1.3	10
30	0.7	1.1	0.7	0.6	0.1	0.4	0.2	1.4	0.1	0.1	10
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

2310

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	June 2014
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

DEQ RESOURCE MANAGEMENT DIVISION JUL 28 2014 LANSING DISTRICT

Treatment Rate and Filter Data

Maximum Treatment Rate:	25	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	74	Hours
Average Head Loss:	*	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.5	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.5	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.6%	Percent of Treated Water

Chemical Data

Chlorine on hand:	24000	lb.	Est. supply:	20	days
Primary Coagulant (Ferric Chloride) on hand:	63450	lb.	Est. supply:	10	days
Lime (CaO) on hand:	169	tons	Est. supply:	18	days
Fluoride on Hand:	9064	lb.	Est. supply:	16	days
Cost of All Chemicals per Million Gallons:	*	dollars			
Total Power Cost per Million Gallons:	*	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	180	180
Percent of filter confluence samples > 0.3 NTU:	0.00%	0.00%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

COMPLETED

Date	Million Gallons Treated	Ferric as Fe^{3+} mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
						Raw			Plate Settler	Applied
						Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	20.2	16.9	46.8	2.2	0.06	6	2.70	4.10	0.38	4.51
2	21.7	14.5	45.8	2.2	0.06	6	2.70	5.90	0.52	3.37
3	20.8	14.4	39.5	1.9	0.05	6	6.70	9.20	0.58	3.50
4	20.6	14.7	55.4	2.0	0.05	6	11.3	30.2	0.48	3.33
5	23.1	14.9	63.7	1.8	0.04	6	6.00	6.70	0.74	4.15
6	23.3	16.2	42.4	1.9	0.05	6	5.30	5.90	0.51	4.52
7	21.1	15.2	0.0	0.0	0.00	6	4.30	5.60	0.38	0.95
8	20.0	15.6	0.0	0.0	0.00	6	2.80	3.90	0.37	0.75
9	20.1	14.7	0.0	0.0	0.00	6	2.60	5.30	0.32	0.56
10	18.5	16.6	120.7	1.9	0.05	6	4.30	5.50	0.32	7.62
11	21.4	18.5	136.0	1.9	0.05	6	3.30	5.20	0.27	2.61
12	24.2	18.1	122.2	1.8	0.05	6	4.70	5.60	0.28	7.06
13	23.4	15.6	113.9	1.8	0.05	6	3.90	4.20	0.41	7.51
14	22.7	14.9	109.3	1.8	0.05	6	4.40	5.00	0.45	4.09
15	24.4	15.1	140.7	1.8	0.05	6	4.60	5.70	0.41	2.34
16	24.3	15.2	137.1	1.8	0.05	6	5.10	7.10	0.37	1.63
17	21.6	17.0	155.0	2.0	0.05	6	4.30	5.50	0.27	2.55
18	20.8	19.2	168.0	2.2	0.05	6	4.90	7.20	0.26	2.15
19	20.5	18.4	152.9	2.1	0.05	6	2.70	4.30	0.24	1.23
20	23.0	18.7	144.3	2.2	0.05	6	6.60	39.4	0.29	1.14
21	22.4	18.0	147.6	2.2	0.06	6	3.40	12.0	0.31	1.20
22	21.4	18.3	122.5	2.2	0.06	6	5.10	26.2	0.29	1.82
23	21.2	18.2	147.6	2.2	0.06	6	3.10	6.70	0.27	1.02
24	21.0	19.4	161.8	2.3	0.06	6	3.60	8.20	0.27	1.55
25	21.5	19.7	175.1	2.4	0.06	6	3.60	10.6	0.24	2.93
26	21.6	18.9	143.9	2.4	0.06	6	2.40	3.60	0.26	2.67
27	16.1	19.0	149.8	2.4	0.06	6	1.90	2.70	0.29	1.91
28	18.3	19.1	137.8	2.2	0.06	6	5.80	12.2	0.33	2.56
29	20.4	19.6	115.1	1.8	0.05	6	8.20	19.5	0.44	1.87
30	21.0	19.2	116.8	1.8	0.05	6	6.20	10.5	0.51	2.74
Avg.	21.4	17.1	107.1	1.8	0.05	6	4.55			2.86
Max.	24.4	19.7	175.1	2.4	0.06	6	11.3	39.4	0.74	7.62
Min.	16.1	14.4	0.0	0.0	0.00	6	1.90			0.56
Total	640.5									

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	6	0.09	0.12	6	0	0	6	0.09	0.11	6	0	0	0.07
2	6	0.11	0.16	6	0	0	6	0.10	0.14	6	0	0	0.09
3	6	0.14	0.23	6	0	0	6	0.12	0.19	6	0	0	0.11
4	6	0.14	0.19	6	0	0	6	0.09	0.11	6	0	0	0.10
5	6	0.18	0.24	6	0	0	6	0.15	0.22	6	0	0	0.15
6	6	0.13	0.15	6	0	0	6	0.12	0.16	6	0	0	0.12
7	6	0.14	0.18	6	0	0	6	0.12	0.14	6	0	0	0.12
8	6	0.12	0.20	6	0	0	6	0.15	0.20	6	0	0	0.12
9	6	0.15	0.25	6	0	0	6	0.14	0.22	6	0	0	0.11
10	6	0.21	0.26	6	0	0	6	0.14	0.23	6	0	0	0.14
11	6	0.11	0.16	6	0	0	6	0.12	0.23	6	0	0	0.16
12	6	0.11	0.13	6	0	0	6	0.10	0.13	6	0	0	0.09
13	6	0.09	0.12	6	0	0	6	0.09	0.11	6	0	0	0.08
14	6	0.11	0.13	6	0	0	6	0.09	0.12	6	0	0	0.10
15	6	0.11	0.18	6	0	0	6	0.10	0.15	6	0	0	0.10
16	6	0.11	0.14	6	0	0	6	0.09	0.10	6	0	0	0.09
17	6	0.09	0.13	6	0	0	6	0.07	0.13	6	0	0	0.07
18	6	0.09	0.13	6	0	0	6	0.08	0.20	6	0	0	0.08
19	6	0.08	0.14	6	0	0	6	0.09	0.17	6	0	0	0.08
20	6	0.08	0.10	6	0	0	6	0.07	0.09	6	0	0	0.16
21	6	0.07	0.08	6	0	0	6	0.08	0.20	6	0	0	0.08
22	6	0.08	0.11	6	0	0	6	0.09	0.12	6	0	0	0.08
23	6	0.08	0.10	6	0	0	6	0.08	0.11	6	0	0	0.07
24	6	0.09	0.14	6	0	0	6	0.10	0.26	6	0	0	0.13
25	6	0.07	0.14	6	0	0	6	0.08	0.19	6	0	0	0.09
26	6	0.08	0.10	6	0	0	6	0.08	0.10	6	0	0	0.09
27	6	0.09	0.11	6	0	0	6	0.08	0.10	6	0	0	0.09
28	6	0.08	0.10	6	0	0	6	0.09	0.10	6	0	0	0.10
29	6	0.10	0.14	6	0	0	6	0.09	0.12	6	0	0	0.11
30	6	0.10	0.11	6	0	0	6	0.09	0.14	6	0	0	0.15
Avg.	6	0.11	0.15	6	0	0	6	0.10	0.15	6	0	0	
Max.	6	0.21	0.26	6	0	0	6	0.15	0.26	6	0	0	0.16
Min.	6	0.07	0.08	6	0	0	6	0.07	0.09	6	0	0	

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.00	0.15	0.17		4.8	1.5	6.3	1.3	1.6	1.5	2.0	1.2	1.7
2	0.00	0.16	0.17		4.7	1.7	6.4	1.1	1.5	1.6	2.0	1.3	1.5
3	0.00	0.16	0.16		5.4	1.8	7.2	1.0	1.5	1.5	2.0	1.3	1.7
4	0.50	0.18	0.20		5.3	2.0	7.3	1.4	1.8	1.8	2.1	1.7	2.0
5	0.50	0.14	0.45	0.25	4.5	2.0	6.5	0.9	1.2	1.6	1.9	1.3	1.7
6	0.00	0.15	0.18		4.7	2.4	7.1	0.7	1.0	1.6	1.9	1.4	1.7
7	0.00	0.14	0.18		5.5	2.8	8.3	0.7	1.0	1.6	2.0	1.3	1.6
8	0.00	0.17	0.19		5.2	2.7	7.9	0.7	0.9	1.5	1.9	1.3	1.7
9	0.00	0.17	0.18		5.1	2.7	7.8	0.5	0.9	1.7	2.1	1.3	1.8
10	0.00	0.16	0.18		4.8	2.5	7.3	0.3	0.6	1.4	1.8	1.2	1.6
11	0.00	0.17	0.14		4.8	3.1	7.9	0.9	1.2	1.7	2.2	1.6	1.9
12	0.00	0.14	0.13	0.18	4.2	2.9	7.1	0.8	1.2	2.0	2.4	1.9	2.3
13	0.00	0.16	0.14		4.4	3.4	7.8	0.6	0.8	2.4	2.8	2.1	2.4
14	0.00	0.16	0.14		4.2	3.5	7.7	0.7	1.0	2.4	2.8	2.0	2.4
15	0.00	0.16	0.13		4.1	3.5	7.6	0.4	0.8	2.3	2.9	1.7	2.0
16	0.00	0.16	0.13		4.2	3.5	7.7	0.8	1.0	2.6	3.1	2.1	2.5
17	0.00	0.15	0.13		4.6	3.1	7.7	1.1	1.5	2.5	2.9	2.2	2.5
18	0.00	0.16	0.13		5.0	2.6	7.6	1.3	1.5	2.5	3.0	2.0	2.5
19	0.00	0.14	0.13	0.18	5.0	2.9	7.9	1.4	1.6	2.7	3.1	2.1	2.4
20	0.00	0.16	0.13		5.0	3.1	8.1	1.3	1.5	2.3	2.8	1.7	2.1
21	0.00	0.16	0.13		5.0	4.0	9.0	1.1	1.4	2.3	2.8	2.0	2.2
22	0.00	0.17	0.13		4.9	4.0	8.9	0.8	1.0	2.4	3.0	2.1	2.4
23	0.00	0.16	0.13		4.7	2.6	7.3	1.4	1.7	2.5	2.8	2.2	2.7
24	0.00	0.16	0.13		4.8	2.9	7.7	1.3	1.5	2.5	2.9	2.7	3.0
25	0.00	0.16	0.13		4.7	2.9	7.6	1.2	1.5	2.5	2.9	2.0	2.4
26	0.00	0.17	0.12	0.15	3.9	3.0	6.9	1.0	1.4	2.2	2.6	2.5	3.0
27	0.00	0.16	0.13		4.9	2.7	7.6	1.2	1.5	2.9	3.2	2.1	2.5
28	0.00	0.16	0.14		4.6	3.0	7.6	1.5	1.8	2.3	3.0	2.4	3.0
29	0.00	0.15	0.14		3.8	3.5	7.3	0.8	1.2	2.3	2.8	1.9	2.3
30	0.00	0.15	0.13		4.1	3.2	7.3	0.6	0.9	2.5	3.3	1.8	2.1
Avg.	0.03	0.16	0.16	0.19	4.7	2.9	7.5	1.0	1.3	2.1	2.6	1.8	2.2
Max.	0.50	0.18	0.45	0.25	5.5	4.0	9.0	1.5	1.8	2.9	3.3	2.7	3.0
Min.	0.00	0.14	0.12	0.15	3.8	1.5	6.3	0.3	0.6	1.4	1.8	1.2	1.5

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.28	7.81	270	234	216	132	54	102	85.8	84.2	13.6	5.8	41	87
2	8.02	7.58	262	236	218	132	44	104	84.2	82.6	12.6	7.3	40	83
3	8.17	7.39	278	248	218	140	60	108	93.0	77.8	6.3	13.1	43	75
4	8.25	7.49	276	238	220	144	56	94	80.2	79.4	18.5	9.2	41	79
5	8.26	7.49	274	236	220	148	54	88	89.0	79.4	12.6	9.2	44	80
6	8.16	7.52	262	234	216	146	46	88	85.0	77.0	12.2	10.2	43	93
7	8.21	7.27	268	260	226	172	42	88	87.4	85.0	12.2	11.7	42	80
8	8.26	7.36	260	262	222	170	38	92	81.0	82.6	13.6	12.2	43	80
9	8.17	7.36	268	266	220	164	48	102	93.0	85.8	8.3	10.2	44	79
10	8.18	7.21	270	260	226	172	44	88	96.2	94.6	4.9	5.8	45	78
11	8.10	7.38	266	192	220	100	46	92	83.4	64.1	14.1	7.8	43	86
12	8.11	7.44	268	192	222	100	46	92	84.2	64.1	14.1	7.8	42	80
13	8.01	7.56	264	218	218	110	46	108	85.8	70.5	12.2	10.2	42	81
14	7.94	7.65	272	210	216	114	56	96	90.6	68.1	11.2	9.7	40	78
15	8.27	7.57	268	188	226	100	42	88	85.8	67.3	13.1	4.9	43	79
16	8.34	7.75	266	186	220	94	46	92	84.2	64.9	13.1	5.8	44	80
17	8.12	7.66	262	190	222	92	40	98	90.6	68.9	7.3	4.4	43	80
18	8.24	7.24	268	184	230	94	38	90	87.4	66.5	12.2	3.4	40	81
19	8.13	7.61	272	182	228	88	44	94	91.4	62.5	8.3	6.3	42	81
20	8.01	7.33	264	180	222	88	42	92	89.0	60.9	10.2	8.7	42	83
21	7.98	7.35	252	182	226	82	26	100	86.6	64.1	9.0	5.3	43	84
22	8.00	7.45	264	180	224	84	40	96	87.4	59.3	11.2	7.8	42	81
23	7.98	7.00	260	168	224	74	36	94	89.8	53.7	8.7	8.3	46	88
24	7.92	7.60	274	194	222	82	52	112	89.0	60.9	10.7	10.2	45	87
25	7.98	7.68	276	168	228	70	48	98	91.4	58.5	11.7	5.3	43	90
26	7.88	7.72	280	186	226	80	54	106	86.6	65.7	15.6	5.3	46	90
27	7.92	7.12	254	176	224	66	30	110	89.8	67.3	7.3	1.9	39	92
28	7.97	7.64	272	176	230	74	42	102	85.0	64.1	14.6	3.9	43	85
29	8.26	7.49	276	178	232	76	44	102	87.4	55.3	12.2	9.7	40	90
30	7.94	7.70	268	156	230	66	38	90	92.2	56.9	9.2	3.4	44	91
Avg.	8.10	7.48	268	205	223	108	45	97	87.7	69.7	11.4	7.5	43	83
Max.	8.34	7.81	280	266	232	172	60	112	96.2	94.6	18.5	13.1	46	93
Min.	7.88	7.00	252	156	216	66	26	88	80.2	53.7	4.9	1.94	39	75

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Wind Direction	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap		Raw	Raw	Tap	Raw	Tap
1	1	320	12	1	1	0	3020	<2		21.7				
2	1	62	12	0	1	0	7840	<2		20.5				
3	1	1710	12	0	1	0	4180	<2		22.4				
4	1	3232	12	0	1	0	5980	<2		22.1				
5	1	3232	12	0	1	0	1368	<2		21.5				
6	1	4286	12	2	1	0	1540	<2		22.2				
7	1	4374	12	0	1	0	11100	<2		22.5				
8	1	3328	12	0	1	0	7840	<2		21.7				
9	1	1768	12	0	1	0	9400	<2		21.5				
10	1	6152	12	0	1	0	11100	<2		23.9				
11	1	12262	12	0	1	0	3660	<2		23.4				
12	1	8704	12	0	1	0	12460	<2		22.9				
13	1	4978	12	0	1	0	1720	<2		22.3				
14	1	4092	12	0	1	0	1240	<2		20.9				
15	1	3912	12	0	1	0	1660	<2		21.7				
16	1	3440	12	0	1	0	1940	<2		22.7				
17	1	2748	12	0	1	0	1600	<2		23.3				
18	1	2338	12	0	1	0	2080	<2		23.3				
19	1	1542	12	0	1	0	7840	<2		22.8				
20	1	1678	12	0	1	0	1180	<2		22.4				
21	1	1672	12	0	1	0	960	<2		21.8				
22	1	7308	12	0	1	0	7440	<2		22.0				
23	1	4028	12	0	1	0	3900	<2		21.6				
24	1	1234	12	0	1	0	3780	<2		22.5				
25	1	2100	12	0	1	0	2240	<2		22.5				
26	1	2396	12	0	1	0	5140	<2		22.0				
27	1	1968	12	0	1	0	2000	<2		22.9				
28	1	1976	12	0	1	0	11100	<2		22.9				
29	1	2802	12	0	1	0	6780	<2		25.8				
30	1	9572	12	0	1	0	2560	<2		24.8				
Avg.										22.5				
Max.							12460	0		25.8				
Min.										20.5				

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Samples
1											0
2									0.5	0.0	2
3									0.2	0.0	2
4	0.5	0.9	0.5	0.5	0.2	0.5	0.4	0.9	0.2	0.0	10
5	0.4	0.2	0.5	0.4	0.1	0.6	0.3	0.9	0.1	0.0	10
6									0.1	0.0	2
7											0
8											0
9									0.1	0.0	2
10	0.6	1.1	0.4	0.6	0.2	0.6	0.3	0.7	0.3	0.0	10
11									0.0	0.0	2
12	1.2	1.8	0.9	1.3	0.6	0.9	0.5	1.8	1.4	0.0	10
13									0.1	0.0	2
14											0
15											0
16									1.2	0.0	2
17	1.3	1.5	1.0	0.5	0.7	1.5	0.9	2.0	0.2	0.3	10
18	1.4	1.1	1.2	1.1	0.3	1.2	0.9	1.4	0.6	0.1	10
19									0.2	0.1	2
20											0
21											0
22											0
23											0
24											0
25	1.3	1.3	1.1	1.0	0.3	0.8	1.0	1.5	0.9	0.4	10
26	1.1	1.4	0.9	0.0	0.0	1.4	0.8	2.1	0.9	0.6	10
27									0.7	1.1	2
28											0
29											0
30									0.6	1.3	2

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Disinfectant Free Residual Summary	
Percent samples with a detectable disinfectant residual	86%
Average disinfectant residual this month	0.7

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	2
Percent of routine distribution samples positive	2%

Positive Distribution Samples					
Date	Monitoring Station	Date	Repeat Monitorong Stations	Residual	Positive or Negative
6/10/2014	WEST SIDE	6/11/2014	WS UPSTREAM	.10/.30	ABSENT
		6/11/2014	WS DOWNSTREAM	.10/.30	ABSENT
		6/11/2014	WEST SIDE	0/.10	ABSENT
6/11/2014	CEDAR STREET	6/12/2014	CS UPSTREAM	0.2/0.4	ABSENT
		6/12/2014	CS DOWNSTREAM	0.2/0.3	ABSENT
		6/12/2014	CEDAR STREET	1.4/1.8	ABSENT

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Samples
1											0
2									0.8	0.2	2
3									0.3	0.2	2
4	1.0	1.3	0.8	0.9	0.3	1.0	0.6	1.1	0.3	0.2	10
5	0.8	0.6	0.8	0.6	0.3	0.8	0.6	1.1	0.3	0.2	10
6									0.3	0.2	2
7											0
8											0
9									0.2	0.2	2
10	1.0	1.6	0.7	1.1	0.6	1.2	0.7	1.2	0.5	0.2	10
11									0.2	0.1	2
12	1.7	2.5	1.3	1.7	0.9	1.2	0.9	2.3	1.8	0.1	10
13									0.3	0.2	2
14											0
15											0
16									1.6	0.2	2
17	1.9	1.9	1.3	0.7	1.0	2.0	1.3	2.9	0.3	0.5	10
18	2.0	1.5	1.8	1.5	0.6	1.6	1.4	2.1	0.9	0.3	10
19									0.3	0.3	2
20											0
21											0
22											0
23											0
24											0
25	1.8	1.9	1.6	1.4	0.5	1.1	1.4	2.0	1.1	0.7	10
26	1.5	1.9	1.3	0.1	0.1	1.8	1.1	2.5	1.1	0.8	10
27									1.0	1.5	2
28											0
29											0
30									0.9	1.3	2

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

MONTHLY OPERATION REPORT OF
WATER TREATMENT PLANT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	May 2014
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	Genesee
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	26.9	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	101	Hours
Average Head Loss:	*	Feet
Average Filtration Rate:	2.6	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.8	Gallons Per Square Feet per Minute
Average Wash Water Use:	2	Percent of Treated Water

Chemical Data

Chlorine on hand:	22000	lb.	Est. supply:	20	days
Primary Coagulant (Ferric Chloride) on hand:	83765	lb.	Est. supply:	14	days
Cost of All Chemicals per Million Gallons:	*	dollars			
Total Power Cost per Million Gallons:	*	dollars			

Remarks

Number of filter confluence samples > 0.3 NTU:	3
Number of filter confluence samples collected:	350
Percent of filter confluence samples > 0.3 NTU:	0.86%
Number of filter confluence samples > 1 NTU	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? YES*
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters

City of Flint Water Treatment Plant
WSSN: 2310

May 2014

Date	Million Gallons Treated	Ferric as Fe3+ mg/L	Turbidity, Units																
			Raw			Applied	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
			Number of Samples	Avg.	Max.	Applied Avg.	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	15.1	10.9	6	9.60	12.7	5.04	6	0.10	0.19	6	0	0	6	0.07	0.08	6	0	0	0.09
2	14.7	11.3	6	10.1	10.7	7.12	6	0.06	0.07	6	0	0	6	0.07	0.10	6	0	0	0.09
3	21.4	12.3	6	11.2	12.6	7.40	6	0.15	0.18	6	0	0	6	0.11	0.15	6	0	0	0.11
4	21.4	11.8	6	26.2	31.2	8.65	6	0.11	0.13	6	0	0	6	0.10	0.11	6	0	0	0.12
5	21.6	12.3	6	12.6	14.5	5.80	6	0.16	0.23	6	0	0	6	0.14	0.18	6	0	0	0.12
6	22.3	12.1	6	15.0	20.3	4.53	6	0.21	0.27	6	0	0	6	0.18	0.21	6	0	0	0.19
7	21.9	12.1	6	15.5	14.8	5.23	6	0.13	0.16	6	0	0	6	0.12	0.17	6	0	0	0.11
8	22.7	11.7	6	12.6	15.5	4.74	6	0.16	0.25	6	0	0	6	0.11	0.13	6	0	0	0.16
9	22.2	12.0	6	9.30	9.60	4.33	6	0.12	0.15	6	0	0	6	0.11	0.16	6	0	0	0.14
10	21.8	12.2	6	13.2	15.3	5.60	6	0.11	0.18	6	0	0	6	0.09	0.10	6	0	0	0.09
11	19.1	13.8	6	12.6	14.1	6.43	6	0.19	0.29	6	0	0	6	0.08	0.09	6	0	0	0.09
12	8.5	15.3	2	12.0	13.9	8.46	1	0.09	0.09	1	0	0	1	0.07	0.07	1	0	0	0.08
13	0.0	12.9	2	11.3	14.1	n/a	0	n/a	n/a	0	n/a	n/a	0	n/a	n/a	0	n/a	n/a	0.10
14	22.2	12.3	6	30.8	71.7	11.8	6	0.24	0.37	6	1	1	6	0.23	0.31	6	1	1	0.16
15	16.6	20.6	6	45.2	63.0	5.68	6	0.21	0.28	6	0	0	6	0.24	0.28	6	0	0	0.22
16	20.2	18.7	6	28.2	37.3	5.21	6	0.21	0.38	6	1	1	6	0.22	0.45	6	1	1	0.22
17	21.0	20.0	6	14.3	19.3	4.90	6	0.12	0.22	6	0	0	6	0.09	0.08	6	0	0	0.11
18	20.6	16.3	6	9.50	10.7	6.03	6	0.14	0.28	6	0	0	6	0.08	0.09	6	0	0	0.09
19	22.0	18.2	6	9.20	11.3	4.59	6	0.12	0.17	6	0	0	6	0.07	0.10	6	0	0	0.09
20	22.1	18.0	6	7.20	8.40	4.63	6	0.11	0.11	6	0	0	6	0.09	0.11	6	0	0	0.09
21	21.0	19.4	6	7.80	8.90	6.27	6	0.11	0.18	6	0	0	6	0.08	0.08	6	0	0	0.09
22	21.0	18.6	6	9.40	11.3	6.50	6	0.11	0.16	6	0	0	6	0.07	0.09	6	0	0	0.08
23	21.0	18.9	6	9.10	10.4	6.24	6	0.11	0.13	6	0	0	6	0.08	0.09	6	0	0	0.08
24	20.8	17.9	6	7.10	8.30	5.38	6	0.12	0.18	6	0	0	6	0.08	0.09	6	0	0	0.09
25	21.0	18.3	6	6.00	7.30	5.62	6	0.14	0.22	6	0	0	6	0.18	0.25	6	0	0	0.10
26	22.0	18.0	6	5.20	5.60	3.23	6	0.12	0.14	6	0	0	6	0.10	0.13	6	0	0	0.11
27	20.6	19.4	6	5.70	7.30	2.78	6	0.13	0.18	6	0	0	6	0.12	0.14	6	0	0	0.10
28	20.1	20.0	6	4.20	5.30	3.52	6	0.11	0.13	6	0	0	6	0.08	0.08	6	0	0	0.08
29	19.7	20.0	6	5.20	10.3	3.72	6	0.09	0.12	6	0	0	6	0.07	0.08	6	0	0	0.06
30	19.3	16.1	6	3.50	5.30	3.54	6	0.11	0.16	6	0	0	6	0.07	0.07	6	0	0	0.06
31	18.0	17.6	6	3.50	4.40	2.23	6	0.09	0.12	6	0	0	6	0.08	0.09	6	0	0	0.08
Avg.	19.4	15.8	6	12.3		5.51	6	0.13	0.19	6	0	0	6	0.11	0.14	6	0	0	
Max.	22.7	20.6	6	45.2	71.7	11.8	6	0.24	0.38	6	1	1	6	0.24	0.45	6	1	1	0.22
Min.	0.0	10.9	2	3.50		2.23	0	0.06	0.07	0	0	0	0	0.07	0.07	0	0	0	
Total	602.1																		

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0	0.14	0.19		3.4	0.0	3.4	1.4	1.6	1.4	1.6	1.2	1.5
2	0	0.15	0.34		4.0	0.0	4.0	1.2	1.3	1.6	2.0	1.3	1.6
3	0	0.14	0.18		4.0	0.0	4.0	1.8	2.2	1.7	2.0	1.5	1.7
4	0	0.15	0.24		4.4	0.0	4.4	2.2	2.6	1.5	1.7	1.8	2.2
5	0	0.14	0.13		4.7	0.0	4.7	1.9	2.2	1.8	2.1	1.2	1.4
6	0	0.14	0.13		4.9	0.0	4.9	1.9	2.3	1.7	1.9	1.2	1.5
7	0	0.15	0.14		4.9	0.0	4.9	1.8	2.2	2.0	2.3	1.9	2.2
8	0	0.15	0.14	0.17	4.7	0.0	4.7	1.8	2.3	1.8	2.2	1.7	2.1
9	0	0.15	0.13		5.1	0.0	5.1	1.5	1.9	1.7	2.0	1.5	1.9
10	0	0.15	0.14		5.2	0.0	5.2	2.0	2.5	1.7	2.1	1.5	2.0
11	0	0.16	0.14		5.6	0.0	5.6	2.1	2.6	2.0	2.6	1.7	2.1
12	0	0.15	0.13		6.9	0.0	6.9	1.8	2.4	1.7	2.2	1.4	2.0
13	0	0.15	0.25		5.0	0.0	5.0	n/a	n/a	1.7	2.0	1.5	1.8
14	0	0.15	0.13	0.23	4.9	0.0	4.9	1.9	2.3	1.5	1.9	1.5	1.8
15	0	0.14	0.14		6.2	0.0	6.2	2.0	2.4	2.0	2.5	2.2	2.6
16	0	0.14	0.13		5.3	0.0	5.3	1.9	2.3	1.6	2.0	1.4	1.7
17	0	0.15	0.14		5.1	0.6	5.7	1.7	2.1	1.6	1.9	1.6	2.0
18	0	0.16	0.15		5.1	0.6	5.7	1.5	1.9	1.6	1.9	1.4	1.7
19	0	0.15	0.14		4.7	0.2	4.9	1.6	1.8	1.9	2.3	1.5	1.7
20	0	0.15	0.15		5.0	0.5	5.5	1.9	2.3	2.1	2.6	1.6	1.9
21	0	0.15	0.16		4.9	0.4	5.3	1.8	2.3	2.0	2.4	1.8	2.3
22	0	0.15	0.14		5.0	0.2	5.2	1.7	2.1	2.1	2.5	1.5	1.8
23	0	0.14	0.13		4.9	0.4	5.3	1.5	1.8	1.8	2.3	1.6	2.1
24	0	0.15	0.15		5.0	0.9	5.9	1.5	2.0	1.5	2.0	1.3	1.7
25	0	0.15	0.14		5.0	1.0	6.0	1.4	1.8	1.6	2.0	1.5	1.9
26	0	0.15	0.16		5.0	0.9	5.9	1.5	1.8	1.7	2.3	1.7	2.0
27	0	0.16	0.17		5.3	0.9	6.2	1.5	1.7	1.8	2.2	1.5	1.7
28	0	0.15	0.16	0.19	5.7	1.0	6.7	1.6	2.0	1.9	2.3	1.6	2.0
29	0	0.16	0.16		5.1	0.8	5.9	1.5	1.8	1.8	2.1	1.2	1.4
30	0	0.16	0.17		5.1	1.1	6.2	1.4	1.7	1.6	1.8	1.4	1.7
31	0	0.15	0.16		5.4	1.4	6.8	1.4	1.7	1.6	2.0	1.2	1.6
Avg.	0	0.15	0.16	0.20	5.0	0.4	5.4	1.7	2.1	1.7	2.1	1.5	1.9
Max.	0	0.16	0.34	0.23	6.9	1.4	6.9	2.2	2.6	2.1	2.6	2.2	2.6
Min.	0	0.14	0.13	0.17	3.4	0.0	3.4	1.2	1.3	1.4	1.6	1.2	1.4

WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.44	7.71	246	146	196	66	50	80	56.7	48.1	20.9	7.8	43.0	67.0
2	8.27	7.07	250	162	196	80	54	82	83.4	48.1	10.2	10.2	44.0	41.0
3	8.26	7.47	260	132	200	60	50	72	82.6	42.5	10.7	6.3	40.0	60.0
4	8.39	7.50	256	120	196	70	60	50	86.6	60.9	6.3	6.3	47.0	60.0
5	8.39	7.41	232	152	204	76	28	76	78.6	54.5	8.7	3.9	45.0	75.0
6	8.25	7.21	240	160	202	90	38	70	80.2	54.5	9.7	7.3	53.0	71.0
7	8.24	7.24	266	210	212	130	54	80	71.3	66.5	21.4	10.7	51.0	76.0
8	8.33	7.13	272	218	210	128	62	90	86.6	84.2	10.7	2.4	n/a	n/a
9	8.29	7.22	264	224	210	130	54	94	86.6	75.4	11.7	8.7	50.0	80.0
10	8.38	7.36	260	216	214	122	46	94	81.8	73.7	13.6	7.8	48.0	80.0
11	8.35	7.46	286	230	216	126	70	104	81.0	73.7	20.4	11.2	46.0	82.0
12	8.33	7.43	266	218	208	120	58	98	99.4	72.1	4.4	9.2	45.0	76.0
13	8.26	7.24	278	202	216	114	62	88	85.8	59.3	15.6	13.1	48.0	66.0
14	8.23	7.30	264	220	208	138	56	82	68.9	68.1	22.4	12.2	45.0	72.0
15	8.06	7.42	242	206	184	122	58	84	66.5	65.7	18.5	10.2	43.0	73.0
16	8.05	7.12	234	214	196	116	38	96	81.0	69.7	7.8	9.7	41.0	90.0
17	8.16	7.21	246	206	200	98	46	108	85.8	65.7	7.8	10.2	41.0	85.0
18	8.29	7.27	280	212	206	116	74	96	77.0	64.9	14.6	12.2	47.0	80.0
19	8.24	7.27	266	214	214	120	52	94	85.8	69.7	12.6	9.7	43.0	78.0
20	8.22	7.44	254	220	212	124	42	96	85.8	70.5	9.7	10.7	43.0	80.0
21	8.23	7.42	246	226	208	118	38	108	77.8	74.5	12.6	9.7	45.0	85.0
22	8.33	7.50	244	216	206	118	36	98	79.4	72.1	11.2	8.7	42.0	85.0
23	8.22	7.49	248	222	208	114	40	108	82.6	72.9	10.2	9.7	48.0	87.0
24	8.24	7.52	258	228	208	118	50	110	78.6	72.9	15.1	11.2	42.0	80.0
25	8.30	7.49	240	228	208	124	32	104	8.6	75.4	9.7	11.2	42.0	82.0
26	8.28	7.30	248	220	208	120	40	100	84.2	81.0	9.2	4.4	41.0	80.0
27	8.21	7.55	242	226	208	126	34	100	78.6	77.0	11.2	8.3	41.0	84.0
28	8.28	7.46	242	240	208	126	34	114	82.6	80.2	8.8	9.7	43.0	87.0
29	8.23	7.46	254	224	210	114	44	110	83.4	78.6	11.2	6.8	42.0	86.0
30	8.33	7.49	256	230	216	132	40	98	83.4	79.4	11.7	7.8	42.0	88.0
31	8.32	7.41	248	242	212	130	36	112	77.8	74.5	13.1	13.6	40.0	78.0
Avg.	8.27	7.37	254	206	207	113	48	93	78.3	68.6	12.3	9.1	44.4	77.2
Max.	8.44	7.71	286	242	216	138	74	114	99.4	84.2	22.4	13.6	53	90
Min.	8.05	7.07	232	120	184	60	28	50	8.6	42.5	4.4	2.4	40	41

WSSN: 2310

Date	Total Coliform						Standard Plate Count		Wind Direction	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap		Raw	Raw	Tap	Raw	Tap
1	1	1166	12	0	1	0	14760	<2		12.6				
2	1	864	12	0	1	0	800	<2		13.2				
3	1	930	12	0	1	0	1300	<2		12.0				
4	1	974	12	0	1	0	>14760	<2		13.6				
5	1	882	12	0	1	0	>14760	<2		12.5				
6	1	618	12	0	1	0	12460	<2		14.9				
7	1	728	12	0	1	0	>14760	<2		14.3				
8	1	426	12	0	1	0	9400	<2		13.4				
9	1	342	12	0	1	0	>14760	<2		16.6				
10	1	610	12	0	1	0	>14760	2		17.6				
11	1	220	12	0	1	0	>14760	2		18.1				
12	1	218	12	0	1	0	>14760	<2		18.3				
13	1	126	12	0	1	0	11100	<2		19.5				
14	1	2910	12	0	1	0	>14760	<2		19.6				
15	1	16328	12	0	1	0	14760	<2		17.4				
16	1	12588	12	0	1	0	5980	<2		13.2				
17	1	3720	12	1	1	0	3320	2		14.3				
18	1	1618	12	0	1	0	7840	<2		16.7				
19	1	4494	12	0	1	0	16.1	<2		16.1				
20	1	1816	12	0	1	0	860	<2		17.2				
21	1	4764	12	0	1	0	14760	<2		18.2				
22	1	2934	12	0	1	0	7440	<2		19.0				
23	1	960	12	0	1	0	7840	<2		18.0				
24	1	682	12	0	1	0	3780	<2		18.3				
25	1	398	12	0	1	0	14760	2		18.7				
26	1	482	12	0	1	0	>14760	<2		21.4				
27	1	2034	12	0	1	0	1600	<2		20.6				
28	1	2028	12	0	1	0	7440	<2		21.1				
29	1	918	12	0	1	0	5740	<2		20.6				
30	1	862	12	0	1	0	2160	<2		22.3				
31	1	1166	12	0	1	0	3320	<2		22.7				
Avg.										17.2				
Max.							> 14760	2		22.7				
Min.										12.0				

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Samples
1									0.6	0.8	2
2									0.6	0.8	2
3											0
4											0
5									0.7	0.6	2
6									1.1	1.4	2
7	1.0	1.3	0.9	1.0	0.9	0.9	0.9	1.3	0.4	0.6	10
8	1.1	1.3	1.0	1.4	0.9	1.1	0.9	1.4	0.8	0.6	10
9									0.7	0.6	2
10											0
11											0
12									0.3	0.4	2
13									0.3	0.4	2
14	1.0	0.7	1.0	1.0	0.7	0.7	0.9	0.7	0.3	0.4	10
15	0.6	0.5	0.5	0.3	0.2	0.3	0.2	0.4	0.2		9
16									0.3		1
17											0
18											0
19									0.4	0.3	2
20									0.3	0.3	2
21	0.3	1.2	0.7	0.8	0.5	1.0	0.7	1.2	0.3	0.3	10
22	0.8	0.9	0.7	0.4					0.3	0.2	6
23									0.3	0.2	2
24											0
25											0
26									0.3	0.1	2
27									0.2	0.0	2
28	0.7	0.9	0.6	0.1	0.5	0.6	0.5	1.0	0.2	0.1	10
29	0.7	1.1	0.6	0.9	0.3	0.9	0.9	1.1	0.3	0.1	10
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Disinfectant Free Residual Summary	
Percent samples with a detectable disinfectant residual	99
Average disinfectant residual this month	0.7

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0

Positive Distribution Samples					
Date	Monitoring Station	Date	Repeat Monitorong Stations	Residual	Positive or Negative

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WR	Number of Sample
1									0.7	1.0	2
2									0.7	0.8	2
3											0
4											0
5									1.0	0.8	2
6									1.9	0.9	2
7	1.5	1.7	1.4	1.4	1.1	1.1	1.1	1.7	0.6	0.9	10
8	1.6	1.9	1.2	1.7	1.3	1.7	1.3	1.7	0.9	1.1	10
9									0.9	0.8	2
10											0
11											0
12									0.4	0.6	2
13									0.4	0.7	2
14	1.3	1.0	1.4	1.3	1.0	1.1	1.2	0.9	0.4	0.7	10
15	0.8	0.7	1.0	0.6	0.5	0.7	0.7	0.7	0.3		9
16									0.4		1
17											0
18											0
19									0.5	0.5	2
20									0.4	0.5	2
21	0.4	1.9	1.2	1.3	1.0	1.5	1.1	1.6	0.4	0.4	10
22	1.2	1.5	1.0	1.7					0.5	0.3	6
23									0.4	0.3	2
24											0
25											0
26											0
27									0.4	0.2	2
28	1.1	1.2	1.0	0.3	0.8	1.1	0.9	1.4	0.3	0.2	10
29	1.1	1.5	1.1	1.1	0.5	1.1	1.1	1.2	0.5	0.3	10
30											0
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residua	100
Average disinfectant residual this month	1.0

Cover Page Notes:

1. Filter head loss meters are not operational on our SCADA. They will be operational after our SCADA upgrades are complete. The SCADA upgrades are out for bid at the moment.

2. No cost analysis done for chemicals or power. An accurate chemical cost could not be determined due to polymer usage. We were given significant quantities (4-5 days) of polymer to use as a trial on two different occasions. No power cost was determined because I am trying to gain access to the correct monthly power cost.

3. POE continuous chlorine residual monitoring equipment has not been installed. We plan to move the continuous chlorine analyzer from the 3MG Well to the discharge side of the high service pumps. At this time we are taking residuals in the 3MG well, and using our lab tap to represent POE.

Report Notes:

1. Plant operations were shut down on 5/12 until 5/14. This was done to drain a softening clarifier and change plant set-up to test a new polymer. Storage reservoirs were utilized during this time.

281c

DEQ
RESOURCE MANAGEMENT DIVISION

MAY 15 2014

LANSING DISTRICT

FLINT WATER PLANT & FACILITIES

Coagulation Parameters **WSSN 2310** **Apr-14**

DATE	Total Million Gallons Purchased	Million Gallons to County	Million Gallons to Flint			Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units						
							Raw				Plant Tap		
							# of Samples	Avg.	Max		# of Samples	Avg.	Max
	1	1A	1B	4	5	6	7	8	9	10	11	12	13
1		0.00									3	0.12	0.18
2		0.00									3	0.08	0.08
3		0.00									3	0.07	0.08
4		0.00									3	0.08	0.08
5		0.00									3	0.07	0.08
6		0.00									3	0.07	0.08
7		0.00									2	0.08	0.10
8		0.00									3	0.08	0.08
9		0.00									3	0.08	0.10
10		0.00									3	0.07	0.08
11		0.00									3	0.06	0.07
12		0.00									3	0.08	0.08
13		0.00									3	0.06	0.06
14		0.00									1	0.09	0.09
15		0.00									1	0.11	0.11
16		0.00									0	n.s	n.s
17		0.00									3	0.07	0.08
18		0.00									3	0.06	0.07
19		0.00									3	0.06	0.07
20		0.00									0	n.s	n.s
21		0.00									3	0.08	0.08
22		0.00									3	0.07	0.08
23		0.00									3	0.07	0.07
24		0.00									3	0.07	0.08
25		0.00					2	10.2	11.8		1	0.10	0.10
26		0.00					2	11.4	13.4		2	0.08	0.10
27		0.00					2	11.4	13.7		2	0.07	0.08
28		0.00					2	14.6	15.6		2	0.07	0.07
29		0.00					2	11.3	13.2		2	0.06	0.07
30		0.00					2	10.5	11.1		2	0.08	0.10
AVG	#DIV/0!	0.00	######				2	11.6	13.1		2	0.08	0.08
MAX	0.00	0.00	0.00				2	14.6	15.6		3	0.12	0.18
MIN	0.00	0.00	0.00				2	10.2	11.1		0	0.06	0.06
Total	0.00	0.00	0.00										

COMPLETED

FLINT WATER PLANT & FACILITIES

Flouridation & Chlorination **WSSN 2310** **Apr-14**

DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l							
						Chlorine (prior to filtration) mg/L OCl-	Post Chlorine mg/L	B&P	Sta II	Dort	3MG Well		Tap		
		Raw	Tap	Dist				Free	Free	Free	Free			Free	
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1			0.59					0.8	0.9	0.9	0.9			0.9	
2			0.58					1.0	1.0	0.9	0.9			0.9	
3			0.63					0.8	1.1	1.0	0.9			0.9	
4			0.65					1.0	1.1	0.9	1.0			1.0	
5			0.66					1.0	1.1	1.1	1.0			1.1	
6			0.65					1.0	1.0	1.0	1.0			0.9	
7			0.71					n.s	n.s	n.s	n.s			1.0	
8			0.68					0.8	1.0	0.9	0.9			0.9	
9			0.64					1.0	1.0	0.9	0.9			0.8	
10			0.68					0.9	1.0	0.9	0.9			0.8	
11			0.64					1.0	1.2	1.0	1.0			1.0	
12			0.63					0.8	0.9	0.8	0.8			1.0	
13			0.67					0.9	1.0	0.9	0.8			0.9	
14			0.62					0.9	1.0	1.0	0.9			1.0	
15			0.54					0.9	1.1	1.0	n/a			1.0	
16			0.54					0.9	1.0	0.9	n/a			0.8	
17			0.59					0.8	1.1	0.9	n/a			0.9	
18			0.54					0.9	1.0	1.0	n/a			1.0	
19			0.57					0.8	1.0	0.9	n/a			1.0	
20			n/a					n.s	n.s	n.s	n/a			n.s	
21			0.61					0.9	1.0	0.9	n/a			1.0	
22			0.66					0.8	1.1	0.9	n/a			1.0	
23			0.61					0.8	1.0	0.9	n/a			0.8	
24			0.61					n.s	1.0	0.9	n/a			0.9	
25		0.14	0.59			3.5		n.s	n/a	n.s	1.7			0.8	
26		0.14	0.53			3.5		n.s	n/a	n.s	1.6			0.9	
27		0.13	0.53			3.6		n.s	n/a	n.s	1.5			1.0	
28		0.13	0.19			3.7		n.s	n/a	n.s	1.4			0.9	
29		0.15	0.58			3.7		n.s	n/a	n.s	1.5			0.9	
30		0.15	0.62			3.5		n.s	n/a	n.s	1.7			0.8	
AVG		0.14	0.60			3.6		0.9	1.0	0.9	1.1			0.9	
MAX		0.15	0.71			3.7		1.0	1.2	1.1	1.7			1.1	
MIN		0.13	0.19			3.5		0.8	0.9	0.8	0.8			0.8	

n.s. = no sample collected/tested

Chemical Analyses **WSSN 2310** **Apr-14**

DATE	pH		Total Hard as $CaCO_3$ mg/l		Total Alk as $CaCO_3$ mg/l		NonCarbonate Hardness as $CaCO_3$ mg/l				Calcium Ca ++ mg/l		Magnesium as Mg ++ mg/l		Chloride as Cl - mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1		7.57		98		74		24				30.5		5.3		
2		7.36		98		73		25				29.7		5.8		
3		7.33		98		74		24				30.5		5.3		
4		7.32		100		75		25				32.1		4.9		
5		7.44		100		76		24				30.5		5.8		
6		7.32		98		74		24				28.9		6.3		
7		7.41		100		73		27				31.3		5.3		
8		7.62		98		69		29				28.9		6.3		
9		7.46		98		72		26				29.7		5.8		
10		7.39		98		71		27				28.9		6.3		
11		7.34		100		75		25				31.3		5.3		
12		7.56		102		71		31				28.1		7.8		
13		7.37		96		64		32				28.9		5.8		
14		7.32		96		75		21				28.9		5.8		
15		7.46		98		73		25				28.9		6.3		
16		7.47		96		66		30				28.9		5.8		
17		7.32		96		71		25				29.7		5.3		
18		7.30		98		73		25				31.3		4.9		
19		7.28		100		72		28				28.9		6.8		
20		n.s		n.s		n.s		n.s				n.s		n.s		
21		7.34		98		74		24				29.7		5.8		
22		7.26		98		72		26				29.7		5.8		
23		7.25		98		71		27				29.7		5.8		
24		7.46		96		71		25				29.7		5.3		
25		7.39		96		75	0	21				29.7		5.3		
26	8.31	7.28	255	98	200	73	55	25			77.9	29.7	13.6	5.8	48	24
27	8.34	7.32	249	98	199	70	50	28			75.4	30.5	14.6	5.8	42	32
28	8.39	8.46	247	92	205	60	42	32			82.6	46.5	9.8	8.3	43	68
29	8.46	7.35	230	98	190	70	40	28			76.2	30.5	9.7	5.3		
30	8.41	7.30	248	98	208	73	40	25			72.1	29.7	17.5	5.8	45	17
AVG		7.42		98		72		26				30.4		5.9		
MAX		8.46		102		76		32				46.5		8.3		
MIN		7.25		92		60		21				28.1		4.9		

n.s. = no sample collected/tested

FLINT WATER PLANT & FACILITIES

Bacteriological & Physical Parameters **WSSN 2310** **Apr-14**

DATE	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap														
	B&P	C.F.E.	Dort	3MG Well	C.S. #2	Lab Tap		Raw	Tap			Raw	Tap	Raw	Tap
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
1	1/0		2/0	2/0	2/0	2/0					10.1				
2	1/0		2/0	2/0	2/0	2/0					10.1				
3	1/0		2/0	2/0	2/0	2/0					11.7				
4	1/0		2/0	2/0	2/0	2/0					11.7				
5	1/0		2/0	2/0	2/0	2/0					10.9				
6	1/0		2/0	2/0	2/0	2/0					10.7				
7	0/0		0/0	0/0	0/0	2/0					11.3				
8	1/0		2/0	2/0	2/0	2/0					9.9				
9	1/0		2/0	2/0	2/0	2/0					10.2				
10	1/0		2/0	2/0	2/0	2/0			< 2		8.8				
11	1/0		2/0	2/0	2/0	2/0					9.1				
12	1/0		2/0	2/0	2/0	2/0					10.1				
13	1/0		2/0	2/0	2/0	2/0					9.8				
14	1/0		2/0	2/0	2/0	2/0					9.9				
15	1/0		2/0	2/0	2/0	2/0					8.9				
16	1/0		2/0	2/0	2/0	2/0					10.6				
17	1/0		2/0	0/0	2/0	2/0					9.4				
18	1/0		1/0	0/0	1/0	2/0					9.2				
19	1/0		2/0	0/0	2/0	2/0					8.3				
20	0/0		0/0	0/0	0/0	0/0					n.s				
21	1/0		2/0	0/0	2/0	2/0					8.1				
22	1/0		2/0	0/0	2/0	2/0					7.7				
23	1/0		2/0	0/0	2/0	2/0					9.3				
24	1/0		2/0	2/0	2/0	2/0					8.7				
25	1/0	10/0	0/0	1/0	n/a	1/0			< 2		8.7				
26	1/0	12/0	0/0	1/0	n/a	1/0		> 1476	< 2		9.0				
27	1/0	12/0	0/0	1/0	n/a	1/0		142	< 2		8.8				
28	1/0	12/0	0/0	1/0	n/a	1/0		532	< 2		7.9				
29	1/0	4/0	0/0	1/0	n/a	1/0			< 2		8.5				
30	1/0	6/0	0/0	1/0	n/a	1/0		1246	< 2		10.3				
											9.6				
C.F.E. = Combined Filter Effluent											11.7				
											7.7				

n.s. = no sample collected/tested

FLINT WATER PLANT & FACILITIES

Distribution System Monitoring WSSN 2310 Apr-14

DATE	Free Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1									0.9	1.0	0.9	0.9	4
2	1.0	0.8	0.9	0.8	0.8	0.9	0.9	1.1	0.9	1.1	0.9	1.0	12
3									0.9	1.1	1.0	1.1	4
4									0.9	1.0	1.1	1.1	4
5											1.1	1.1	2
6											0.9	1.0	2
7													0
8									0.8	1.0	1.0	0.9	4
9	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.9	1.0	0.9	12
10	1.2	1.1	1.1	0.9	0.9	0.5	0.8	1.0	0.8	1.0	1.0	0.9	12
11									0.8	0.9	1.2	1.1	4
12											0.8	0.9	2
13											1.0	1.0	2
14									0.8	0.9	1.0	1.0	4
15											1.0	1.1	2
16	1.1	0.9	1.0	0.9	1.0	1.0	1.1	1.0	0.8	0.9	1.0	0.9	12
17											1.0	1.1	2
18											1.0		1
19											1.0	0.9	2
20													0
21											1.0	1.0	2
22											1.1	1.0	2
23									0.8		1.0	1.0	3
24	1.0	0.8	1.0	0.8	0.8	0.9	0.8	1.0			1.0	1.0	10
25													0
26													0
27													0
28													0
29	1.0	0.8	1.0	0.7	0.8	0.8	1.1	0.8	0.7	0.9			10
30													0

Monthly Cl_2 Avg.	**0.939**
Quarterly Cl_2 Avg.	**0.873**
Yearly Cl_2 Avg.	**0.756**
Total Samples	**114**

FLINT WATER PLANT & FACILITIES

Distribution System Monitoring WSSN 2310 Apr-14

DATE	Total Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1									1.1	1.3	1.0	1.1	4
2	1.2	1.0	1.1	1.0	1.0	1.1	1.1	1.2	1.1	1.3	1.2	1.2	12
3									1.1	1.3	1.2	1.3	4
4									1.0	1.2	1.3	1.2	4
5											1.3	1.2	2
6											1.1	1.1	2
7													0
8									1.0	1.2	1.1	1.1	4
9	1.1	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.1	12
10	1.3	1.2	1.3	1.0	1.2	0.8	1.0	1.2	1.0	1.2	1.2	1.0	12
11									1.0	1.1	1.3	1.3	4
12											1.0	1.1	2
13											1.1	1.1	2
14									1.0	1.1	1.3	1.1	4
15											1.2	1.2	2
16	1.3	1.1	1.1	1.0	1.1	1.1	1.2	1.1	1.0	1.1	1.2	1.1	12
17											1.1	1.2	2
18											1.2		1
19											1.2	1.1	2
20													0
21											1.2	1.2	2
22											1.2	1.1	2
23									1.0		1.1	1.1	3
24	1.2	1.0	1.1	1.0	1.0	1.1	1.0	1.1			1.1	1.1	10
25													0
26													0
27													0
28													0
29	1.2	1.0	1.2	0.9	0.9	0.9	1.3	0.9	0.8	1.0			10
30													0

Monthly Cl_2 Avg.	**1.11**
Quarterly Cl_2 Avg.	**1.042**
Yearly Cl_2 Avg.	**0.919**
Total Samples	**114**

FLINT WATER PLANT & FACILITIES

ROUTINE POSITIVE DISTRIBUTION SAMPLES

Apr-14

Total number of positive routine samples:				Total Coliform: 0		Fecal Coliform: 0	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform

Total number of routine distribution samples analyzed:	114
Total number of routine distribution samples required:	100

D-5a 1/86
Authority; Act 399, P.A. 1976

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

231C

MONTHLY OPERATION REPORT
OF
WATER TREATMENT PLANT

For Month of March 2014

Flint Water Plant — 2310 — Genesee
NAME OF WATER SYSTEM — WSSN — COUNTY

Michael Glasgow — F-1R S-3
CERTIFIED OPERATOR — CLASSIFICATION

Michael Glasgow
SIGNATURE OF APPROPRIATE OFFICIAL

DEQ
RESOURCE MANAGEMENT DIVISION
APR 14 2014
LANSING DISTRICT

TREATMENT RATE AND FILTER DATA

1. Treatment Rate, Maximum____ Million Gallons Per Day
2. Treatment Rate, Approved Rated Plant Capacity____Million Gallons per Day
3. Average Filter Run___ Hours, Average Head Loss _____Feet
4. Average Filtration Rate _____ Gallons per Square Ft. per Minute
5. Maximum Filtration Rate _____ Gallons per Square Ft. per Minute
6. Average Wash Water Use _____ percent of Treated Water

CHEMICAL DATA

7. Chlorine on hand _____ lbs.: Estimated supply _____ days
8. Lime (CaO) on hand _____ lbs.: Estimated supply _____ days
9. Alum (Al3+) on hand _____ lbs.: Estimated supply _____ days
10. Cost of All Chemicals per Million Gallons
11. Total Power Cost per Million Gallons

Remarks:

Submit to: Mike Prysby, P.E.
MDEQ-Water Division-Lansing District
P.O. Box 30242
Lansing, MI 48909

Failure to complete this form is a violation of Act 399, P.A. 1976 and is subject to penalties as outlined in the Act.

MP

Coagulation Parameters **WSSN 2310** **Mar-14**

DATE	Total Million Gallons Purchased	Million Gallons to County	Million Gallons to Flint			Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units						
							Raw				Plant Tap		
							# of Samples	Avg.	Max		# of Samples	Avg.	Max
	3	1A	1B	4	5	6	7	8	9	10	11	12	13
1	34.37	10.40	23.97								3	0.26	0.31
2	33.65	10.55	23.10								3	0.23	0.46
3	33.76	11.75	22.01								3	0.10	0.10
4	35.78	11.62	24.16								3	0.17	0.19
5	35.08	10.62	24.46								3	0.18	0.19
6	33.39	9.26	24.13								3	0.17	0.22
7	33.81	9.37	24.44								3	0.17	0.24
8	33.05	8.99	24.06								3	0.19	0.23
9	29.24	8.67	20.58								3	0.10	0.11
10	31.58	9.33	22.26								3	0.10	0.13
11	32.52	9.50	23.03								3	0.09	0.10
12	30.94	8.58	22.36								3	0.07	0.08
13	32.34	9.14	23.20								3	0.09	0.09
14	32.60	9.43	23.17								3	0.10	0.11
15	34.03	9.95	24.08								3	0.09	0.10
16	32.20	9.92	22.28								3	0.09	0.10
17	32.25	9.26	22.99								3	0.08	0.09
18	32.76	9.32	23.44								3	0.08	0.10
19	31.34	8.96	22.38								3	0.09	0.09
20	30.69	8.64	22.05								3	0.08	0.08
21	30.47	8.43	22.04								3	0.07	0.07
22	30.55	8.99	21.57								3	0.07	0.08
23	30.60	8.96	21.64								3	0.08	0.09
24	31.21	9.73	21.48								3	0.08	0.08
25	29.90	8.75	21.14								3	0.08	0.09
26	31.07	8.75	22.32								3	0.09	0.11
27	29.48	8.46	21.03								3	0.08	0.08
28	28.28	5.65	22.64								3	0.07	0.08
29	27.65	7.54	20.12								3	0.07	0.08
30	27.04	7.33	19.71								3	0.08	0.10
31	28.55	7.89	20.66								3	0.08	0.09
AVG	31.62	9.15	22.47								3	0.11	0.13
MAX	35.78	11.75	24.46								3	0.26	0.46
MIN	27.04	5.65	19.71								3	0.07	0.07
Total	980.17	283.69	696.48										

Flouridation & Chlorination **WSSN 2310** **Mar-14**

DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l							
						Chlorine (prior to filtration) mg/L OCl-	Post Chlorine mg/L	B&P	Sta II	Dort	3MG Well		Tap		
		Raw	Tap	Dist				Free	Free	Free	Free			Free	
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1			0.48					0.7	1.2	0.9	0.9			0.9	
2			0.51					0.8	1.0	0.9	0.8			0.9	
3			0.49					0.8	1.0	0.9	0.8			1.0	
4			0.51					0.9	1.0	1.0	0.9			1.0	
5			0.52					0.9	1.0	0.9	0.9			0.8	
6			0.53					0.7	1.0	1.0	0.9			1.0	
7			0.52					0.9	1.0	0.9	0.9			1.0	
8			0.52					0.9	1.1	1.0	1.0			1.1	
9			0.49					0.7	1.0	0.9	0.8			0.8	
10			0.51					0.8	0.9	0.9	0.9			1.0	
11			0.52					0.9	1.0	0.9	0.8			1.0	
12			0.51					0.9	1.0	1.0	0.9			0.9	
13			0.49					0.8	1.2	0.9	0.8			0.9	
14			0.48					0.9	1.0	1.0	0.9			1.0	
15			0.43					0.9	1.0	0.9	0.8			1.0	
16			0.48					0.8	1.1	0.9	0.8			1.1	
17			0.53					0.9	1.0	0.9	0.9			0.9	
18			0.54					0.8	1.1	1.0	0.9			0.9	
19			0.54					0.9	1.2	1.0	0.9			1.0	
20			0.52					0.8	1.0	0.9	0.9			1.0	
21			0.52					1.0	1.2	1.0	0.9			1.1	
22			0.54					0.8	1.1	1.0	1.0			1.0	
23			0.58					0.8	1.0	0.9	0.9			1.0	
24			0.50					0.9	1.1	1.1	1.0			1.0	
25			0.53					0.9	1.1	1.0	1.0			1.1	
26			0.53					0.9	1.2	0.9	0.9			0.9	
27			0.54					0.9	1.1	1.0	1.1			1.1	
28			0.54					1.0	1.2	1.0	0.9			1.0	
29			0.61					0.9	1.0	0.8	0.9			1.0	
30			0.58					0.8	1.2	0.9	0.9			1.0	
31			0.55					0.8	1.0	0.9	0.9			1.0	
AVG			0.52					0.9	1.1	0.9	0.9			1.0	
MAX			0.61					1.0	1.2	1.1	1.1			1.1	
MIN			0.43					0.7	0.9	0.8	0.8			0.8	

n.s. = no sample collected/tested

Chemical Analyses **WSSN 2310** **Mar-14**

DATE	pH		Total Hard as $CaCO_3$ mg/l		Total Alk as $CaCO_3$ mg/l		NonCarbonate Hardness as $CaCO_3$ mg/l				Calcium Ca ++ mg/l		Magnesium as Mg ++ mg/l		Chloride as Cl - mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1		7.35		98		71		27				29.7		5.8		
2		7.36		98		65		33				28.9		6.3		
3		7.36		98		71		27				29.7		5.8		
4		7.37		98		73		25				28.9		6.3		
5		7.56		100		75		25				29.7		6.3		
6		7.41		98		71		27				29.7		5.8		
7		7.36		98		75		23				30.5		5.3		
8		7.49		98		70		28				28.1		6.8		
9		7.32		98		64		34				29.7		5.8		
10		7.36		96		74		22				31.3		4.4		
11		7.45		98		72		26				29.7		5.8		
12		7.39		98		72		26				29.7		5.8		
13		7.45		98		72		26				29.7		5.8		
14		7.34		98		74		24				30.9		5.1		
15		7.40		98		69		29				29.7		5.8		
16		7.33		98		65		33				29.7		5.8		
17		7.40		98		65		33				29.7		5.8		
18		7.30		98		74		24				29.7		5.8		
19		7.41		98		75		23				29.7		5.8		
20		7.44		98		70		28				29.7		5.8		
21		7.38		98		74		24				29.7		5.8		
22		7.42		98		72		26				28.1		6.8		
23		7.31		98		72		26				29.7		5.8		
24		7.41		98		75		23				32.1		3.6		
25		7.44		98		74		24				31.3		4.9		
26		7.45		98		73		25				28.9		6.3		
27		7.41		102		77		25				30.5		6.3		
28		7.47		102		77		25				31.3		5.8		
29		7.33		98		74		24				29.7		5.8		
30		7.22		98		70		28				29.7		5.8		
31		7.35		100		74		26				29.7		6.3		
AVG		7.39		98		72		26				29.8		5.8		
MAX		7.56		102		77		34				32.1		6.8		
MIN		7.22		96		64		22				28.1		3.6		

n.s. = no sample collected/tested

Bacteriological & Physical Parameters **WSSN 2310** **Mar-14**

DATE	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap														
	B&P		Dort	3MG Well	Pump	Lab Tap		Raw	Tap			Raw	Tap	Raw	Tap
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
1	1/0		2/0	2/0	2/0	2/0					11.4				
2	1/0		2/0	2/0	2/0	2/0					11.8				
3	1/0		2/0	2/0	2/0	2/0					12.1				
4	1/0		2/0	2/0	2/0	2/0					11.1				
5	1/0		2/0	2/0	2/0	2/0			< 2		13.3				
6	1/0		2/0	2/0	2/0	2/0					11.1				
7	1/0		2/0	2/0	2/0	2/0					11.4				
8	1/0		2/0	2/0	2/0	2/0					10.7				
9	1/0		2/0	2/0	2/0	2/0					13.1				
10	1/0		2/0	2/0	2/0	2/0					10.5				
11	1/0		2/0	2/0	2/0	2/0					11.7				
12	1/0		2/0	2/0	2/0	2/0					11.6				
13	1/0		2/0	2/0	2/0	2/0					12.2				
14	1/0		2/0	2/0	2/0	2/0					11.7				
15	1/0		2/0	2/0	2/0	2/0					11.9				
16	1/0		2/0	2/0	2/0	2/0					11.3				
17	1/0		2/0	2/0	2/0	2/0					11.1				
18	1/0		2/0	2/0	2/0	2/0					10.5				
19	1/0		2/0	2/0	2/0	2/0					10.0				
20	1/0		2/0	2/0	2/0	2/0					10.6				
21	1/0		2/0	2/0	2/0	2/0					13.1				
22	1/0		2/0	2/0	2/0	2/0					11.7				
23	1/0		2/0	2/0	2/0	2/0					12.1				
24	1/0		2/0	2/0	2/0	2/0					11.7				
25	1/0		2/0	2/0	2/0	2/0					10.6				
26	1/0		2/0	2/0	2/0	2/0					10.8				
27	1/0		2/0	2/0	2/0	2/0					11.1				
28	1/0		2/0	2/0	2/0	2/0					12.7				
29	1/0		2/0	2/0	2/0	2/0					12.9				
30	1/0		2/0	2/0	2/0	2/0					12.6				
31	1/0		2/0	2/0	2/0	2/0					10.6				
											11.6				
											13.3				
											10.0				

n.s. = no sample collected/tested

Distribution System Monitoring WSSN 2310 Mar-14

DATE	Free Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											1.3	1.0	2
2											1.0	1.0	2
3											1.0	0.9	2
4									0.8	0.9	1.0	1.0	4
5	1.0	0.9	0.9	0.8	0.8	1.0	0.9	1.0	0.7	0.8	1.1	0.9	12
6	1.2	1.1	1.0	1.0	0.9	0.8	1.1	0.9	0.8	0.8	1.0	1.0	12
7										0.8	1.1	0.9	3
8											1.1	1.0	2
9											0.9	1.0	2
10									0.9	0.9	0.9	0.9	4
11									0.8	0.9	1.0	1.0	4
12	1.0	0.8	1.0	0.8	0.8	cl	n/a	0.8	0.7	0.8	1.1	0.9	10
13	1.2	1.0	1.1	1.0	1.0	0.7	1.0	0.9	0.6	0.8	1.1	1.2	12
14									0.7	0.8	1.1	0.9	4
15											0.9	1.1	2
16											1.0	1.1	2
17											1.0	1.0	2
18									1.0	0.9	1.0	1.1	4
19	1.0	0.9	0.8	0.8	0.9	1.0	0.8	0.9	0.7	0.9	1.2	1.1	12
20									0.8	0.9	1.0	1.0	4
21									0.8	0.8	1.2	1.2	4
22											1.0	1.1	2
23											1.0	1.0	2
24									0.9	1.0	1.1	1.1	4
25									0.9	1.0	1.1	1.1	4
26	1.0	0.9	0.9	0.8	0.9	1.0	0.9	1.0	0.7	0.9	1.1	1.2	12
27	1.3	0.7	1.0	1.1	1.0	0.7	1.1	1.1	0.8	1.0	1.1	1.0	12
28									0.7	1.0	1.2	1.1	4
29											1.0	1.0	2
30											1.2	1.1	2
31									1.2	1.1	1.0	1.0	4

Monthly Cl_2 Avg.	**0.961**
Quarterly Cl_2 Avg.	**0.879**
Yearly Cl_2 Avg.	**0.758**
Total Samples	**153**

Distribution System Monitoring WSSN 2310 Mar-14

DATE	Total Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											1.5	1.1	2
2											1.1	1.1	2
3											1.1	1.1	2
4									0.9	1.1	1.2	1.2	4
5	1.3	1.1	1.1	1.0	1.0	1.1	1.0	1.2	0.9	1.0	1.3	1.0	12
6	1.4	1.2	1.2	1.2	1.1	0.9	1.3	1.1	1.0	1.1	1.2	1.2	12
7										1.0	1.3	1.1	3
8											1.4	1.2	2
9											1.1	1.1	2
10									1.0	1.2	1.1	1.0	4
11									1.0	1.1	1.1	1.1	4
12	1.2	1.0	1.1	1.0	1.0	cl	n/a	1.0	0.9	1.0	1.3	1.1	10
13	1.3	1.2	1.3	1.0	1.2	0.8	1.2	1.2	0.8	1.0	1.2	1.4	12
14									0.9	0.9	1.3	1.1	4
15											1.0	1.3	2
16											1.1	1.2	2
17											1.1	1.1	2
18									1.2	1.1	1.2	1.2	4
19	1.2	1.1	1.0	1.0	1.1	1.3	1.0	1.1	0.9	1.1	1.3	1.2	12
20									0.9	1.1	1.1	1.2	4
21									1.0	1.1	1.3	1.4	4
22											1.4	1.4	2
23											1.2	1.2	2
24									1.0	1.2	1.3	1.3	4
25									1.0	1.2	1.3	1.2	4
26	1.2	1.0	1.1	1.0	1.1	1.2	1.1	1.1	1.0	1.1	1.3	1.4	12
27	1.4	0.8	1.2	1.3	1.2	0.8	1.3	1.2	1.0	1.2	1.3	1.2	12
28									0.9	1.2	1.3	1.3	4
29											1.1	1.2	2
30											1.3	1.3	2
31									1.3	1.3	1.1	1.1	4

Monthly Cl_2 Avg.	**1.14**
Quarterly Cl_2 Avg.	**1.050**
Yearly Cl_2 Avg.	**0.922**
Total Samples	**153**

ROUTINE POSITIVE DISTRIBUTION SAMPLES

Mar-14

Total number of positive routine samples:				Total Coliform: 0		Fecal Coliform: 0	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform

Total number of routine distribution samples analyzed:	**153**
Total number of routine distribution samples required:	**100**

D-5a 3/86
Authority: Act 399, P.A. 1976

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

23K

MONTHLY OPERATION REPORT
OF
WATER TREATMENT PLANT

For Month of February 2014

Flint Water Plant — NAME OF WATER SYSTEM
2310 — WSSN
Genesee — COUNTY

Michael Glasgow — CERTIFIED OPERATOR
F-1R S-3 — CLASSIFICATION

Michael Glasgow
SIGNATURE OF APPROPRIATE OFFICIAL

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 13 2014
LANSING DISTRICT

TREATMENT RATE AND FILTER DATA

1. Treatment Rate, Maximum____ Million Gallons Per Day
2. Treatment Rate, Approved Rated Plant Capacity____Million Gallons per Day
3. Average Filter Run___ Hours, Average Head Loss _____Feet
4. Average Filtration Rate _____ Gallons per Square Ft. per Minute
5. Maximum Filtration Rate _____ Gallons per Square Ft. per Minute
6. Average Wash Water Use _____ percent of Treated Water

CHEMICAL DATA

7. Chlorine on hand _____ lbs.: Estimated supply _____ days
8. Lime (CaO) on hand _____ lbs.: Estimated supply _____ days
9. Alum (Al3+) on hand _____ lbs.: Estimated supply _____ days
10. Cost of All Chemicals per Million Gallons
11. Total Power Cost per Million Gallons

Remarks:

Submit to: Mike Prysby, P.E.
MDEQ-Water Division-Lansing District
P.O. Box 30242
Lansing, MI 48909

Failure to complete this form is a violation of Act 399, P.A. 1976 and is subject to penalties as outlined in the Act.

MP

Coagulation Parameters **WSSN 2310** **Feb-14**

DATE	Total Million Gallons Purchased	Million Gallons to County	Million Gallons to Flint			Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units						
							Raw				Plant Tap		
							# of Samples	Avg.	Max		# of Samples	Avg.	Max
	1	1A	1B	4	5	6	7	8	9	10	11	12	13
1	31.70	12.74	18.96								3	0.08	0.09
2	31.73	11.33	20.40								3	0.10	0.10
3	31.70	10.81	20.89								3	0.14	0.14
4	30.57	10.58	19.99								3	0.09	0.10
5	29.73	10.72	19.01								3	0.12	0.14
6	29.84	10.32	19.52								3	0.11	0.12
7	28.87	10.09	18.78								3	0.12	0.14
8	29.80	10.01	19.78								3	0.08	0.09
9	30.37	10.77	19.60								3	0.09	0.11
10	30.63	11.20	19.43								3	0.09	0.09
11	29.63	11.03	18.60								3	0.11	0.12
12	31.55	11.04	20.50								3	0.12	0.14
13	31.43	11.34	20.10								3	0.10	0.11
14	30.83	11.43	19.40								3	0.10	0.11
15	31.02	10.77	20.25								3	0.10	0.14
16	30.77	10.54	20.23								3	0.09	0.10
17	32.58	10.70	21.89								3	0.09	0.10
18	31.61	10.69	20.93								3	0.09	0.10
19	31.44	10.66	20.78								3	0.07	0.08
20	32.06	10.88	21.18								3	0.10	0.11
21	32.12	10.62	21.50								3	0.09	0.10
22	32.91	11.91	21.00								3	0.09	0.10
23	32.88	11.47	21.40								3	0.13	0.18
24	32.66	11.33	21.33								3	0.08	0.09
25	32.23	10.86	21.37								3	0.10	0.11
26	32.09	10.78	21.31								3	0.09	0.10
27	32.47	10.33	22.14								3	0.12	0.14
28	33.48	10.37	23.11								3	0.13	0.15
AVG	31.38	10.90	20.48								3	0.10	0.11
MAX	33.48	12.74	23.11								3	0.14	0.18
MIN	28.87	10.01	18.60								3	0.07	0.08
Total	878.69	305.33	573.37										

FLINT WATER PLANT & FACILITIES

Flouridation & Chlorination **WSSN 2310** **Feb-14**

DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l							
						Chlorine (prior to filtration) mg/L OCl-	Post Chlorine mg/L	B&P	Sta II	Dort	3MG Well		Tap		
		Raw	Tap	Dist				Free	Free	Free	Free			Free	
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1			0.50					1.1	1.2	0.8	0.8			1.0	
2			0.49					0.8	1.0	0.9	0.9			0.9	
3			0.51					0.9	1.0	1.0	0.9			1.0	
4			0.52					0.9	1.0	1.0	0.9			1.0	
5			0.52					1.0	1.1	1.0	1.0			1.1	
6			0.50					0.9	1.0	0.9	0.9			0.9	
7			0.54					0.8	1.0	1.0	0.9			1.0	
8			0.54					1.0	1.1	1.0	1.0			1.1	
9			0.57					0.8	1.0	1.0	0.9			0.9	
10			0.59					1.1	1.1	1.0	0.9			0.9	
11			0.58					0.9	1.1	1.1	1.0			1.1	
12			0.56					0.9	1.2	1.1	1.0			1.0	
13			0.54					0.9	1.2	1.0	1.0			0.9	
14			0.57					1.0	1.2	1.0	1.0			1.0	
15			0.56					0.9	1.1	1.0	1.0			1.1	
16			0.54					0.8	1.0	1.0	0.9			1.0	
17			0.48					1.1	1.2	1.0	0.9			0.9	
18			0.51					1.0	1.0	1.0	1.0			0.9	
19			0.51					1.1	1.3	1.1	1.0			1.1	
20			0.51					0.9	1.1	1.0	1.0			1.0	
21			0.51					0.9	1.1	1.1	1.0			1.0	
22			0.48					0.8	1.0	0.9	0.9			1.0	
23			0.47					0.8	1.1	1.0	0.9			0.9	
24			0.52					0.8	0.9	0.9	0.8			0.9	
25			0.49					0.7	1.0	0.9	0.8			1.0	
26			0.50					0.9	1.1	1.0	0.9			1.0	
27			0.51					0.9	1.1	1.0	0.9			1.0	
28			0.51					0.9	1.1	1.0	0.9			1.0	
AVG			0.52					0.9	1.1	1.0	0.9			1.0	
MAX			0.59					1.1	1.3	1.1	1.0			1.1	
MIN			0.47					0.7	0.9	0.8	0.8			0.9	

Chemical Analyses **WSSN 2310** **Feb-14**

DATE	pH		Total Hard as $CaCO_3$ mg/l		Total Alk as $CaCO_3$ mg/l		NonCarbonate Hardness as $CaCO_3$ mg/l				Calcium Ca ++ mg/l		Magnesium as Mg ++ mg/l		Chloride as Cl - mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1		7.30		98		72		26				28.9		6.3		
2		7.26		98		69		29				28.1		6.8		
3		7.38		98		69		29				28.9		6.3		
4		7.36		96		74		22				32.9		3.4		
5		7.24		98		70		28				29.7		5.8		
6		7.43		96		70		26				28.9		5.8		
7		7.37		98		72		26				29.7		5.8		
8		7.44		96		74		22				29.7		5.3		
9		7.40		96		68		28				28.9		5.8		
10		7.40		98		71		27				29.7		5.8		
11		7.43		98		74		24				31.3		4.9		
12		7.32		96		74		22				31.3		4.4		
13		7.30		98		69		29				29.7		5.8		
14		7.30		96		74		22				30.5		4.9		
15		7.35		96		73		23				30.5		4.9		
16		7.25		98		71		27				28.9		6.3		
17		7.34		96		70		26				29.7		5.3		
18		7.24		98		70		28				29.7		5.8		
19		7.40		98		69		29				30.5		5.3		
20		7.34		98		70		28				30.5		5.3		
21		7.39		98		74		24				30.5		5.3		
22		7.29		98		71		27				28.9		6.3		
23		7.43		98		69		29				29.7		5.8		
24		7.32		96		69		27				30.5		4.9		
25		7.39		96		71		25				29.7		5.3		
26		7.39		98		73		25				30.5		5.3		
27		7.35		96		73		23				31.3		4.4		
28		7.37		98		72		26				30.5		5.3		
AVG		7.35		97		71		26				30.0		5.5		
MAX		7.44		98		74		29				32.9		6.8		
MIN		7.24		96		68		22				28.1		3.4		

Bacteriological & Physical Parameters **WSSN 2310** **Feb-14**

DATE	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap														
	B&P		Dort	3MG Well	Pump	Lab Tap		Raw	Tap			Raw	Tap	Raw	Tap
	60	61.	62	63	64	65	66	67	68	69	70	71	72	73	74
1	1/0		2/0	2/0	2/0	2/0					12.9				
2	1/0		2/0	2/0	2/0	2/0					11.2				
3	1/0		2/0	2/0	2/0	2/0					11.3				
4	1/0		2/0	2/0	2/0	2/0					12.7				
5	1/0		2/0	2/0	2/0	2/0					11.8				
6	1/0		2/0	2/0	2/0	2/0					13.0				
7	1/0		2/0	2/0	2/0	2/0					13.2				
8	1/0		2/0	2/0	2/0	2/0					12.5				
9	1/0		2/0	2/0	2/0	2/0					12.8				
10	1/0		2/0	2/0	2/0	2/0					13.7				
11	1/0		2/0	2/0	2/0	2/0					13.6				
12	1/0		2/0	2/0	2/0	2/0			< 2		13.1				
13	1/0		2/0	2/0	2/0	2/0					12.7				
14	1/0		2/0	2/0	2/0	2/0					13.5				
15	1/0		2/0	2/0	2/0	2/0					13.7				
16	1/0		2/0	2/0	2/0	2/0					14.8				
17	1/0		2/0	2/0	2/0	2/0					11.2				
18	1/0		2/0	2/0	2/0	2/0					11.7				
19	1/0		2/0	2/0	2/0	2/0					11.7				
20	1/0		2/0	2/0	2/0	2/0					12.3				
21	1/0		2/0	2/0	2/0	2/0					12.3				
22	1/0		2/0	2/0	2/0	2/0					11.3				
23	1/0		2/0	2/0	2/0	2/0					9.3				
24	1/0		2/0	2/0	2/0	2/0					11.9				
25	1/0		2/0	2/0	2/0	2/0					11.3				
26	1/0		2/0	2/0	2/0	2/0					12.7				
27	1/0		2/0	2/0	2/0	2/0					12.1				
28	1/0		2/0	2/0	2/0	2/0					11.0				
											12.3				
											14.8				
											9.3				

FLINT WATER PLANT & FACILITIES

Distribution System Monitoring WSSN 2310 Feb-14

DATE	Free Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											1.1	1.2	2
2											0.9	1.1	2
3									0.5	0.7	1.1	0.9	4
4									0.7	0.8	1.0	1.0	4
5									0.5	0.6	1.1	1.1	4
6	1.2	1.1	0.9	1.0	0.9	0.6	1.1	1.1	0.5	0.6	1.1	0.9	12
7									0.5	0.7	1.0	1.0	4
8											1.1	1.1	2
9											0.9	1.0	2
10									0.6	0.6	1.2	0.9	4
11									0.6	0.8	1.1	1.1	4
12	1.2	1.1	1.0	1.0	1.0	0.9	1.0	1.1	0.6	0.7	1.2	1.1	12
13	1.2	1.1	1.0	1.1	1.1	0.8	0.8	1.0	0.5	0.8	1.2	1.1	12
14									0.6	0.8	1.2	1.1	4
15											1.1	1.1	2
16											1.0	1.0	2
17									0.6	0.9	1.2	1.1	4
18									0.6	0.8	1.1	0.9	4
19	0.6	0.9	0.9	0.6	0.9	0.8	0.7	1.0	0.5	0.8	1.3	1.3	12
20	1.2	1.1	1.0	1.1	0.9	0.8	0.9	1.0	0.6	0.9	1.1	1.0	12
21									0.6	0.9	1.1	1.1	4
22											1.0	1.0	2
23											1.0	1.1	2
24											0.9	0.9	2
25									0.7	0.9	0.9	1.0	4
26									0.6	0.8	1.1	1.1	4
27	1.2	1.0	0.9	1.1	0.8	0.6	1.1	1.0	0.6	0.8	1.1	1.0	12
28									0.5	0.9	1.1	1.0	4

Monthly Cl_2 Avg.	**0.926**
Quarterly Cl_2 Avg.	**0.798**
Yearly Cl_2 Avg.	**0.749**
Total Samples	**142**

FLINT WATER PLANT & FACILITIES

Distribution System Monitoring WSSN 2310 Feb-14

DATE	Total Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											1.3	1.3	2
2											1.1	1.2	2
3									0.7	0.9	1.3	1.1	4
4									0.8	0.9	1.3	1.2	4
5									0.7	0.9	1.3	1.3	4
6	1.4	1.3	1.1	1.1	1.1	0.7	1.3	1.3	0.7	0.8	1.3	1.1	12
7									0.7	0.9	1.3	1.2	4
8											1.5	1.4	2
9											1.0	1.3	2
10									0.7	0.8	1.4	1.2	4
11									0.7	1.0	1.4	1.3	4
12	1.4	1.2	1.2	1.2	1.1	1.0	1.2	1.2	0.8	1.0	1.4	1.2	12
13	1.4	1.2	1.2	1.3	1.3	0.9	1.0	1.2	0.7	1.0	1.4	1.3	12
14									0.7	1.0	1.4	1.3	4
15											1.3	1.3	2
16											1.1	1.1	2
17									0.8	1.1	1.3	1.4	4
18									0.8	1.1	1.3	1.1	4
19	0.7	1.1	1.1	0.8	1.1	1.0	0.9	1.2	0.7	1.0	1.4	1.5	12
20	1.3	1.3	1.2	1.2	1.1	0.9	1.2	1.2	0.8	1.1	1.2	1.1	12
21									0.8	1.1	1.3	1.3	4
22											1.1	1.1	2
23											1.1	1.3	2
24											1.1	1.1	2
25									0.9	1.1	1.1	1.1	4
26									0.8	1.0	1.3	1.2	4
27	1.4	1.1	1.1	1.2	1.0	0.7	1.3	1.2	0.8	1.0	1.3	1.2	12
28									0.8	1.1	1.3	1.1	4

Monthly Cl_2 Avg.	**1.11**
Quarterly Cl_2 Avg.	**0.961**
Yearly Cl_2 Avg.	**0.915**
Total Samples	**142**

FLINT WATER PLANT & FACILITIES

ROUTINE POSITIVE DISTRIBUTION SAMPLES

Feb-14

Total number of positive routine samples:				Total Coliform: 0		Fecal Coliform: 0	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform
Total number of routine distribution samples analyzed:				142			
Total number of routine distribution samples required:				100			

D-5a 1/06
Authority: Act 399, P.A. 1976

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

231C

MONTHLY OPERATION REPORT OF WATER TREATMENT PLANT

For Month of January 2014

Flint Water Plant — NAME OF WATER SYSTEM
2310 — WSSN
Genesee — COUNTY

Michael Glasgow — CERTIFIED OPERATOR
F-1R S-3 — CLASSIFICATION

Michael Glasgow
SIGNATURE OF APPROPRIATE OFFICIAL

TREATMENT RATE AND FILTER DATA

1. Treatment Rate, Maximum____ Million Gallons Per Day
2. Treatment Rate, Approved Rated Plant Capacity____Million Gallons per Day
3. Average Filter Run___ Hours, Average Head Loss _____Feet
4. Average Filtration Rate _____ Gallons per Square Ft. per Minute
5. Maximum Filtration Rate _____ Gallons per Square Ft. per Minute
6. Average Wash Water Use _____ percent of Treated Water

CHEMICAL DATA

7. Chlorine on hand _____ lbs.: Estimated supply _____ days
8. Lime (CaO) on hand _____ lbs.: Estimated supply _____ days
9. Alum (Al3+) on hand _____ lbs.: Estimated supply _____ days
10. Cost of All Chemicals per Million Gallons
11. Total Power Cost per Million Gallons

Remarks:

Submit to: Mike Prysby, P.E.
MDEQ-Water Division-Lansing District
P.O. Box 30242
Lansing, MI 48909

Failure to complete this form is a violation of Act 399, P.A. 1976 and is subject to penalties as outlined in the Act.

M

Coagulation Parameters **WSSN 2310** **Jan-14**

DATE	Total Million Gallons Purchased	Million Gallons to County	Million Gallons to Flint			Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units						
							Raw				Plant Tap		
							# of Samples	Avg.	Max		# of Samples	Avg.	Max
	1	1A	1B	4	5	6	7	8	9	10	11	12	13
1	23.19	10.32	12.87								3	0.07	0.08
2	22.83	9.72	13.11								3	0.07	0.09
3	22.70	9.74	12.96								3	0.07	0.07
4	23.31	9.84	13.47								3	0.08	0.09
5	23.72	9.69	14.04								3	0.10	0.11
6	24.40	12.68	11.72								3	0.08	0.09
7	26.88	11.74	15.13								3	0.07	0.07
8	26.38	12.22	14.16								3	0.09	0.10
9	27.12	13.03	14.09								3	0.09	0.09
10	27.63	11.53	16.10								3	0.09	0.09
11	25.34	10.28	15.06								3	0.08	0.09
12	25.96	9.91	16.05								3	0.07	0.08
13	26.93	10.63	16.30								3	0.07	0.07
14	27.31	11.17	16.14								3	0.06	0.07
15	27.76	11.98	15.78								3	0.07	0.08
16	28.29	11.76	16.53								3	0.08	0.09
17	26.25	10.28	15.97								3	0.07	0.08
18	24.40	9.21	15.19								3	0.06	0.08
19	23.08	8.82	14.26								3	0.09	0.14
20	23.13	8.31	14.82								3	0.07	0.09
21	25.85	10.30	15.55								3	0.06	0.08
22	27.40	11.75	15.65								3	0.07	0.07
23	26.91	10.96	15.95								3	0.07	0.08
24	27.04	9.72	17.31								3	0.10	0.16
25	25.43	9.71	15.72								3	0.09	0.12
26	27.79	12.10	15.69								3	0.06	0.08
27	27.57	10.97	16.61								3	0.08	0.08
28	27.77	11.33	16.44								3	0.11	0.14
29	28.62	11.18	17.44								3	0.15	0.19
30	30.98	12.39	18.58								3	0.16	0.18
31	30.76	12.93	17.83								3	0.08	0.09
AVG	26.22	10.84	15.37								3	0.08	0.10
MAX	30.98	13.03	18.58								3	0.16	0.19
MIN	22.70	8.31	11.72								3	0.06	0.07
Total	812.70	336.17	476.53										

Flouridation & Chlorination **WSSN 2310** **Jan-14**

DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l							
						Chlorine (prior to filtration) mg/L OCl-	Post Chlorine mg/L	B&P	Sta II	Dort	3MG Well		Tap		
		Raw	Tap	Dist				Free	Free	Free	Free			Free	
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1			0.51					0.8	0.9	0.8	0.8			0.9	
2			0.47					0.7	0.9	0.8	0.8			0.9	
3			0.48					0.8	0.9	0.8	0.8			0.9	
4			0.51					0.6	1.0	0.8	0.8			0.9	
5			0.48					0.7	1.0	0.9	0.9			0.8	
6			0.49					n.s.	1.0	0.8	0.8			1.1	
7			0.50					0.9	1.0	0.8	0.8			0.9	
8			0.52					0.9	1.0	0.8	0.8			0.9	
9			0.45					0.7	1.0	0.8	0.8			0.8	
10			0.51					1.0	1.1	0.8	0.8			0.9	
11			0.48					0.8	0.9	0.9	0.8			1.0	
12			0.49					0.7	0.9	0.8	0.8			0.9	
13			0.46					0.9	1.0	0.9	0.8			0.9	
14			0.47					0.80	1.00	0.90	0.90			0.9	
15			0.47					0.9	1.0	0.9	0.9			0.9	
16			0.46					0.7	1.0	0.9	0.9			0.9	
17			0.45					0.9	1.1	0.9	0.9			1.0	
18			0.40					0.8	1.0	0.9	0.9			0.9	
19			0.45					0.5	0.9	0.9	0.9			0.9	
20			0.45					0.8	1.0	0.9	0.8			1.0	
21			0.49					0.8	1.0	0.9	0.8			0.9	
22			0.52					1.0	1.1	0.9	0.9			1.0	
23			0.50					0.9	1.1	0.9	0.9			1.0	
24			0.49					1.0	1.1	0.9	0.9			1.0	
25			0.49					0.9	1.2	1.1	1.0			1.0	
26			0.53					0.8	1.0	0.8	0.8			0.9	
27			0.54					0.8	1.0	0.9	0.9			0.9	
28			0.50					0.7	1.0	1.0	0.9			1.0	
29			0.53					0.9	1.1	0.9	0.9			0.9	
30			0.47					0.9	1.0	0.9	0.9			0.9	
31			0.51					1.0	1.1	0.9	0.8			1.0	
AVG			0.49					0.8	1.0	0.9	0.9			0.9	
MAX			0.54					1.0	1.2	1.1	1.0			1.1	
MIN			0.40					0.5	0.9	0.8	0.8			0.8	

n.s. = no sample collected/tested

Chemical Analyses **WSSN 2310** **Jan-14**

DATE	pH		Total Hard as $CaCO_3$ mg/l		Total Alk as $CaCO_3$ mg/l		NonCarbonate Hardness as $CaCO_3$ mg/l				Calcium Ca ++ mg/l		Magnesium as Mg ++ mg/l		Chloride as Cl - mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1		7.32		98		62		36				28.9		6.3		
2		7.20		98		73		25				30.5		5.8		
3		7.35		100		73		27				28.9		6.8		
4		7.44		98		70		28				28.9		6.3		
5		7.39		98		70		28				29.7		5.8		
6		7.29		98		62		36				27.3		7.3		
7		7.33		102		65		37				31.3		5.8		
8		7.36		96		71		25				28.9		5.8		
9		7.25		100		68		32				29.7		6.3		
10		7.24		100		71		29				31.3		5.3		
11		7.30		96		66		30				28.9		5.8		
12		7.31		98		67		31				28.9		6.3		
13		7.40		98		69		29				28.1		6.8		
14		7.37		98		65		33				28.9		6.3		
15		7.35		98		68		30				28.9		6.3		
16		7.29		98		68		30				28.1		6.8		
17		7.26		96		69		27				32.1		3.9		
18		7.36		98		71		27				28.9		6.3		
19		7.47		96		63		33				28.9		5.8		
20		7.22		96		67		29				28.1		6.3		
21		7.28		98		67		31				28.9		6.3		
22		7.29		94		72		22				30.5		4.4		
23		7.38		94		72		22				32.1		3.4		
24		7.34		94		70		24				32.1		3.4		
25		7.38		96		71		25				28.9		5.8		
26		7.29		96		69		27				28.1		6.3		
27		7.34		98		68		30				28.1		6.8		
28		7.35		98		68		30				28.9		6.3		
29		7.34		98		68		30				28.1		6.8		
30		7.24		98		69		29				28.1		6.8		
31		7.32		96		73		23				28.9		5.8		
AVG		7.32		97		69		29				29.3		5.9		
MAX		7.47		102		73		37				32.1		7.3		
MIN		7.20		94		62		22				27.3		3.4		

n.s. = no sample collected/tested

Bacteriological & Physical Parameters **WSSN 2310** **Jan-14**

DATE	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap														
	B&P		Dort	3MG Well	Pump	Lab Tap		Raw	Tap			Raw	Tap	Raw	Tap
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
1	1/0		2/0	2/0	2/0	2/0					13.1				
2	1/0		2/0	2/0	2/0	2/0					12.4				
3	1/0		2/0	2/0	2/0	2/0					12.5				
4	1/0		2/0	2/0	2/0	2/0					11.7				
5	1/0		2/0	2/0	2/0	2/0					13.2				
6	0/0		2/0	2/0	2/0	2/0					11.7				
7	1/0		2/0	2/0	2/0	2/0					11.3				
8	1/0		2/0	2/0	2/0	2/0					14.2				
9	1/0		2/0	2/0	2/0	2/0					11.3				
10	1/0		2/0	2/0	2/0	2/0					13.3				
11	1/0		2/0	2/0	2/0	2/0					12.7				
12	1/0		2/0	2/0	2/0	2/0					12.7				
13	1/0		2/0	2/0	2/0	2/0					13.4				
14	1/0		2/0	2/0	2/0	2/0					14.2				
15	1/0		2/0	2/0	2/0	2/0					13.6				
16	1/0		2/0	2/0	2/0	2/0			< 2		12.4				
17	1/0		2/0	2/0	2/0	2/0					14.0				
18	1/0		2/0	2/0	2/0	2/0					14.6				
19	1/0		2/0	2/0	2/0	2/0					13.5				
20	1/0		2/0	2/0	2/0	2/0					14.0				
21	1/0		2/0	2/0	2/0	2/0					14.3				
22	1/0		2/0	2/0	2/0	2/0					13.1				
23	1/0		2/0	2/0	2/0	2/0					13.4				
24	1/0		2/0	2/0	2/0	2/0					12.5				
25	1/0		2/0	2/0	2/0	2/0					11.3				
26	1/0		2/0	2/0	2/0	2/0					12.5				
27	1/0		2/0	2/0	2/0	2/0					12.9				
28	1/0		2/0	2/0	2/0	2/0					12.4				
29	1/0		2/0	2/0	2/0	2/0					12.7				
30	1/0		2/0	2/0	2/0	2/0					12.5				
31	1/0		2/0	2/0	2/0	2/0					14.3				
											13.0				
											14.6				
											11.3				

n.s. = no sample collected/tested

Distribution System Monitoring WSSN 2310 Jan-14

DATE	Free Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											0.9	0.9	2
2											0.9	0.9	2
3											0.9	0.9	2
4											1.0	1.0	2
5											1.0	0.9	2
6											1.0	1.0	2
7									0.5	0.6	1.0	0.9	4
8	0.9		0.9	0.5	0.9						1.1	0.9	6
9	1.1	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.4	0.7	1.0	0.9	12
10									0.4	0.7	1.1	1.0	4
11											0.9	0.9	2
12											0.9	0.9	2
13									0.5	0.7	1.0	0.9	4
14											1.0	0.9	2
15		0.8				0.9	0.9	0.9			1.1	0.9	6
16	1.1	0.8	0.7	0.8	0.7	0.6	0.8	0.9	0.5	0.6	1.0	1.0	12
17									0.4	0.7	1.0	1.1	4
18											1.0	1.0	2
19											0.9	0.9	2
20											0.9	1.0	2
21											1.0	0.9	2
22									0.4	0.6	1.1	1.1	4
23	1.1	0.8	0.8	1.0	0.8	0.8	0.9	0.9	0.5	0.7	1.1	1.1	12
24									0.5	0.6	1.1	1.0	4
25											1.2	1.2	2
26											0.9	1.1	2
27									0.3	0.7	1.1	0.9	4
28											0.9	1.0	2
29	0.9	0.8	1.0	0.6	0.7	0.9	0.9	0.9	0.5	0.6	1.0	1.1	12
30	1.1	0.9	1.0	1.0	0.9	0.8	0.9	1.0	0.4	0.6	1.1	0.9	12
31									0.5	0.6	1.1	1.0	4

Monthly Cl_2 Avg.	**0.860**
Quarterly Cl_2 Avg.	**0.706**
Yearly Cl_2 Avg.	**0.738**
Total Samples	**136**

Distribution System Monitoring WSSN 2310 Jan-14

DATE	Total Chlorine Residual at Bacteriological Montioring Stations mg/l												
	1	2	3	4	5	6	7	8	CS	WR	STA II AM	STA II PM	Number of Samples
1											1.1	1.1	2
2											1.0	1.0	2
3											1.1	1.1	2
4											1.1	1.1	2
5											1.1	1.0	2
6											1.2	1.2	2
7									0.7	0.7	1.2	1.2	4
8	1.0		1.0	0.7	1.0						1.3	1.1	6
9	1.2	0.9	1.1	1.0	1.0	0.9	1.0	1.1	0.6	0.8	1.2	1.1	12
10									0.5	0.9	1.3	1.2	4
11											1.1	1.1	2
12											1.1	1.1	2
13									0.7	0.9	1.2	1.1	4
14											1.2	1.1	2
15		1.0				1.0	1.0	1.0			1.3	1.1	6
16	1.3	0.9	0.9	0.9	0.9	0.7	1.0	1.1	0.6	0.8	1.2	1.1	12
17									0.5	0.9	1.2	1.3	4
18											1.1	1.2	2
19											1.0	1.1	2
20											1.0	1.1	2
21											1.2	1.1	2
22									0.6	0.8	1.3	1.3	4
23	1.3	1.1	1.1	1.1	1.0	0.9	1.2	1.1	0.7	0.9	1.2	1.2	12
24									0.7	0.8	1.3	1.2	4
25											1.5	1.5	2
26											1.1	1.2	2
27									0.5	0.8	1.2	1.1	4
28											1.0	1.2	2
29	1.0	1.0	1.2	0.7	0.9	1.1	1.0	1.0	0.6	0.8	1.2	1.3	12
30	1.3	1.0	1.2	1.1	1.1	0.9	1.1	1.2	0.6	0.7	1.3	1.2	12
31									0.7	0.8	1.3	1.3	4

Monthly Cl_2 Avg.	**1.03**
Quarterly Cl_2 Avg.	**0.861**
Yearly Cl_2 Avg.	**0.904**
Total Samples	**136**

FLINT WATER PLANT & FACILITIES

ROUTINE POSITIVE DISTRIBUTION SAMPLES

Jan-14

Total number of positive routine samples:				Total Coliform: 0		Fecal Coliform: 0	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform

Total number of routine distribution samples analyzed:	136
Total number of routine distribution samples required:	100

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people		☒ 10,000 or more people	

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1.** For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: September 8, 2015

Method of delivery to Local Health Department

☐ Mail ☐ Email ☒ Hand Delivery ☐ Other _____ Date delivered: July 20, 2015

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: July 17, 2015
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons:** Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons:** Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: https://www.cityofflint.com/wp-content/uploads/CCR-2014.pdf
Date accessible: July 1, 2015

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: July 17, 2015
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☒ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent Wright Supervisor

Signature: _____ Date: September 8, 2015

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

2310

Flint River

The Consumers Annual Water Quality Report provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing regulatory required testing results, and a table giving explanations of important terms to understand when viewing the test results. The City of Flint Department of Utilities is dedicated to providing quality drinking water to the residents of the community. The Flint Water Plant operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations, and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water. Information about your drinking water is available on the City of Flint web page at *www.cityofflint.com* or by calling the City of Flint Water Plant at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can also be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

The City of Flint began using the Flint River as a water source in May of 2014. Flint is located roughly in the middle of the Flint River Watershed. The Flint River watershed includes Holloway Reservoir, C.S. Mott Lake, Kearsley Lake, and numerous streams and creeks that drain to these lakes or directly into the Flint River. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, and the City of Flint Utilities Department conducted a source water assessment in February 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Flint River source water intake is categorized as having a very high susceptibility to potential contaminant sources.

The use of the Flint River as a source water for the City of Flint Water Treatment Plant was a temporary move, driven largely by economics and the financial state of the City. The City of Flint joined the Karegnondi Water Authority (KWA) in 2010. The KWA consists of a group of local communities that decided to support and fund construction of a raw water pipeline to Lake Huron. The KWA will provide the City of Flint Water Treatment Plant with source water from Lake Huron. The KWA pipeline is currently under construction, and is scheduled to be completed by the end of 2016.

KWA pipeline construction

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

General Information (cont.)

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

2014 & Current Drinking Water Issues

The City of Flint did experience drinking water issues in the summer of 2014. Issues began with areas of the city experiencing "rusty" water. This was largely due to the fact that the city distribution system contains hundreds of miles of cast iron pipe. As these pipes age and degrade, iron is released, causing the water to exhibit color. The change in source water, water main breaks, and routine maintenance to the system also contributed to this problem.

The City of Flint received violations from the Michigan Department of Environmental Quality (MDEQ). The violations included a total coliform and E. coli in August and September of 2014, and a corresponding total trihalomethanes (TTHM) violation in December of the same year. As the city distribution system testing began to detect bacteria, system flushing increased, and chlorine addition to the water at the treatment plant also increased. The resulting increased chlorine addition then resulted in the higher formation of trihalomethanes.

While facing these issues, the City of Flint took steps to confer with industry professionals and state regulators in regards to treatment plant operation and distribution system operation. In November, TTHM levels were below the Maximum contaminant level set forth in the Michigan Safe Drinking Water Act.

Moving Forward

The City of Flint has taken many steps to correct the underlying issues that resulted in the drinking water violations. Water Treatment Plant corrective actions that were taken immediately after the issues occurred included:

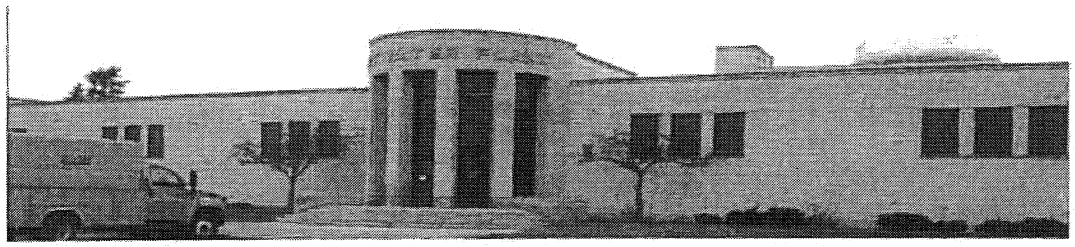
- Limiting the use of storage reservoirs during the warm weather months.
  - Warm water temperatures and water age are large contributors to the formation of THM's.
- Optimizing ozone pretreatment by updating control programming along with cleaning and inspection of the ozone generators.
  - Ozone is a powerful oxidant that provides a level of disinfection along with taste and odor control.
- Currently finalizing the installation of granular activated carbon (GAC) to the filtration process, which should be complete by the end of July 2015.
  - GAC will reduce THM's by removing the chemical precursors that react with chlorine to form the THM's.

Moving Forward (cont.)

Distribution system corrective actions that were enacted include:

- Increased water main flushing in an effort to alleviate stagnant water.
- Update distribution system water hydraulic model, to determine possible problem areas.
- Repaired or replaced several large water main valves, which were inhibiting the designed flow of water through the system.
- Planning and budgeting of 24' transmission water main repair in area of concern in the distribution system.
- Begin a complete distribution system evaluation of the 7000 water main valves that control the flow of water throughout the city. This project will be complete in July of 2015 and will provide information on where to proceed with further repairs and future projects.

The City of Flint is dedicated to resolving the issues that are facing the water system, and will continue to move forward as we prepare for the future. The City would like to thank all the residents and customers for their patience and understanding as we face the challenges ahead. The trials and tribulations that we have faced with the switch to the Flint River as a source water will prove to be important as we move ahead as a member of the KWA. Some of the distribution system issues experienced in 2014 while using the Flint River may also have been experienced with a different source water. As we continue to address the issues and take steps to be proactive, we can assure a future of quality drinking water in the City of Flint.



If you have any questions about this report or other concerns please contact the City of Flint Water Plant (810) 787-6537.

2014 Regulated Detected Contaminants
Monitored at Treatment Plant

Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Inorganic Chemicals						
Fluoride	mg/L	4	4			No
Nitrate	mg/L	10	10	0.5	0 – 0.5	No
Metals						
Barium	mg/L	2	2	0.03	0.02 – 0.03	No
Selenium	mg/L	0.05	0.05	0.001	0 – 0.001	No
Pesticides						
Atrazine	mg/L	0.03	0.03	0.0003	0 – 0.0003	No
Organics						
Total Xylenes	mg/L	10	10	0.0005	0 – 0.0005	No

More than 100 other chemicals were monitored throughout the year that were not detected. The list of various classifications these chemicals are associated with include metals, carbamates, herbicides, pesticides, organics, and radiological.

Total Organic Carbon, TOC			
Regulated Contaminant	Required Monthly % Removal	Minimum Monthly % Removal	Monthly % Removal Ranges
Total Organic Carbon	50	53	53 - 68

Finished water and Source water samples are collected and analyzed monthly to calculate percent removal. Total organic carbon includes numerous chemicals that are found naturally in surface waters. Certain chemicals found in this group are precursors to the disinfection byproducts trihalomethanes and haloacetic acids.

Turbidity		
Highest Single Measurement (Cannot exceed 1NTU)	Lowest Monthly % of Samples Meeting Turbidity Limit (< 0.3 NTU in 95% of samples)	Violation
0.22	99.1	No

Turbidity is a measure of the apparent cloudiness of water, usually attributed to particulate matter. The turbidity data in the chart above is measured from the water plant tap every 4 hours. Turbidity is monitored throughout each stage of the treatment process in 4 hour intervals, and in one of the final stages of treatment, filtration, turbidity is monitored continuously with in line meters, and verified every 4 hours in the laboratory.

In 2014, the EPA required the City of Flint and other communities to conduct further testing on unregulated contaminants at the treatment plant and the maximum residence time in the distribution system. The monitoring results will be utilized by the EPA to determine if these chemicals should be regulated. The unregulated contaminant monitoring that yielded results are presented in the chart below

Unregulated Contaminant Monitoring			
Regulated Contaminant	Unit of Measure	Highest Level Detected	Range of Detection
Chromium	ug/L	0.40	0 – 0.4
Hexavalent Chromium	ug/L	0.40	0.34 – 0.40
Strontium	ug/L	130	120 – 130
Vanadium	ug/L	0.20	0 – 0.20

2014 Regulated Detected Contaminants
Monitored in Distribution System

Disinfectant Residuals						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Total Chlorine Residual	mg/L	4.0	4.0	3.5	0.1 – 3.5	No

Microbiological Contaminants				
Regulated Contaminant	MCL G	MCL	Highest Number detected (in 1 month)	Violation
Total Coliform bacteria	0	The presence of coliform bacteria in > 5% of monthly samples	15	Yes
E. coli Bacteria	0	0	1	Yes

Disinfectant residuals and microbiological contaminants are monitored at 8 locations throughout the city distribution system, and at the 2 drinking water reservoirs and pump stations located out in the distribution system. At least 100 samples are collected and analyzed each month.

Lead & Copper						
Regulated Contaminant	Unit of Measure	MCLG	Action Level AL	90th Percentile Value	Number of samples over AL	Violation
Lead	ug/L	0	15	6	2	No
Copper	mg/L	1.3	1.3	0.11	0	No

Lead and copper monitoring was conducted from June through December 2014 with the collection of 100 samples. Samples were collected by residents from the taps at their residence. Thank you to all who participated in collecting samples.

Disinfection By-Products						
Regulated Contaminant	Unit of Measure	MCL G	MCL	Highest Level Detected	Range of Detection	Violation
Total Trihalomethanes (TTHM)	ug/L	n/a	80	196	33.3 -196.2	Yes
Haloacetic Acids (HAA)	ug/L	n/a	60	64	5 - 64	No
Bromate	ug/L	10	10	23	0 - 23	No

Disinfection by-products occur as a result of the water treatment process. Bromate is formed as a result of using ozone as a treatment additive. Ozone is used to help control taste and odor issues, and as a pre-treatment disinfection. Naturally occurring bromide reacts with Ozone to generate bromate. Bromate is monitored monthly, and compliance is based on a yearly average.

TTHM's and HAA's are formed as a result of utilizing chlorine in the treatment process. Naturally occurring compounds known as TOC's (total organic carbon) react with chlorine to form TTHM's and HAA's. The temperature and the age of water increase the formation of THM's and HAA's, and as a result, during the warm months of the year is when levels were at their highest. Samples are tested quarterly from 8 sites throughout the distribution system and compliance is based on a running annual average at each individual site.

Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in d water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.
ug/L	Micrograms per Liter	A microgram = 1/1,000,000 gram 1 microgram per liter is equal to 1ppb

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people		☒ 10,000 or more people	

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1.** For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: September 8, 2015

Method of delivery to Local Health Department

☐ Mail ☐ Email ☒ Hand Delivery ☐ Other _____ Date delivered: June 30, 2015

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: June 29, 2015
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons**: Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons**: Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☐ Internet address: _____ Date accessible: _____

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: June 29, 2015
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☐ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent Wright Supervisor

Signature: _____ Date: September 8, 2015

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

Detroit

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2014 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water.

Information about your drinking water is available at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

From January 1st through April 30th 2014, The City of Flint purchased drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your hoe may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Lake Huron Water Treatment Plant
2014 Regulated Detected Contaminants Tables

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at the Plant Finished Water Tap								
Fluoride	5/13/14	ppm	4	4	0.59	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	5/13/14	ppm	10	10	0.31	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Disinfection By-Products – Monitoring in Distribution System Stage 2 Disinfection By-Products								
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Total Trihalomethanes (TTHM)	2014	ppb	n/a	80	33.0	10.0 - 48.5	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	2014	ppb	n/a	60	15.8	8.0 – 19.0	No	By-product of drinking water disinfection
Disinfectant Residuals Monitoring in DWSD Distribution System								
Regulated Contaminant	Test Date	Unit	Health Goal MRDGL	Allowed Level MRDL	Highest RAA	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Total Chlorine Residual	Jan-Dec 2014	ppm	4	4	0.82	0.64-0.94	No	Water additive used to control microbes

Regulated Contaminant	Treatment Technique	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.	Erosion of natural deposits

2014 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation yes/no	Major Sources in Drinking Water
0.19 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2014 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Regulated Contaminant	MCLG	MCL	Highest Number Detected	Violation yes/no	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0	No	Naturally present in the environment.
E.coli Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL	Violation yes/no	Major Sources in Drinking Water
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.10	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.

2014 Radionuclides

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Level Detected	Violation yes/no	Major Sources in Drinking Water
Combined Radium Radium 226 & 228	5/13/14	pCi/L	0	5	0.86 + or - 0.55	No	Erosion of natural deposits

014 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.78	Erosion of natural deposits

ollection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

ity of Flint sample result information provided by the City of Flint Water Plant, M. Glasgow

2014 Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people		☒ 10,000 or more people	

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1.** For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: 6/25/2014

Method of delivery to Local Health Department

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: 6/25/2014

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: 6/24/2014
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons**: Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons**: Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com/utilities/utilities.asp Date accessible: 6/26/2014

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: 6/24/2014
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☐ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent F. Wright / Water Plant Supervisor

Signature: _____ Date: 6/25/2014

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 27 2014
LANSING DISTRICT

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

02310

CUSTOMER SERVICE CENTER
CITY HALL
1101 S. SAGINAW ST.
FLINT, 48501

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 27 2014
LANSING DISTRICT

Department of Utilities
FLINT
WATER PLANT

City of Flint
Water Plant & Facilities

2013 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water.

Information about your drinking water is available at the City of Flint web page on the Internet at www.cityofflint.com or by calling the Flint Water Plant & Facilities at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

In 2013, The City of Flint purchased drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Lake Huron Water Treatment Plant
2013 Regulated Detected Contaminants Tables

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at Plant Finished Water Tap								
Fluoride	05/13/2013	ppm	4	4	0.55	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	05/13/2013	ppm	10	10	0.32	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Disinfection By-Products – Monitoring in Distribution System								
Contaminant	**Test Date**	**Units**	**Health Goal MCLG**	**Allowed Level MCL**	**Highest LRAA**	**Range of Detection**	**Violation**	**Major Sources in Drinking Water**
Total Trihalomethanes (TTHM)	2013	ppb	n/a	80	37.8	11.5 – 43.8	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	2013	ppb	n/a	60	17.0	6.0 – 19.0	No	By-product of drinking water disinfection
Disinfectant Residuals Monitoring in Distribution System								
Contaminant	**Test Date**	**Units**	**Health Goal**	**Allowed Level**	**Highest RAA**	**Range of Detection**	**Violation**	**Major Sources in Drinking Water**
Disinfectant Total Chlorine Residual	Jan-Dec 2013	ppm	MRDGL 4	MRDL 4	0.81	0.65-0.93	No	Water additive used to control microbes

2013 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	**Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)**	**Violation**	**Major Sources in Drinking Water**
0.26 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2013 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Regulated Contaminant	**MCLG**	**MCL**	**Highest Number Detected**	**Violation**	**Major Sources in Drinking Water**
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	in one month 1	No	Naturally present in the environment.
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Regulated Contaminant	**Test Date**	**Units**	**Health Goal MCLG**	**Action Level AL**	**90th Percentile Value***	**Number of Samples Over AL**	**Violation**	**Major Sources in Drinking Water**
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.10	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.

Regulated Contaminant	Treatment Technique	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.	Erosion of natural deposits

2013 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.52	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

Additional sample result information provided by the City of Flint Water Plant Laboratory, M Glasgow

2013 Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

October 30, 2015

VIA E-MAIL and U.S. MAIL

Mr. Mike Glasgow
Utilities Administrator
City of Flint
4500 North Dort Highway
Flint, Michigan 48505

Dear Mr. Glasgow:

SUBJECT: Water Supply – City of Flint (City) – Corrosion Control Treatment Operation

The purpose of this letter is to outline additional requirements and recommendations regarding the additional corrosion control treatment measures being taken by the City water system.

The City has been purchasing drinking water from the Detroit Water and Sewerage Department (DWSD)/Great Lakes Water Authority (GLWA) since Friday, October 16, 2015. DWSD/GLWA provides corrosion control treatment to its water and DWSD/GLWA has been deemed by the Michigan Department of Environmental Quality (MDEQ) to have fully optimized corrosion control treatment. This optimization requires DWSD/GLWA to provide orthophosphate addition, maintain a minimum dose of 0.9 milligrams per liter (mg/L) as PO_4, and maintain a DWSD/GLWA plant tap residual of 0.8 mg/L as PO_4. As part of its optimization, DWSD/GLWA is also required to maintain a minimum pH of 7.0 at the DWSD/GLWA plant tap.

Corrosion Control Treatment and Operation

To further enhance pipe passivation in the City water distribution system, customer service lines, and customer plumbing, **the City shall dose additional orthophosphate to increase distribution system phosphate residual to a minimum of 3.1 mg/L as PO_4 (1.0 mg/L as P).** The City has obtained a Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), water system construction permit for the installation of this treatment equipment at Control Station 2 and Pump Station 4, construction permit number W151104, issued on October 28, 2015.

The City should also maintain a minimum pH level of 7.0 throughout the City's water distribution system. If pH levels of 7.0 or less are detected, the City shall immediately notify the MDEQ.

As part of the City water system operations, the City shall conduct:

- **Daily monitoring of incoming DWSD/GLWA water for pH and for orthophosphate residual, as PO_4**
- **Daily monitoring of additional orthophosphate dosage, as PO_4**
- **Daily monitoring of water entering the City distribution system for pH and for orthophosphate residual, as PO_4**

This information shall be included in the City's monthly operation report and shall be reported to the MDEQ as required under Administrative Rule 1502 (R 325.11502) of the administrative rules promulgated pursuant to Act 399.

Enhanced Water Quality Parameter Monitoring

The City's revised monitoring schedule dated October 22, 2015, requires quarterly Water Quality Parameter Monitoring at 25 sites throughout the City's water distribution system for temperature (Celcius), Conductivity (mS), pH, Total Alkalinity (mg/L as $CaCO_3$), Calcium (mg/L as Ca^{2+}), and orthophosphate (mg/L PO_4). Ten of these 25 sites are also used by the City to conduct required total coliform bacteria and chlorine residual monitoring (location numbers 1, 2, 3, 4, 5, 6, 7, 8, CS, and WS). **At these ten locations, the City shall also conduct weekly monitoring for the following parameters at the same time that total coliform bacteria and chlorine residual monitoring is conducted to further assess water stability:**

- **Turbidity (NTU)**
- **Iron (mg/L)**
- **Orthophosphate (mg/L PO_4)**
- **pH**
- **Total Alkalinity (mg/L as $CaCO_3$)**
- **Calcium (mg/L as Ca^{2+})**
- **Chloride (mg/L as Cl^-)**
- **Temperature (Celcius)**
- **Conductivity (mS)**

In addition to the 10 locations, the entry point to the distribution system should be one of the locations for enhanced water quality parameter monitoring.

If orthophosphate residual levels less than 3.1 mg/L as PO_4 (1.0 mg/L as P) are detected at any of these locations, then orthophosphate dosage shall be increased to achieve the minimum phosphate residual of 3.1 mg/L as PO_4 (1.0 mg/L as P) at all locations. In addition, if pH levels of 7.0 or less are detected at any of these locations, the City shall immediately notify the MDEQ.

Corrosion Control Treatment Test Loops

To further confirm the effectiveness of corrosion control treatment and the City's operations, it is recommended that the City construct, install, and monitor test loops of service line and plumbing materials. Instructions for construction, installation, and monitoring of these test loops can be obtained from the United States Environmental Protection Agency's (U.S. EPA) Office of Research and Development. The U.S. EPA has also offered to provide analytical services to support this investigative effort. Please contact Mr. Darren Lytle, Acting Branch Chief, at 512-569-7432 or lytle.darren@epa.gov.

Lead Service Line Verification Sampling

The City has been reviewing customer service connection records in order to confirm customer service line materials at each connection. The U.S. EPA has developed a sampling procedure that can be used to help verify the presence of lead service lines and it is recommended that the City conduct this sampling at a selection of customer locations for this purpose. Information regarding this verification sampling can also be obtained from Mr. Lytle. Any water analysis for samples meeting the criteria for inclusion in the 90th percentile calculation for lead and copper compliance must be completed by a certified laboratory.

Customer Household Exposure Assessment

The Michigan Department of Health and Human Services (MDHHS) is continuing to conduct blood lead level testing for children in the City. Families with children found to have elevated blood lead levels will be asked to have an elevated blood lead level investigation conducted at their residence that will include a lead exposure assessment, including the contribution of lead from water service lines and premise plumbing. This diagnostic testing is different than the first draw sampling being conducted by the City and should help further substantiate the effectiveness of corrosion control treatment. Any water analysis samples meeting the criteria for inclusion in the 90th percentile calculation for compliance purposes for lead and copper must be completed by a certified laboratory.

Flint Water Treatment Plant Evaluation of Karegnondi Water Authority (KWA) Raw Water

The City is planning to change source water in the next year to raw water from Lake Huron purchased from the KWA. The City is required to evaluate the Flint Water Treatment Plant (WTP) processes related to optimization of corrosion control treatment using source water purchased from the KWA to determine if any adjustments are necessary. It is recognized that full scale testing at the Flint WTP may not be feasible. A report of this evaluation shall be provided to our office for review and approval prior to initiating service of this treated water to its customers.

If you have any questions regarding this correspondence, please contact me at the number below or at prysbym@michigan.gov.

Sincerely,

Michael F. Prysby, P.E.
District Engineer
Field Operations Section
Office of Drinking Water and
Municipal Assistance
517-290-8817

cc: Mr. Brent Wright, City of Flint
Mr. Howard Croft, City of Flint
Ms. Natasha Henderson, City of Flint
Mr. Darren Lytle, U.S. EPA
Mr. Samir F. Matta, P.E., Lockwood, Andrews & Newnam, Inc.
Mr. Warren Green, Lockwood, Andrews & Newnam, Inc.
Mr. James Henry, Genesee County Health Department
Dr. Linda Dykema, MDHHS
Mr. Jim Sygo, Chief Deputy Director, MDEQ
Mr. Stephen Busch, MDEQ
Mr. Adam Rosenthal, MDEQ

Year	Department	Division/Section	Title
Liane Shekter Smith			
2015 - 2016	Environmental Quality	Executive	Assistant
2012 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance	Office Chief
2011 - 2012	Environmental Quality	Office of Waste Management and Radiological Protection	Office Chief
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management	Division Chief
2005 - 2010	Environmental Quality	Waste and Hazardous Materials	Division Chief
2002 - 2005	Environmental Quality	Waste and Hazardous Materials - Hazardous Waste	Environmental Manager
1996 - 2002	Environmental Quality	Drinking Water and Radiological Protection (Kalamazoo 2000-2002)	Engineer Manager
1994 - 1996	Natural Resources/Environmental Quality		Environmental Manager
1990 - 1994	Natural Resources		Environmental Quality Manager
1989 - 1993	Natural Resources		General Engineer/Environmental Engineer
1988 - 1989	Public Health		Student Assistant
Stephen Busch			
2014 -	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Environmental Manager/District Coordinator
2013 - 2014	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Environmental Manager
2011 - 2013	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Grand Rapids	Environmental Engineer
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management/Field Operations - Grand Rapids	Environmental Engineer
2005 - 2010	Environmental Quality	Water Resources Bureau - Grand Rapids	Environmental Engineer
2002 - 2005	Environmental Quality	Water Resources Bureau - Grand Rapids, Kalamazoo	Environmental Engineer
2000 - 2002	Environmental Quality	Surface Water Quality	Environmental Engineer/General Engineer
Richard Benzie			
2015 -	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations	Section Manager
2013 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance	Engineer Manager
2011 - 2013	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations	Engineer Manager
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management	Engineer Manager
2004 - 2010	Environmental Quality	Water Resources Bureau - Community Drinking Water	Engineer Manager
2003 - 2004	Environmental Quality	Water Division - Technical Support	Engineer Manager
2002 - 2003	Environmental Quality	Water Division	Engineer Manager
2000 - 2002	Environmental Quality	Drinking Water and Radiological Protection/Field Operations	Engineer Manager
1998 - 2000	Environmental Quality		Environmental Engineer Specialist
1996 - 1998	Environmental Quality		Engineer Manager
1988 - 1996	Environmental Quality		Environmental Engineer
1981 - 1988	Environmental Quality		Sanitary Engineer
1979 - 1981	Public Health		Environmental Engineer
1978 - 1979	Public Health		General Engineer
1977 - 1978	Public Health		Sanitary Engineer

Adam Rosenthal

2016 -	Environmental Quality	Office of Drinking Water and Municipal Assistance - Environmental Health	Environmental Quality Analyst
2011 - 2016	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Environmental Quality Analyst
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management/Field Operations - Lansing	Environmental Quality Analyst
2004 - 2010	Environmental Quality	Water Resources Bureau - Lansing	Environmental Quality Analyst
2002 - 2004	Environmental Quality	Water Division - Lansing	Resource Analyst
2001 - 2002	Environmental Quality	Drinking Water and Radiological Protection/Field Operations-Shiawassee	Resource Analyst
1999 - 2001	Environmental Quality	Drinking Water and Radiological Protection/Field Operations-Plainwell	Resource Analyst

Michael Prysby

2011 -	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Environmental Engineer
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management/Field Operations - Lansing	Environmental Engineer
2004 - 2010	Environmental Quality	Water Resources Bureau - Lansing	Environmental Engineer
2002 - 2004	Environmental Quality	Water Division - Lansing	Environmental Engineer
1989 - 2002	Environmental Quality	Drinking Water and Radiological Protection/Field Operations-Shiawassee	Environmental Engineer
1988 - 1990	Environmental Quality		General Engineer

Patrick Cook

2015-	Environmental Quality	Office of Drinking Water and Municipal Assistance - Environmental Health	Environmental Engineer Specialist
2011 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations	Environmental Engineer Specialist
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management	Environmental Engineer Specialist
2004 - 2010	Environmental Quality	Water Resources Bureau - Community Drinking Water	Environmental Engineer Specialist
2002 - 2004	Environmental Quality	Water Division - Technical Support	Environmental Engineer Specialist
1990 - 2002	Environmental Quality	Drinking Water and Radiological Protection	Environmental Engineer
1988 - 1990	Environmental Quality		General Engineer

Year	Department	Division/Section	Title
Liane Shekter Smith			
2015 - 2016	Environmental Quality	Executive	Assistant
2012 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance	Office Chief
2011 - 2012	Environmental Quality	Office of Waste Management and Radiological Protection	Office Chief
2010 - 2011	Natural Resources and the Environment	Environmental Resources Management	Division Chief
2005 - 2010	Environmental Quality	Waste and Hazardous Materials	Division Chief
2002 - 2005	Environmental Quality	Waste and Hazardous Materials - Hazardous Waste	Environmental Manager
1996 - 2002	Environmental Quality	Drinking Water and Radiological Protection (Kalamazoo 2000-2002)	Engineer Manager
1994 - 1996	Natural Resources/Environmental Quality		Environmental Manager
1990 - 1994	Natural Resources		Environmental Quality Manager
1989 - 1993	Natural Resources		General Engineer/Environmental Engineer
1988 - 1989	Public Health		Student Assistant
Stephen Busch			
2015 - 2016	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Section Manager/District Coordinator
2015 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Section Manager/District Coordinator
2014 - 2015	Environmental Quality	Office of Drinking Water and Municipal Assistance/Field Operations - Lansing	Environmental Manager
2013 - 2014	Environmental Quality	Office of Waste Management and Radiological Protection/Field Operations-Lansing	Environmental Manager
2010 - 2011	Natural Resources and the Environment	Environmental Resources Division/Field Operations - Grand Rapids	Environmental Engineer
2005 - 2010	Environmental Quality	Water Resources Bureau - Grand Rapids	Environmental Engineer
2002 - 2005	Environmental Quality	Water Resources Bureau - Grand Rapids, Kalamazoo	Environmental Engineer
2000 - 2002	Environmental Quality	Surface Water Quality	Environmental Engineer/General Engineer

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

DRAFT DEQ

LEAD AND COPPER REPORT AND CONSUMER NOTICE OF LEAD RESULT CERTIFICATE FOR COMMUNITY WATER SUPPLY

Issued under authority of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rules, as amended.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit www.michigan.gov/deq and click on Locations.

1. Water Supply Name: City of Flint Water Plant
2. County: Genesee 3. WSSN: 2310
4. Population: 99,763 5. Monitoring Period: From: 1/1/15 To: 6/30/15
6. Minimum # of Samples Required: 100 60 7. # of Samples Taken: ~~71~~ 69
8. Name of Certified Laboratory: DEQ Drinking Water Laboratory

9. SAMPLE CRITERIA:

Yes	No	Explain No responses in Comments block.	
☐	☒	a. Are the same sampling points used as in the previous monitoring period?	
☐	☒	b. Are all samples from Tier 1 sites?	For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
☒	☐	c. Are all samples from Tier 1, 2, or 3 sites giving Tier 1 priority?	
☒	☐	d. If no Tier 1, 2, or 3 sites are available, do all sites have plumbing materials commonly found at other locations in the system?	
☒	☐	e. Is the minimum number of lead service line samples taken (when applicable)?	

Comments:
A total of 175 sample bottles and instructions were distributed to city residents. We are contiuning to solicit samples due to the fact that we did not reach the minimum number for this monitoring period.

Lead service - majority (30,000?)

10. NAME:

Name: Michael Glasgow

Title: Utilites Administrator Phone: 810-766-7135 Date: 7/28/2015

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumbing[2]	Lead (ppb)	Copper (ppb)	Lab #
2205 Flusing Rd	2/15/15	1	L	C,P	N.D.	0.13	54663
212 Browning Ave.	2/18/15	1	L	P	104	N.D.	54945
1809 Stevenson St.	2/10/15	1	L	P	10	N.D.	54956
4202 Custer Ave.	3/4/15	1	L	C,P	6	0.27	56223
401 E. Newall St.	3/2/15	1	L	P	5	N.D.	56225
215 Browning Ave.	3/21/15	1	L	C,P	N.D.	0.16	56226
2615 Trumbull Ave.	2/27/15	1	L	C,P	3	N.D.	56227
201 Browning Ave.	3/5/15	1	L	P	N.D.	N.D.	56228
1224 Decker St.	3/17/15	1	L	C,P	13	0.10	57728
1220 Decker St.	3/17/15	1	L	P	4	N.D.	57730
1379 Washington Ave.	3/19/15	1	L	P	8	N.D.	57731
1383 Washington Ave.	3/19/15	1	L	C,P	6	0.17	57734
1372 Washington Ave.	3/19/15	1	L	C,P	2	0.14	57733
1367 Washington Ave.	3/17/15	1	L	P	1	N.D.	57735
1701 Marquettte Dr.	3/14/15	1	L	C,P	1	0.19	57736
778 Bundy Ave.	3/24/15	1	L	P	N.D.	N.D.	58413
3714 Beecher Rd.	3/24/15	1	L	C	2	0.52	58414
1016 Ingleside Ave.	4/9/15	1	L	C,P	7	0.07	59749
1818 Rock Creek Ln.	4/6/15	1	L	C,P	3	0.11	59750
3010 Cheyenne St.	4/3/15	1	L	C,P	5	0.10	59751

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed) DRAFT

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2606 Mountain Ave.	4/15/15	1	L	P	N.D.	N.D.	60546
2020 Crooked Ln.	4/24/15	1	L	C,P	5	0.10	61845
310 E. Moore St.	4/22/15	1	L	P	5	N.D.	61846
631 Alvord Ave.	5/6/15	1	L	P	42	N.D.	63410
216 Browning Ave.	5/7/15	1	L	C,P	22	0.31	63411
3714 Beecher Rd.	5/14/15	1	L	C,P	8	0.15	64283
~~625 S. Grand Traverse~~	~~5/18/15~~	~~5~~	~~L~~	~~C,P~~	~~20~~	~~0.14~~	~~64284~~ X
812 Lexington Ave.	5/15/15	1	L	P	6	N.D.	64285
349 Robbie Ln.	5/31/15	1	L	P	2	N.D.	67428
353 Robbie Ln.	5/30/15	1	L	C,P	5	0.11	67427
341 Robbie Ln.	5/31/15	1	L	C,P	3	0.05	67426
328 Robbie Ln.	5/30/15	1	L	C,P	2	0.09	67425
357 Robbie Ln.	5/31/15	1	L	C	3	0.20	67424
344 Robbie Ln.	5/31/15	1	L	C,P	4	0.11	67423
1807 Oren Ave.	6/8/15	1	L	P	21	N.D.	68023
421 Lyon St.	6/14/15	1	L	C,P	7	0.14	68788
1528 Delaware Ave.	6/12/15	1	L	P	3	N.D.	68789
3811 Brentwood Dr.	6/14/15	1	L	P	42	N.D.	68790
1615 S. Franklin Ave.	6/14/15	1	L	P	N.D.	N.D.	68791
853 E. 7th St.	6/12/15	1	L	C,P	7	0.07	68792

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

19

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
1150 Woodside Dr.	6/14/15	1	L	P	29	N.D.	68793
547 Copeman Blvd.	6/14/15	1	L	P	18	N.D.	68794
920 Stocker Ave.	6/21/15	1	L	P	1	N.D.	69622
742 Lincoln Ave.	6/19/15	1	L	P	2	N.D.	69623
3517 Bennett Ave.	6/24/15	1	L	C,P	3	0.06	69624
1730 Overhill Dr.	6/22/15	1	L	C,P	1	0.08	69625
2117 Stanford Ave.	6/23/15	1	L	C,P	5	0.08	69626
2432 Beta Ln.	6/21/15	1	L	P	N.D.	N.D.	69627
2023 Miller Rd.	6/21/15	1	L	C,P	3	0.06	69628
721 East St. Apt #2	6/25/15	4	L	C,P	10	0.16	70222
3814 Whitter	6/26/15	1	L	P	2	N.D.	70223
3120 Norwood	6/24/15	1	L	P	5	N.D.	70224
2122 Pierce St.	6/21/15	1	L	P	2	N.D.	70225
3521 Bennett Ave.	6/25/15	1	L	P	3	N.D.	70226
1602 Raspberry Ln.	6/24/15	1	L	P	N.D.	N.D.	70227
1809 Lynbrook	6/26/15	1	L	P	3	N.D.	70228
2112 Sherff	6/24/15	1	L	C,P	9	0.06	70229
1205 Blanchard Ave.	6/24/15	1	L	C,P	11	0.05	70230
860 Schafer St.	6/26/15	1	L	C,P	N.D.	0.06	70231
2110 Flushing Rd.	6/30/15	1	L	C	N.D.	0.10	71158

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2300 Flushing Rd.	6/29/15	1	L	C	3	0.28	71159
2130 Flushing Rd.	6/28/15	1	L	C,P	6	0.05	71160
2202 Flushing Rd.	6/29/15	1	L	C,P	2	0.06	71162
2429 Flushing Rd.	6/30/15	1	L	C,P	N.D.	0.06	71163
4013 Brownell Blvd.	6/29/15	1	L	C,P	2	0.08	71165
2414 Flushing Rd.	6/30/15	1	L	P	N.D.	N.D.	71166
1914 Penbrook Ln	6/29/15	1	L	P	2	N.D.	71167
3901 Leedra St.	6/26/15	1	L	P	N.D.	N.D.	71168
3142 McClure	6/26/15	1	L	P	3	N.D.	71169
2114 Flushing Rd.	6/30/15	1	L	C,P	5	0.05	71170
709 Frost St.	6/30/15	1	L	P	2	N.D.	72033

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

Consumer Notice of Lead Result in Drinking Water

Water Supply Name:	City of Flint		
County:	Genesee	WSSN:	**2310**
Sample Location:	401 E. Newall St.	Date Sampled:	**3/2/15**

Thank you for participating in the lead and copper monitoring of drinking water. The levels of lead and copper found at your location are in the table below.

Key to Table	Contaminant	AL	MCLG	Your Result
Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety. **ppb:** parts per billion or micrograms per liter.	Lead (ppb)	15	0	5
	Copper (ppb)	1300	1300	Not Detected

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

To reduce exposure to lead in drinking water:

- *Run your water to flush out lead.* Run the water until it becomes cold.
- *Use cold water for cooking and preparing baby formula.* Do not cook with or drink water from the hot water tap; lead dissolves more easily in hot water.
- *Do not boil water to remove lead.* Boiling water will not reduce lead levels.
- *Look for alternative sources or treatment of water.* If your lead result is above 15 ppb, you may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010, or www.nsf.org for information on performance standards for water filters.
- *Identify if your plumbing fixtures contain lead.* New faucets, fittings, and valves, may contain up to 8 percent lead including those advertised or labeled as "lead-free" and may contribute lead to drinking water. Consumers should be aware of this when choosing fixtures and take appropriate precautions.

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead-contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water.

For more information, contact us at: City of Flint Water Plant (810) 787-6537.
For more information on reducing lead exposure around your home and the health effects of lead, visit the U.S. EPA's Web site at www.epa.gov/lead, call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.

Certification: WSSN: 2310

I certify that this public water supply has provided the consumer notice of lead result to persons served at each of the taps that was tested, either by mail or by another method approved by the DEQ, within 30 days of knowing the result. The Notice includes required content.

Michael Flanagan	UTILITIES ADMINISTRATOR	3/17/15
Signature	Title	Date Sent to Consumer

Reminder to water supplier: Complete this certification on only one (1) example copy of a notice sent to a consumer and submit it to the DEQ.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

LEAD AND COPPER REPORT AND CONSUMER NOTICE OF LEAD RESULT CERTIFICATE FOR COMMUNITY WATER SUPPLY

Issued under authority of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rules, as amended.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit www.michigan.gov/deq and click on Locations.

1. Water Supply Name: City of Flint Water Plant
2. County: Genesee 3. WSSN: 2310
4. Population: 99,763 5. Monitoring Period: From: 1/1/15 To: 6/30/15
6. Minimum # of Samples Required: 60 7. # of Samples Taken: 69
8. Name of Certified Laboratory: DEQ Drinking Water Laboratory

9. SAMPLE CRITERIA:

Yes	No	Explain No responses in Comments block.	
☐	☒	a. Are the same sampling points used as in the previous monitoring period?	
☐	☒	b. Are all samples from Tier 1 sites?	For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
☒	☐	c. Are all samples from Tier 1, 2, or 3 sites giving Tier 1 priority?	
☒	☐	d. If no Tier 1, 2, or 3 sites are available, do all sites have plumbing materials commonly found at other locations in the system?	
☒	☐	e. Is the minimum number of lead service line samples taken (when applicable)?	

Comments: Revised report after conference call with DEQ staff. Two samples were removed from list for not meeting sample criteria, and due to population the number of samples required was reduced to 60.

10. NAME:

Name: Michael Glasgow

Title: Utilites Administrator Phone: 810-766-7135 Date: 8/20/2015

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2205 Flusing Rd	2/15/15	1	L	C,P	N.D.	0.13	54663
1809 Stevenson St.	2/10/15	1	L	P	10	N.D.	54956
4202 Custer Ave.	3/4/15	1	L	C,P	6	0.27	56223
401 E. Newall St.	3/2/15	1	L	P	5	N.D.	56225
215 Browning Ave.	3/21/15	1	L	C,P	N.D.	0.16	56226
2615 Trumbull Ave.	2/27/15	1	L	C,P	3	N.D.	56227
201 Browning Ave.	3/5/15	1	L	P	N.D.	N.D.	56228
1224 Decker St.	3/17/15	1	L	C,P	13	0.10	57728
1220 Decker St.	3/17/15	1	L	P	4	N.D.	57730
1379 Washington Ave.	3/19/15	1	L	P	8	N.D.	57731
1383 Washington Ave.	3/19/15	1	L	C,P	6	0.17	57734
1372 Washington Ave.	3/19/15	1	L	C,P	2	0.14	57733
1367 Washington Ave.	3/17/15	1	L	P	1	N.D.	57735
1701 Marquettte Dr.	3/14/15	1	L	C,P	1	0.19	57736
778 Bundy Ave.	3/24/15	1	L	P	N.D.	N.D.	58413
3714 Beecher Rd.	3/24/15	1	L	C	2	0.52	58414
1016 Ingleside Ave.	4/9/15	1	L	C,P	7	0.07	59749
1818 Rock Creek Ln.	4/6/15	1	L	C,P	3	0.11	59750
3010 Cheyenne St.	4/3/15	1	L	C,P	5	0.10	59751
2606 Mountain Ave.	4/15/2015	1	L	P	N.D.	N.D.	60546

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2020 Crooked Ln.	4/24/15	1	L	C,P	5	0.10	61845
310 E. Moore St.	4/22/15	1	L	P	5	N.D.	61846
631 Alvord Ave.	5/6/15	1	L	P	42	N.D.	63410
216 Browning Ave.	5/7/15	1	L	C,P	22	0.31	63411
3714 Beecher Rd.	5/14/15	1	L	C,P	8	0.15	64283
912 Lexington Ave.	5/15/15	1	L	P	6	N.D.	64285
349 Robbie Ln.	5/31/15	1	L	P	2	N.D.	67428
353 Robbie Ln.	5/30/15	1	L	C,P	5	0.11	67427
341 Robbie Ln.	5/31/15	1	L	C,P	3	0.05	67426
328 Robbie Ln.	5/30/15	1	L	C,P	2	0.09	67425
357 Robbie Ln.	5/31/15	1	L	C	3	0.20	67424
344 Robbie Ln.	5/31/15	1	L	C,P	4	0.11	67423
1807 Oren Ave.	6/8/15	1	L	P	21	N.D.	68023
421 Lyon St.	6/14/15	1	L	C,P	7	0.14	68788
1528 Delaware Ave.	6/12/15	1	L	P	3	N.D.	68789
3811 Brentwood Dr.	6/14/15	1	L	P	42	N.D.	68790
1615 S. Franklin Ave.	6/14/15	1	L	P	N.D.	N.D.	68791
853 E. 7th St.	6/12/15	1	L	C,P	7	0.07	68792
1150 Woodside Dr.	6/14/15	1	L	P	29	N.D.	68793
547 Copeman Blvd.	6/15/14	1	L	P	18	N.D.	68794

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2114 Flushing Rd.	6/30/15	1	L	P	5	0.05	71170
709 Frost St.	6/30/15	1	L	P	2	N.D.	72033
920 Stocker Ave.	6/21/15	1	L	P	1	N.D.	69622
742 Lincoln Ave.	6/19/15	1	L	P	2	N.D.	69623
3517 Bennett Ave.	6/24/15	1	L	C,P	3	0.06	69624
1730 Overhill Dr.	6/22/15	1	L	C,P	1	0.08	69625
2117 Stanford Ave.	6/23/15	1	L	C,P	5	0.08	69626
2432 Beta Ln.	6/21/15	1	L	P	N.D.	N.D.	69627
2023 Miller Rd.	6/21/15	1	L	C,P	3	0.06	69628
721 East St. Apt #2	6/25/15	4	L	C,P	10	0.16	70222
3814 Whitter	6/25/15	1	L	P	2	N.D.	70223
3120 Norwood	6/24/15	1	L	P	5	N.D.	70224
2122 Pierce St.	6/21/15	1	L	P	2	N.D.	70225
3521 Bennett Ave.	6/25/15	1	L	P	3	N.D.	70226
1602 Raspberry Ln.	6/24/15	1	L	P	N.D.	N.D.	70227
1809 Lynbrook	6/26/15	1	L	P	3	N.D.	70228
2112 Sherff	6/24/15	1	L	C,P	9	0.06	70229
1205 Blanchard Ave.	6/24/15	1	L	C,P	11	0.05	70230
860 Schafer St.	6/26/15	1	L	C,P	N.D.	0.06	70231
2110 Flushing Rd.	6/30/15	1	L	C	N.D.	0.10	71158

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2300 Flushing Rd.	6/29/15	1	L	C	3	0.28	71159
2130 Flushing Rd.	6/28/15	1	L	C,P	6	0.05	71160
2202 Flushing Rd.	6/29/15	1	L	C,P	2	0.06	71162
2429 Flushing Rd.	6/30/15	1	L	C,P	N.D.	0.06	71163
4013 Brownell Blvd.	6/29/15	1	L	C,P	2	0.08	71165
2414 Flushing Rd.	6/30/15	1	L	P	N.D.	N.D.	71166
1914 Penbrook Ln	6/29/15	1	L	P	2	N.D.	71167
3901 Leedra St.	6/26/15	1	L	P	N.D.	N.D.	71168
3142 McClure	6/26/15	1	L	P	3	N.D.	71169

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph **11**, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

LEAD AND COPPER REPORT AND CONSUMER NOTICE OF LEAD RESULT CERTIFICATE FOR COMMUNITY WATER SUPPLY

Issued under authority of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rules, as amended.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit www.michigan.gov/deq and click on Locations.

1. Water Supply Name: City of Flint
2. County: Genesee 3. WSSN: **2310**
4. Population: 5. Monitoring Period: From: 7/1/2014 To: 12/31/2014
6. Minimum # of Samples Required: 100 7. # of Samples Taken: 100
8. Name of Certified Laboratory: MDEQ Drinking Water Laboratory

9. SAMPLE CRITERIA:

Yes	No	Explain No responses in Comments block.	
☐	☒	a. Are the same sampling points used as in the previous monitoring period?	
☐	☒	b. Are all samples from Tier 1 sites?	For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
☒	☐	c. Are all samples from Tier 1, 2, or 3 sites giving Tier 1 priority?	
☒	☐	d. If no Tier 1, 2, or 3 sites are available, do all sites have plumbing materials commonly found at other locations in the system?	
☒	☐	e. Is the minimum number of lead service line samples taken (when applicable)?	

Comments: The increased number of samples required has led to many new sample sites.

10. NAME:

Name: Michael Glasgow

Title: Assistant Water Plant Supervisor Phone: (810)787-6537 Date: 2/27/15

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint / Genesee WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2205 Flushing Rd.	11/19/14	1	L		N.D.	110	
3814 Whitter Ave.	11/20/14	1	L		2	N.D.	
3521 Bennett Ave	11/21/14	1	L		2	N.D.	
1914 Penbrook Ln	11/20/14	1	L		N.D.	N.D.	
305 Allendale Pl.	11/24/14	1	L		2	130	
518 Frost St.	12/1/14	1	L		1	N.D	
3120 Norwood Dr.	12/2/14	1	L		N.D.	N.D.	
1901 Crestbrook Ln.	11/25/14	1	L		N.D.	70	
3727 Maryland Ave.	12/3/14	1	L		1	N.D.	
1220 Beard St.	12/2/14	1	L		10	60	
3718 Dolphaine Ln	12/3/14	1	L		N.D.	N.D.	
2213 Flushing Rd	12/3/2014	1	L		1	100	
721 East St.	12/10/14	1	L		9	120	
1125 Barrie Ave	12/5/14	1	L		4	N.D.	
1505 Woodlawn Park Dr.	12/6/2014	1	L		5	N.D.	
2622 Windmere	12/7/14	1	L		5	N.D.	
3517 Bennett	12/10/14	1	L		3	N.D.	
927 Kensington Ave.	12/5/14	1	L		N.D.	110	
1109 Kensington Ave.	12/4/14	1	L		N.D.	N.D.	
1901 Montclair Ave.	12/5/14	1	L		4	60	

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint / Genesee WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
1809 Lynbrook	12/4/14	1	L		2	N.D.	
1130 Simcoe Ave.	12/5/14	1	L		2	50	
413 Burroughs Ave	12/4/14	1	L		N.D.	N.D.	
2079 Zimmerman	12/8/14	1	L		4	N.D.	
2615 Westwood Pkwy	12/6/14	1	L		2	280	
2441 Norbert	12/8/14	1	L		8	60	
711 Kensington Ave.	12/9/14	1	L		3	N.D.	
2015 Gold Ave.	12/4/14	1	L		2	N.D.	
618 S. Meade St.	12/8/14	1	L		2	N.D.	
2802 Westwood Pkwy.	12/5/14	1	L		1	110	
860 Schafer St.	12/8/14	1	L		N.D.	70	
1021 S. Franklin Ave.	12/5/14	1	L		4	N.D.	
1616 Durand St.	12/5/14	1	L		N.D.	200	
928 Durand	12/7/14	1	L		N.D.	N.D.	
2730 Westwood Pkwy	12/4/14	1	L		23	290	
1543 Kearsley Park Blvd.	12/4/14	1	L		1	N.D.	
2920 Parkside Dr.	12/5/14	1	L		10	220	
2721 Westwood Pkwy	12/5/14	1	L		2	110	
1002 Durand St.	12/4/14	1	L		2	110	
2560 Thomas St.	12/4/14	1	L		N.D.	N.D.	

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint / Genesee WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
815 Bradley Ave.	12/7/14	1	L		5	270	
4013 Brownell Blvd.	12/8/14	1	L		2	80	
2418 Gold Ave.	12/10/14	1	L		N.D.	N.D.	
626 Commomwealth Ave	12/5/14	1	L		3	N.D.	
920 Stocker St.	12/9/14	1	L		N.D.	N.D.	
430 Westcombe Ave.	12/9/14	1	L		2	N.D.	
1623 Neome Dr.	12/5/14	1	L		7	70	
3802 Gorey Ave.	12/8/14	1	L		1	50	
1720 Davison Rd.	12/4/14	1	L		2	130	
2110 Mountain Ave.	12/8/14	1	L		5	60	
2006 Clement St.	12/3/14	1	L		3	N.D.	
2028 Corunna Rd.	12/7/14	1	L		N.D.	N.D.	
2829 Yale St.	12/10/14	1	L		N.D.	N.D.	
1914 W. Home Ave.	12/15/14	1	L		4	N.D.	
2920 N. Dexter St.	12/15/14	1	L		N.D.	70	
2810 Kellar Ave.	12/15/14	1	L		N.D.	N.D.	
3245 Montana Ave.	12/15/14	1	L		4	N.D.	
3623 Norwood Dr.	12/15/14	1	L		1	N.D.	
2801 Reynolds	12/8/14	1	L		2	N.D.	
3510 Brandon St.	12/10/14	1	L		5	80	

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint / Genesee WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2117 Stanford Ave.	12/11/14	1	L		3	N.D.	
5805 Leslie Dr.	12/12/14	1	L		N.D.	N.D.	
1809 W. Home Ave.	12/11/14	1	L		1	N.D.	
1414 Stone St.	12/12/14	1	L		2	N.D.	
2006 Aitken Ave.	12/16/14	1	L		N.D.	N.D.	
3131 Wolcott	12/17/14	1	L		N.D.	N.D.	
983 Gainey Ave.	12/17/14	1	L		N.D.	100	
2806 Norbert St.	12/18/14	1	L		N.D.	N.D.	
912 Crawford St.	12/15/14	1	L		1	110	
4024 Sterling	12/16/14	1	L		1	N.D.	
3737 Worchester Dr.	12/16/14	1	L		N.D.	140	
1100 Stockton St.	12/18/14	1	L		6	N.D.	
1725 Lincoln Ave.	12/21/14	1	L		2	N.D.	
3139 Colorado	12/18/14	1	L		N.D.	N.D.	
1401 Gainey Ave.	12/20/14	1	L		4	N.D.	
2730 Coventry Ct.	12/19/14	1	L		N.D.	N.D.	
709 Frost St.	12/19/14	1	L		N.D.	N.D.	
2307 Radcliffe	12/20/14	1	L		37	80	
224 E. Court St.	12/15/14	1	L		4	N.D.	
3440 Rangeley	12/13/14	1	L		N.D.	N.D.	

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint / Genesee WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
3808 Brownell Blvd.	12/16/14	1	L		N.D.	90	
1006 Kensington	12/19/14	1	L		2	N.D.	
2517 Delaware Ave.	12/18/14	1	L		5	200	
1810 W. Hobson Ave.	12/21/14	1	L		N.D.	N.D.	
5805 Leslie Dr.	12/21/14	1	L		2	N.D.	
1721 Chelsea Circle	12/22/14	1	L		N.D.	N.D.	
912 Waldman Ave.	12/23/14	1	L		N.D.	N.D.	
3082 Lanning Dr.	12/24/14	1	L		N.D.	N.D.	
25151 Chicago Blvd.	12/26/14	1	L		6	N.D.	
742 Lincoln Ave.	12/26/14	1	L		3	N.D.	
1805 Ramsay Blvd.	12/27/14	1	L		4	N.D.	
1910 Ramsay Blvd.	12/20/14	1	L		N.D.	N.D.	
3009 Montana Ave.	12/29/14	1	L		1	N.D.	
1223 Campbell St.	12/30/14	1	L		1	N.D.	
3821 Delaware	12/27/14	1	L		N.D.	N.D.	
1651 Woodlawn Pk Blvd.	12/29/14	1	L		N.D.	N.D.	
1911 Cony St.	12/30/14	1	L		4	N.D.	
3507 Dearborn Ave.	12/20/14	1	L		6	N.D.	
3829 Ivanhoe Ave.	12/29/14	1	L		N.D.	N.D.	
1559 Cherolet Ave.	12/30/14	1	L		9	N.D.	

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max.	# > AL
Pb	6.0			2
Cu	110			0

Consumer Notice of Lead & Copper Results in Drinking Water

Water Supply Name: City of Flint

County: Genesee WSSN: 2310

Sample Location 2205 Flushing Rd. Date Sampled: 11/19/2014

Thank you for participating in the lead and copper monitoring of drinking water. The levels of lead and copper found at your location are in the table below.

Key to Table	Contaminant	AL	MCLG	Your Result
Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water which there is no known or expected risk to health. MCLG's allow for a margin of safety. **ppb:** parts per billion or micrograms per liter.	Lead (ppb)	15	0	Not Detected
	Copper (ppb)	1300	1300	110

Lead can cause serious health problem if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects on the brain with lower IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

To reduce exposure to lead in drinking water:

- Run your water to flush out lead. Run the water until it becomes cold.
- Use cold water for cooking and preparing baby formula. Do not cook with or drink water from the hot tap; lead dissolves more easily in hot water.
- Do not boil water to remove lead. Boiling water will not reduce lead levels.
- Look for an alternative sources or treatment of water. If your lead result is above 15 ppb, you may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010, or www.nsf.org for information on performance standards for water filters.
- Identify if your plumbing fixtures contain lead. New faucets, fittings, and valves, may contain up to 8 percent lead including those advertised as lead-free" and may contribute lead to drinking water. Consumers should be aware of this when choosing fixtures and take appropriate precautions.

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water.

For more information, contact us at: City of Flint Water Plant (810)787-6537.

For more information on reducing lead exposure around your home ant the health effects of lead, visit the U.S. EPA's Web site at www.epa.gov/lead, call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.

From: Creagh, Keith (DEQ)
Subject: Message to DEQ Staff from Director Keith Creagh
Date: Wednesday, January 20, 2016 10:26:16 AM

Dear DEQ Staff,

Over the past few weeks, some things have changed for our agency while many others have not. The DEQ's core mission remains the same: Public health is our highest priority. Though the department has been under increased scrutiny in the press, know that our continuing efforts to assist the residents of Flint to get access to clean drinking water is testament to the agency's commitment to its mission. While there are differing opinions on the department's role in the Flint water incident, our focus must be on collaboration with the city, county, and federal levels to be part of the solution.

As we move forward, I ask that you stay closely focused on what we need to do to best serve the citizens of Michigan. Even though we will be pulling resources to work on the city of Flint drinking water solutions, we recognize all the other priorities and important work that we do in the other DEQ program areas, and that will continue. Know that you can influence what happens in our agency, and do not be afraid to ask for assistance for issues outside your expertise. I encourage you to support each other, build partnerships inside and outside the DEQ with those who can advance our mission, and think innovatively in order to reach the best possible solutions for the people of our state.

I am proud to undertake this important work with you, and I thank you for all of your dedication and hard work.

Keith Creagh
Director

Department of Environmental Quality
Office of Drinking Water and Municipal Assistance
Public Water Supply Program Funding
Fiscal Year 2010 - 2015

	FY10	FY11	FY12	FY13	FY14	FY15
General Funds	1,510,300	1,085,000	1,207,200	1,240,700	1,275,000	1,288,700
Federal Funds						
Public Water Supply Supervision Grant	4,741,000	4,687,700	4,425,000	4,194,000	4,213,000	4,145,000
Drinking Water Revolving Fund Set Asides	3,090,700	4,651,100	4,416,500	3,910,800	3,834,700	4,904,800
Public Water Supply Fees	3,571,100	3,517,200	3,388,600	4,377,900	4,322,000	4,329,900
	12,913,100	13,941,000	13,437,300	13,723,400	13,644,700	14,668,400
Full Time Equivalent Positions	Unavailable	90.0	78.0	90.5	87.5	85.5

Footnotes

a) The development of the FY 2011 budget included an internal reorganization within the DEQ and the merger of DEQ and DNR into the newly created Department of Natural Resources and Environment (DNRE). The reduction in funding is a result of a fund shift that occurred during the reorganization and mandated general fund reductions across the Department.

b) The information above represents the programmatic costs for the Public Water Supply Program. In addition, the DEQ receives federal Drinking Water Revolving Funds that are passed through to public water supplies. In FY 2016, the DEQ anticipates awarding 7 loans totaling $36 million.

Prepared 3/2/2016

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT APPLICATION FOR WATER SUPPLY SYSTEMS

(CONSTRUCTION - ALTERATION - ADDITION OR IMPROVEMENT) AS DESCRIBED HEREIN

Required under the Authority of 1976 PA 399, as amended

This application becomes an Act 399 Permit only when signed and issued by authorized Michigan Department of Environmental Quality (DEQ) Staff. See instructions below for completion of this application.

1. Municipality or Organization, Address and WSSN that will own or control the water facilities to be constructed. This permit is to be issued to:

City of Flint
4500 North Dort Highway
Flint, MI 48505

WSSN: 02310

2. Owner's Contact Person (provide name for questions):

Contact: Brent Wright

Title: Plant Supervisor

Phone: 810-787-6537

Permit Stamp Area (DEQ use only)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 140025 APR 09 2014

EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

3. Project Name (Provide phase number if project is segmented):

1) Flint WTP Phase II, Sement I - Initial Watermain Cut-In / Rehabilitation; 2) Flint WTP Phase II, Segment II - Lime Residual Disposal; 3) Flint WTP Phase II, Segment III - Electrical Improvements

4. Project Location (City, Village, Township): City of Flint

5. County (location of project): Genesee County

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR OF THE DEPARTMENT OF ENVIRONMENT QUALITY

cc:

Issued by: [signature]

Reviewed by: Patrick Cook for MPP for Mike Prysby

☐ **If this box is marked see attached special conditions.**

Instructions: Complete items 1 through 5 above and 6 through 21 on the following pages of this application. Print or type all information except for signatures. Mail completed application, plans and specifications, and any attachments to the DEQ District Office having jurisdiction in the area of the proposed construction.

Please Note:

a. This **PERMIT** only authorizes the construction, alteration, addition or improvement of the water system described herein and is issued solely under the authority of 1976 PA 399, as amended.
b. The issuance of this **PERMIT** does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other DEQ permits, or approvals from other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the date of issuance in accordance with R 325.11306, 1976 PA 399, administrative rules, unless construction has been initiated prior to expiration.
d. Noncompliance with the conditions of this permit and the requirements of the Act constitutes a violation of the Act.
e. Applicant must give notice to public utilities in accordance with 1974 PA 53, (MISS DIG), being Section 460.701 to 460.718 of the Michigan Compiled Laws, and comply with each of the requirements of that Act.
f. All earth changing activities must be conducted in accordance with the requirements of the Soil Erosion and Sedimentation Control Act, Part 91, 1994 PA 451, as amended.
g. All construction activity impacting wetlands must be conducted in accordance with the Wetland Protection Act, Part 303, 1994 PA 451, as amended.
h. Intentionally providing false information in this application constitutes fraud which is punishable by fine and/or imprisonment.
i. Where applicable for water withdrawals, the issuance of this permit indicates compliance with the requirements of Part 327 of Act 451, Great Lakes Preservation Act.

6. **Facilities Description** – In the space below provide a detailed description of the proposed project. Applications without adequate facilities descriptions **will be returned.** SEE EXAMPLES BELOW. Use additional sheets if needed.

Improvements to the City of Flint WTP to enable treatment of Flint River water on an interim basis until the KWA Lake Huron Water Supply is available for connection and use by the City of Flint:

PHASE II, SEGMENT I - INITIAL WATERMAIN CUT-IN / REHABILITATION (@WTP):
* Replace existing 25 MGD HSP #1 at Pump Station No. 4 with a new 700 HP, vertically mounted, split-case centrifugal pump rated for 15 MGD at 185' TDH. New pump suction and discharge piping, valves and supports will also be provided.
* Construction of new ozone system LOX/LIN storage facility to provide system redundancy and a minimum of 30 days chemical storage. A new concrete containment structure will be constructed adjacent to the existing LOX/LIN storage facility. The new LOX and LIN tanks will have nominal capacities of 9000 gal. and 525 gal., respectively.
* Installation of Midpoint Chlorination. A 3"x6" dual walled chlorine solution line, approx. 665 LF, will be installed from the existing chlorine room at Pump Station No. 4 to a diffuser in the filter influent channel at Plant 2. The chlorine gas feed system shall consist of four 500 ppd feed systems (total 2000 ppd) to be installed by City personnel. Each 500 ppd system consists of a ton cylinder mounted vacuum regulator, control panel, ejector, and misc. piping, tubing & valves.
* Approx. 850 LF 42" raw watermain connection from existing 48" and 36" mains that feed the plant to convey KWA raw water to the Ozone Building. Work includes a 54x48 cross to make the initial connection at the Ozone Building, buried yard butterfly valves, access and air release manholes, and cathodic protection test stations.

PHASE II, SEGMENT III - ELECTRICAL IMPROVEMENTS (@WTP):
* Plant substation improvements, including two new 2500 kW transformers and switchgear. The substation switchgear has been fabricated with two utility main breakers, one generator breaker and two tie breakers. So provisions are in place for a future permanent generator. If a temporary generator is needed in the event of an outage to both independent utility services, provisions are in place to temporary cable a large portable generator through a manhole, duct bank and cable tray system to the generator breaker in the substation switchgear
* Plant 2 electrical improvements, including two new 500 kW transformers and switchgear.
* Pump Station No. 4 improvements, including new switchgear and VFD for HSP #1.

EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES	
Water Mains	500 feet of 8-inch water main in First Street from Main Street north to State Street. OR 250 feet of 12-inch water main in Clark Road from an existing 8-inch main in Third Avenue north to a hydrant.
Booster Stations	A booster station located at the southwest corner of Third Avenue and Main Street, and equipped with two, 15 Hp pumps each rated 150 gpm @ 200 feet TDH. Station includes backup power and all other equipment as required for proper operation.
Elevated Storage Tank	A 300,000 gallon elevated storage tank located in City Park. The proposed tank shall be spherical, all welded construction and supported on a single pedestal. The tank shall be 150 feet in height, 40 feet in diameter with a normal operating range of 130 – 145 feet. The interior coating system shall be ANSI/NSF Standard 61 approved or equivalent. The tank will be equipped with a cathodic protection system, and includes a tank level control system with telemetry.
Chemical Feed	A positive displacement chemical feed pump, rated at 24 gpd @ 110 psi to apply a chlorine solution for Well No. 1. Chlorine is 12.5% NaOCL, ANSI/NSF Standard 60 approved and will be applied at a rate of 1.0 mg/l of actual chlorine.
Water Supply Well	Well No. 3, a 200 foot deep well with 170 feet of 8-inch casing and 30 feet of 8-inch, 10 slot screen. The well will be equipped with a 20 Hp submersible pump and motor rated 200 gpm @ 225 feet TDH, set at 160 feet below land surface.
Treatment Facilities	A 5 million gpd water treatment plant located at the north end of Second Avenue. The facility will include 6 low service pumps, 2 rapid mix basins, 4 flocculation/sedimentation basins, 8 dual media filters, 3 million gallon water storage reservoir and 6 high service pumps. Also included are chemical feed pumps and related appurtenances for the addition of alum, fluoride, phosphate and chlorine.

General Project Information – Complete all boxes below.

7. Design engineer's name, engineering firm, address, phone number, and email address:

Jeremy N. Nakashima, PE
Lockwood, Andrews & Newnam, Inc.
1 Oakbrook Terrace, Suite 207
Oakbrook Terrace, IL 60181
630-495-4123 / jnnakashima@lan-inc.com

8. Indicate who will provide project construction inspection:
☒ Organization listed in Box 1.
☒ Engineering firm listed in Box 7.
☐ Other - name, address, and phone number listed below.

9. Is a basis of design attached?
☒ YES ☐ NO

If no, briefly explain why a basis of design is not needed. Submitted previously under separate cover.

10. Are sealed and signed engineering plans attached?
☒ YES ☐ NO

If no, briefly explain why engineering plans are not needed. Plans and specs submitted previously under separate cover.

11. Are sealed and signed construction specifications attached?
☒ YES ☐ NO

If specifications are not attached, they need to be on file at DEQ.

12. Were Recommended Standards for Water Works, Suggested Practice for Water Works, AWWA guidelines, and the requirements of Act 399 and its administrative rules followed?
☒ YES ☐ NO

If no, explain which deviations were made and why.

13. Are all coatings, chemical additives and construction materials ANSI/NSF or other adequate 3rd party approved?
☒ YES ☐ NO

If no, describe what coatings, additives or materials did not meet the applicable standard and why.

14. Are all water system facilities being installed in the public right-of-way or a dedicated utility easement? (For projects not located in the public right-of-way, utility easements must be shown on the plans.)
☐ YES ☒ NO

If no, explain how access will be obtained. Most work will be on City owned property, except forcemain.

15. Is the project construction activity within a wetland (as defined by Section 324.30301(d)) of Part 303, 1994 PA 451?
☐ YES ☒ NO

If yes, a wetland permit must be obtained.

16. Is the project construction activity within a 100-year floodplain (as defined by R 323.1311(e)) of Part 31, 1994 PA 451, administrative rules?
☐ YES ☒ NO

If yes, a flood plain permit must be obtained.

17. Is the project construction activity within 500 feet of a lake, reservoir, or stream?
☒ YES ☐ NO

If yes, a Soil and Erosion Control Permit must be obtained or indicate if the owner listed in box 2 of this application is an Authorized Public Agency (Section 10 of Part 91, 1994 PA 451) ☐ Owner is APA.

18. Will the proposed construction activity be part of a project involving the disturbance of five (5) or more acres of land?
☐YES ☒NO
If yes, is this activity regulated by the National Pollutant Discharge Elimination System storm water regulations?
☐YES: NPDES Authorization to discharge storm water from construction activities must be obtained.

☐NO: Describe why activity is not regulated:
Please call 517-241-8993 with questions regarding the applicability of the storm water regulations.

19. Is the project in or adjacent to a site of suspected or known soil or groundwater contamination?
☐YES ☒NO

If yes, attach a copy of a plan acceptable to the DEQ for handling contaminated soils and/or groundwater disturbed during construction. Contact the local DEQ district office for listings of Michigan sites of environmental contamination.

20. IF YOU ARE A CUSTOMER/WHOLESALE/BULK PURCHASER, COMPLETE THE FOLLOWING

1) Name and WSSN of source water supply system (seller) _____

2) Does the water service contract require water producer/seller to review and approve customer/wholesale/bulk purchaser water system construction plans?
☐YES ☐NO

If yes to #2, the producer/seller approval letter must be attached when submitted to DEQ.

21. **Owner's Certification** The owner of the proposed facilities or the owner's authorized representative shall complete the owner's certification. It is anticipated that the owner will either be a governmental agency (city, village, township, county, etc.) or a private owner (individual, company, association, etc.) of a Type I public water supply.

OWNER'S CERTIFICATION

I, BRENT F. WRIGHT (name), acting as the WATER PLANT SUPERVISOR (title/position) for
(print) (print)

CITY OF FLINT (entity owning proposed facilities) certify that this project has
(print)

been reviewed and approved as detailed by the Plans and Specifications submitted under this application, and is in compliance with the requirements of 1976 PA 399, as amended, and its administrative rules.

Signature* 3-31-2014 Date (810) 787-6537 Phone

*Original signature only, no photocopies will be accepted.

PROJECT BASIS OF DESIGN – FOR WATER MAIN PROJECTS

PROJECT NAME: _____

For this PROJECT the following information must be provided per Act 399 unless waived by the Department. For projects other than water main installation, or if additional space is needed, attach separate sheet(s) with detailed Basis of Design calculations.

A. A general map of the initial and ultimate service areas
☐ Included on engineering plans ☐ Attached separately

B. Number of service connections served by this permit application _____

C. Total number of service connections ultimately served by entire project _____

D. Residential Equivalent Units (REUs) served by this permit application _____

E. Total Residential Equivalent Units (REUs) ultimately served by entire project _____

F. Water flow rates for proposed project based on REUs listed in "D' and "E" above

1. Initial design average day flow (mgd) _____
2. Initial design maximum day flow (mgd) _____
3. Total design average day flow (mgd) _____
4. Total design maximum day flow (mgd) _____
5. Required fire flows: (1) _____ gpm for _____ hours

G. Actual flows and pressures of existing system at the connection point(s) (2)
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi

H. Estimated minimum flows and pressures within the proposed water main system (3) _____ gpm at _____ psi

(1) Every water system must decide what levels of fire fighting flows they wish to provide. Fire flow should be appropriate for the area (residential, commercial, industrial) being served by the project. Typical fire flow rates can be obtained from the water supply, local fire dept., ISO or AWWA. The water system must then be designed to be able to provide the required fire flows while maintaining at least 20 psi in all portions of the distribution system.

(2) Flows and pressures at the connection points must be given to determine if the existing water main(s) are able to deliver water to the new service area. These numbers can be obtained from a properly modeled and calibrated distribution system hydraulic analysis or hydrant flow tests performed in the field. If more than one connection is proposed, list as needed.

(3) List what the estimated minimum flows can be expected in the proposed water mains based on estimated water demands, head losses, elevation changes and other factors that may affect flows, such as dead end mains.

Lockwood, Andrews & Newnam, Inc.

PLANNING

ENGINEERING

PROGRAM MANAGEMENT

Est. 1935

AUSTIN, TX
CHICAGO, IL
CLEARWATER, FL
COLLEGE STATION, TX
DALLAS, TX
FLINT, MI
FORT WORTH, TX
HOUSTON, TX
HUNTINGTON BEACH, CA
LAS VEGAS, NV
LOS ANGELES, CA
MIAMI, FL
MILPITAS, CA
PHOENIX, AZ
SACRAMENTO, CA
SAN ANTONIO, TX
SAN MARCOS, TX
WACO, TX

TRANSMITTAL

Filing Data Code 1-07

☐ UPS ☐ FEDEX
☐ DELIVERY SERVICE ☒ HAND DELIVER ☐ OVERNIGHT
☐ REGULAR MAIL ☐ PICK-UP ☐ OTHER Extranet(To PM)

To: Mr. Steve Busch, PE	**Date** 4-8-14
	Project Number 130-10701-001
Company: MDEQ	**Routing:**
Address: 525 WEST ALLEGAN STREET, Lansing, MI 48933	
Project: City of Flint Water Treatment Plant Improvements.	

We Are Sending You:		These Are Transmitted:
☐ Shop Drawings	☐ Reports	☐ As Requested
☐ Original Drawings	☐ Submittal Data	☒ For Your Use
☒ Prints	☐ Proposal	☒ For Review and Comment
☐ Specifications	☐ As Noted	☐ For Your Signature

Quantity	Description
2	22x34 Plans - Phase II, Segment 1 – Rehabilitation
2	22x34 Plans - Phase II, Segment 1 – Initial Watermain Cut-In
2	22x34 Plans - Phase II, Segment II – Lime Residual Disposal
2	Final Bray Road Lime sludge management Plan
1	Updated page 2 for permit applications
1	LAN Team Response to MDEQ Review comments

Remarks

These plans are being submitted for permit issuance as discussed.

DEQ
RESOURCE MANAGEMENT DIVISION
APR 08 2014
LANSING DISTRICT

Distribution	Prepared By
1- Daugherty Johnson 2- Brent Wright 3- File	Samir Matta, PE

1311 SOUTH LINDEN ROAD
SUITE B
FLINT, MI 48532
TEL 810.820.2682
FAX 810.820.2703
www.lan-inc.com

If enclosures are not as noted, kindly notify us at once.

B-018-11

Flint WTP Improvements – Phase II, Segments I, II, and III
Responses to MDEQ Review Comments dated 4-3-2014

The MDEQ review comments dated 4-3-14 have been addressed as noted in the responses below. Revised drawings have also been prepared in conjunction with these responses and have been included in the attached revised drawing sets for Phase II, Segments I, II, and III.

DEQ
RESOURCE MANAGEMENT DIVISION
APR 08 2014
LANSING DISTRICT

Phase II – Segment 1 - Watermain Cut-in Plans

- **Mid-Pt Chlorination - update plans to depict the additional anti-siphon/ball valve as described in your response to our March 19, 2014 comments. Most likely to be added to Sheet C-508.**

  Response: The anti-siphon/ball valve is shown on revised Sheet C-104, dated 4-7-14.

- **Include a full-sized mid-point chlorination system schematic with the updated plans.**

  Response: The mid-point chlorination system schematic has been included in the Phase II, Segment I – Initial Watermain Cut-in drawings as Sheet C-509, dated 4-7-14.

- **It appears that make-up water and chlorine gas are not combined at the chlorine feeder (panel w. rotometer, vacc. monitor, auto. feed control valve, etc.) for production of liquid chlorine. Instead, this appears to take place at the ejector/check valve assembly on the plant supply line. Please confirm. If gas under vacuum is conveyed to the ejector at the plant supply line, the gas piping must be Schedule 80 seamless steel tubing. Please confirm. This can be included on the chlorination system schematic.**

  Response: The above description of the midpoint chlorination system is essentially correct. As shown on Sheet C-509, the mid-point chlorination system is a vacuum system. The vacuum regulators are mounted directly to the chlorine storage cylinders. Vacuum lines run from the regulators to the chlorinator control panels where feed rate is controlled. Vacuum lines are then connected from the control panel to ejectors, where water supply flowing through the ejectors creates the vacuum required to pull gas from the storage tanks. While the ejectors are not located in the control panel, it is common to have the ejectors remotely mounted from the control panels. A review of the 10 State Standards requirement for Schedule 80 seamless steel tubing appears to be for pressure gas feed systems, and not vacuum gas feed systems as proposed for Flint. As such, the recommended vacuum line material for a 500

ppd system is 5/8" O.D. flexible polyethylene plastic tubing (see attached information from Hydro Instruments).

Please provide 2 full-sized sets of Watermain Cut-in Plans that include the requested information and revisions.

Phase II - Segment 1 - WTP Rehabilitation Plans

- **LOX/LN Storage & Piping – update plans to depict revised sheets D2-102 and D2-601. The revisions were made to clarify the gas piping configuration.**

  Response: Revised drawings D2-101, D2-102, D2-301, D2-502, and D2-601 have been included in the updated plan set.

- **The existing LOX storage tank will provide approximately 16 days storage at max design rate at 12.0 MGD until the second tank is installed. The Act 399 permit will be issued with a condition that the MDEQ is provided a copy of the contract between the city and the LOX supplier that specifies the maximum delivery time. The LOX system shall be operated such that a minimum of 5 days storage is maintained in the LOX tank at all times.**

  Response: The City will provide MDEQ a copy of the contract between the City and their LOX supplier under separate cover. LOX can be supplied within 24 hours of when a purchase order is issued.

- **Mid – Point Chlorination (Chlorine room) - revise sheets C5-105 and C5-508 to show deletion of the chlorine gas scrubber system.**

  Response: Sheets C5-105, C5-508, and EP6-101, which are all specific to the chlorine scrubber work only, have been deleted in their entirety from the updated plan set.

- **Revise the ventilation intake duct detail (Sheet C5-508) to as described in your response.**

  Response: This intake duct detail is no longer applicable as it is for the chlorine scrubber system, which has been deleted. As noted in the previous MDEQ review comment responses, the City will extend the existing ventilation intake ductwork in the existing Chlorine Storage Room to finished floor level. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see Note 7 of revised drawing Sheet C-103.

- **Add panic hardware to chlorinator room door (east and west exits).**

  Response: The City will perform this work. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see Note 8 of revised drawing Sheet C-103.

- **The existing door between P.S. 4 and the chlorine gas storage room should be closed off such that the chlorine gas storage room and chlorinator room are only assessable from the outside. Although an improved door sweep is proposed, door sweeps are not failsafe in a catastrophic gas release and such an event could jeopardize the entire P.S. #4.**

  Response: The City will perform this work. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see notes on revised drawing Sheet C-103.

- **Raw Water Piping – the proposed 54X42 cross provides minimal vertical separation (approximately 6-inches). A pair concrete cradles installed on each side of the 54-inch concrete main will mitigate the force of the 42-inch main installed above at the crossing. A condition will be added to the Act 399 permit to field adjust the 42-inch main installation to maximize the vertical separation at the crossing.**

  Response: The Contractor is required to field verify the elevation of the existing 54" pipeline. The City or the City's representative onsite observing construction will coordinate with the Contractor to ensure that the clearance between the 42" and 54" pipelines is increased to the maximum extent practical.

Please provide 2 full-sized sets of WTP Rehabilitation Plans that include the requested information and revisions.

Phase II – Segment 2 - Bray Road Sludge Lagoon

Provide 2 full-sized sets of construction plans for proposed work at the Bray Road sludge lagoon. Separation between the concrete disposal area the lime sludge disposal area by metal sheet piling, as discussed in our meeting, needs to be depicted.

Response: 2 full sized sets of construction plans of proposed work at the Bray Road Sludge Lagoon are included for your review and file. The separation barrier between the concrete disposal area and the lime sludge disposal area will be accomplished by

establishing a clay barrier that extends to the bottom of the original lagoon bottom as shown in the detail on sheet C-501. The separation barrier will be constructed within the lime sludge lagoon away from the concrete disposal area as to provide complete separation as discussed.

Prepare final Bray Road Lime Sludge Management Plan. The plan also needs to include establishment of a level working surface in the west portion of the lagoon and removal of the island.

Response: A final version of the Bray Road Lime Sludge Management Plan is being included with this final submittal. A level working surface of 738.5' has been designated within the sludge lagoon after the pump station is operational. All debris or vegetation growth within the 742' elevation within the sludge lagoon is intended to be removed and cleared by the contractor.

The Act 399 permit will also include a condition requiring the sheet piling to be driven deep enough into native soil to maintain its structural integrity for removal of waste material on the exterior portion of the lagoon.

Response: Sheet piling is no longer being used as the separation barrier based on further discussion with the contractor and availability. A clay berm will be constructed for the full depth within the lime sludge lagoon using the original bottom of the sludge lagoon as a base using the proposed alignment proposed for the sheet piling.

Act 399 Permit Applications:

WTP Rehabilitation:

Part 6 (Facilities Description) needs to discuss the provisions for the stand-by generator. The description needs to be added in the Phase II – Segment III – Electrical Improvements (@WTP) – (i.e. transfer switch, universal generator connection)

Response: See attached revised Part 6 of the Act 399 Permit Application forms.

Bray Road (Flint WTP Phase II, Segment II – Lime Residual Disposal)

Please revise Part 6 (Facilities Description) since a berm-liner system will not be used to separate the lime sludge area from the concrete debris area. Eliminate "Berm/liner" from the statement: "Berm/liner or Sheet Piling improvements to separate concrete debris from lime sludge."

Response: See attached revised Part 6 of the Act 399 Permit Application forms.

MDEQ Comments & LAN's Responses

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
April 3, 2014

Phase II – Segment 1 - Watermain Cut-in Plans

- Mid-Pt Chlorination - update plans to depict the additional anti-siphon/ball valve as described in your response to our March 19, 2014 comments. Most likely to be added to Sheet C-508.

- Include a full-sized mid-point chlorination system schematic with the updated plans.

- It appears that make-up water and chlorine gas are not combined at the chlorine feeder (panel w. rotometer, vacc. monitor, auto. feed control valve, etc.) for production of liquid chlorine. Instead, this appears to take place at the ejector/check valve assembly on the plant supply line. Please confirm. If gas under vacuum is conveyed to the ejector at the plant supply line, the gas piping must be Schedule 80 seamless steel tubing. Please confirm. This can be included on the chlorination system schematic.

Please provide 2 full-sized sets of Watermain Cut-in Plans that include the requested information and revisions.

Phase II - Segment 1 - WTP Rehabilitation Plans

- LOX/LN Storage & Piping – update plans to depict revised sheets D2-102 and D2-601. The revisions were made to clarify the gas piping configuration.

- The existing LOX storage tank will provide approximately 16 days storage at max design rate at 12.0 MGD until the second tank is installed. The Act 399 permit will be issued with a condition that the MDEQ is provided a copy of the contract between the city and the LOX supplier that specifies the maximum delivery time. The LOX system shall be operated such that a minimum of 5 days

Act 399 Permit Applications:

WTP Rehabilitation:

Part 6 (Facilities Description) needs to discuss the provisions for the stand-by generator. The description needs to be added in the Phase II – Segment III – Electrical Improvements (@WTP) – (i.e. transfer switch, universal generator connection)

Bray Road (Flint WTP Phase II, Segment II – Lime Residual Disposal)

Please revise Part 6 (Facilities Description) since a berm-liner system will not be used to separate the lime sludge area from the concrete debris area. Eliminate "Berm/liner" from the statement: "Berm/liner or Sheet Piling improvements to separate concrete debris from lime sludge."

storage is maintained in the LOX tank at all times.

- Mid – Point Chlorination (Chlorine room) - revise sheets C5-105 and C5-508 to show deletion of the chlorine gas scrubber system.

- Revise the ventilation intake duct detail (Sheet C5-508) to as described in your response.

- Add panic hardware to chlorinator room door (east and west exits).

- The existing door between P.S. 4 and the chlorine gas storage room should be closed off such that the chlorine gas storage room and chlorinator room are only assessable from the outside. Although an improved door sweep is proposed, door sweeps are not failsafe in a catastrophic gas release and such an event could jeopardize the entire P.S. #4.

- Raw Water Piping – the proposed 54X42 cross provides minimal vertical separation (approximately 6-inches). A pair concrete cradles installed on each side of the 54-inch concrete main will mitigate the force of the 42-inch main installed above at the crossing. A condition will be added to the Act 399 permit to field adjust the 42-inch main installation to maximize the vertical separation at the crossing.

Please provide 2 full-sized sets of WTP Rehabilitation Plans that include the requested information and revisions.

Phase II – Segment 2 - Bray Road Sludge Lagoon

Provide 2 full-sized sets of construction plans for proposed work at the Bray Road sludge lagoon. Separation between the concrete disposal area the lime sludge disposal area by metal sheet piling, as discussed in our meeting, needs to be depicted.

Prepare final Bray Road Lime Sludge Management Plan. The plan also needs to include establishment of a level working surface in the west portion of the lagoon and removal of the island.

The Act 399 permit will also include a condition requiring the sheet piling to be driven deep enough into native soil to maintain its structural integrity for removal of waste material on the exterior portion of the lagoon.

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
March 19 , 2014

Segment 1 - Cut –in Piping

The detail shows air-release manholes with corp. stops? How will the air release operation be executed? Means to drain the manhole?

Written response needed.....

Segment 1 – WTP Rehab

1. Raw Water Piping – Maintain back-up supply from Gen Co. during interim operation at C.S. #2. Sheet C5-102

   54X42 cross (Sheet C5-501 & C5-101) only 6-inches – Support?

   Air-release manhole – same as Cut-in piping

   Current yard piping diagram?

Written response needed on the first 3 items. Yard piping diagram will be a work in progress.

2. Mid-Point CL2 - Basis of design provided

   - Scale – use existing or proposed? If poposed - type, capacity
   - Scrubber?
   - Room air-exchange rate ?
   - Pipe penetrations – discuss protective seal
   - Floor drains – discuss
   - Door sweep - discuss
   - Scrubber piping – lower intake

8 in 516 6793

- Check valve/anti-siphon at influent channel - include in final

3. High Service Pump

   Will mechanical ball valve operate like a check valve in event of unexpected pump shut-down?

   TDH of current pump and proposed pump?
   Conformance of proposed pump TDH with system head curve?

   Written response needed.....

4. LOX/LN Storage

   Piping configuration clarified
   The LN calculation (71 ppd) is not clear. Is there a % concentration or transfer efficiency?

5. Electrical improvements

   Are operation of the pumps being split with the MCC or are multiple MCCs being provided?

   Written response needed.....

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
February 27, 2014

2 FKNS
– ACCESS
– MONNITE a.R. line to CORP
– to connect to corp
to accomodate air
Jetting fittings

Segment 1 - Cut –in Piping

✓ **The detail shows air-release manholes with corp. stops? How will the air release operation be executed? Means to drain the manhole?**
↳ Pump em down

Segment 1 – WTP Rehab

✓ 1. **Raw Water Piping – Maintain back-up supply from Gen Co. during interim operation at C.S. #2. Sheet C5-102** → not good
just prior to line A available

✓ **54X42 cross (Sheet C5-501 & C5-101) only 6-inches – Support?**
↳ Field adjust the steel WM – maximize the vert sep.

✓ **Air-release manhole – same as Cut-in piping**
↳ same design
SAME op. concept

Current yard piping diagram? – work in Progress

2. **Mid-Point CL2 - Basis of design needed**

- **Application rate (both mid-pt & post for CT)**
- **CL2 gas max dosage LBs/Day**
- **Scale – type, capacity** ✓ 4 NEW SCALETRON Ind.
- **Rotometer (lbs/day)**
- **Vacc reg, injector, educator (size)**
- **Scrubber capacity** – not being installed
- **Room air-exchange rate** 1/3.3 MIN
- **Pipe penetrations – Sheet C-103 – linkseal – gas resistant?** – will inspect & seal
- **Floor drains** – to be plugged
- **Door sweep** – New better sealing sweeps to be provided
- **Safety features – obs window, fan, lights, switches, panic bar**
- **Scrubber piping – lower intake** → will extend to floor w 90° bend
- **Check valve/anti-siphon at influent channel** – yes

hydraulic actuator
will close on system failure/shut-down

3. **High Service Pump**

   Will mechanical ball valve operate like a check valve in event of unexpected pump shut-down?

   185 will match w. smaller pump

   TDH of current pump and proposed pump?
   Conformance of proposed pump TDH with system head curve?

4. **LOX/LN Storage**

   LOX & LN piping clarification – Sheet D2-102 & D2-601
   BOD for storage
   Ozone was designed at 4.0 mg/l max dose @ 36 MGD (Sec. 3.5 WTP BOD)

   Ozone max dose at 18.0 MGD is 650 Lbs/day

   How many GPD does this equate to?

5. **Electrical improvements**

   Are operation of the pumps being split with the MCC or are multiple MCCs being provided?

One switchgear - dual feed
Two breakers - kirk key

Flint WTP Improvements – Phase II, Segments I, II and III

Responses to MDEQ Review Comments dated 3/19/2014

Segment I – Initial Watermain Cut-in

1. Detail 2, Sheet C-504, "Air Release & Access Manhole," shows a 2" corp stop for air release. These are intended to be manual air release valves for exhausting air upon initial filling of the pipeline or after maintenance has been performed and refilling the pipeline. The manhole structure will be checked periodically and pumped out with a portable sump pump as part of the normal plant maintenance program.

Segment I – Rehabilitation

1. Raw Water Piping
   a. Maintain back up supply from Genesee County during interim operation at C.S. #2. Installation of the 42" raw water piping has been delayed until the KWA project is closer to being ready to supply water to the City. This will allow the City to maintain the backup supply from Genesee County during interim operation.
   b. The crossing of the new 42" steel pipe over the existing 54" concrete pipe is shown in plan on drawing sheet C5-101, with Detail 5, Sheet C5-501 showing how the 42-inch line will be supported. As shown on Detail 5, Sheet C5-501, the new 42-inch line will have concrete pipe cradles constructed on either side of the existing 54" pipe, maintaining a minimum clearance of 12" on either side of the 54" pipe. Pipe loads from the 42" line will then be transferred to the pipe cradles and into the soil, and not the 54" pipe. The 6" clearance between the two pipes will be backfilled with CLSM material as it will be impossible to compact typical granular bedding material under the 42" pipe.
   c. Detail 2, Sheet C5-505, "Air Release & Access Manhole," shows a 2" corp stop for air release. These are intended to be manual air release valves for exhausting air upon initial filling of the pipeline or after maintenance has been performed and refilling the pipeline. The manhole structure will be checked periodically and pumped out with a portable sump pump as part of the normal plant maintenance program.
   d. See attached color coded yard piping diagram.

2. Midpoint Chlorination
   a. Four (4) new scales will be provided for monitoring chlorine usage from ton containers. Scales shall be as manufactured by Scaletron Industries Ltd. with a load range of 0 to 4000 lbs.
   b. The City has not been able to determine that the chlorine scrubber is a requirement of any applicable code. At this time, the City will not be installing the chlorine scrubber shown on the design drawings and will rely on the existing ventilation system to exhaust air from the Chlorine Storage Room.
   c. The existing ventilation in the Chlorine Storage Room was tested to have a capacity of 18.3 air changes per hour, or 0.305 air changes per minute. Therefore, one room volume air

change would take approximately 3.3 minutes with the current ventilation system. See attached test results. Due to the size of the existing Chlorine Storage Room, a ventilation system of 1 air change per minute is not practical. While the existing ventilation system capacity is less than 1 air change per minute, it appears to be in compliance with 10 State Standards as lesser rates may be considered in cases where 1 air change per minute is not appropriate due to the size of the room.

d. WTP staff will identify and inspect all proposed and existing piping and conduit wall penetrations in the Chlorine Storage Room and seal as necessary to prevent gas leakage into other parts of Pump Station No. 4.

Door sweeps not fail SAFE

e. Existing floor drains in the Chlorine Storage Room were for condensate from the old chlorine evaporator system. These drains will no longer be used and will be plugged by WTP staff.

f. WTP staff will attach new door sweeps with better seals at existing doors as required.

g. WTP staff will extend existing ventilation intake ductwork to finished floor level with 90-degree bends.

h. Per Addendum No. 1, an Anti-siphon / Back Pressure Valve and additional ball valve shall be added just prior to the trough wall penetration. The anti-siphon / back pressure valve shall be PVC and designed for use with chlorine systems. The valve shall be a LMI #35856, Walchem E90422, or engineer approved equivalent. The valve shall be installed between the two ball valves to allow for isolation during servicing. The valve shall be located above the high water level in the trough. The Contractor shall install a 1" drain line from the relief port to the finished floor elevation of the pipe gallery.

Would like to Read Cl_2 dosage

3. High Service Pump
   a. The new 16" pump control ball valve for HSP #1 replaces the existing pump control ball valve in kind and will operate in the same manner as the existing valve. The valve will act like a check valve upon emergency shutdown of the pump through the use of a hydraulic cylinder actuator that will automatically close the valve. The cylinder actuator uses hydraulic water system pressure to supply the energy required to close the valve.
   b. The existing HSP #1 is rated for 25 MGD at 185' TDH. The proposed replacement HSP #1 is rated for 15 MGD at 185' TDH, matching the head condition of the existing pump.
   c. Results from the City's hydraulic model were used to develop system curves for max day and average day, which were used to confirm pump selection. The proposed HSP #1 will operate on a VFD which can be adjusted during operation to meet various duty points depending on demand.

4. LOX/LIN Storage
   a. Nitrogen usage is calculated based on 2.5 % of the oxygen usage:

      2,833 ppd O_2 x 0.025 = 71 ppd N_2

5. Electrical Improvements
   a. The operation of the pumps is contained within a single switchgear at Pump Station No. 4. However, there will be a dual feed coming into the main plant switchgear that will supply redundant power to the plant, including Pump Station No. 4. There will also be two breakers

at the main plant switchgear that feed two different breakers at Pump Station No. 4. Therefore, any one point of failure will not take the system down.

Proposed Scope of Upgrades to Flint WTP

Phase II - Segments I & II

1. Introduction

The City of Flint plans to utilize their existing WTP to provide water on a continuous basis. The city plans to treat water from the Flint River until construction of the proposed KWA supply is complete and the WTP can then be used to treat water from Lake Huron. The following proposed improvements are needed to place the WTP into service next spring. These improvements will remain in service once the KWA is in service.

2. Scope of Work

The proposed upgrades have been categorized into Phase II – Segment I and are to be completed as soon as practical so that the WTP can be utilized to treat water from the river in the spring of 2014. Engineering services will include final design, plans, contract documents, bidding assistance. Since time is of importance, specifications and schematic drawings will also be provided for pre-procurement of long lead item equipment and are outlined within each section below. Contract administration and construction phase services are not included within the initial scope of services.

- Design Progress Meetings: Meet with City staff to provide project status updates and to discuss specific design issues and details in order to facilitate timely design decisions. Meetings will include design team personnel from each discipline as required, City operations staff and administrative staff. Five (5) design progress meetings are included.
- Prepare and update opinion of probable construction cost at for each project bidding document submittal (40%, 80% and Final Draft). Prepare final opinion of probable construction cost prior to bidding.
- Quality Assurance/Quality Control: A Quality Control Plan (QCP) will be developed and implemented specifically for this project. At each project submittal stage, the document deliverables will be checked and reviewed by experienced personnel to ensure that the design meets applicable standards and normal engineering practice.
- Deliverables:
  40% Bidding Documents (Drawings and Technical Specification Outline)
  80% Bidding Documents (Drawings and Technical Specifications)
  Final Draft Bidding Documents (Drawings and Technical Specifications)
  Final Bidding Documents (One printed and one electronic set of Drawings and Technical Specifications
- Bidding Phase
  Conduct pre-bid meeting.
  Respond to contractor inquiries.
  Prepare construction document addenda, as necessary.

Review bids and supporting bid documentation. Prepare bid report summarizing bids, contractor references, and contractor qualifications; make recommendation for contract award.

- Construction Phase
  Review and respond to contractor submittals (First two reviews are included in level of effort, subsequent review cost will be paid for by contractor)
  Respond to contractor's request for information
  Prepare monthly payment documents
  Negotiate and prepare change orders for client review and approval
  Attend monthly project meetings
  Provide periodic onsite technical observer (have included two weeks per month in level of effort)
  Develop record documents (provide one hard and one electronic copy to owner)

Specific Work Tasks:

Pr-P

Item 1 – Chemical Systems / Ozone

The Michigan Department of Environmental Quality (MDEQ) requires 30 days of redundant storage of the chemical used in this treatment process. To bring the rehabilitated plant into regulatory compliance with the chemical storage requirements for primary use, additional storage facilities will need to be constructed for liquid oxygen and nitrogen.

One liquid oxygen and one liquid nitrogen storage tanks and unloading stations identical to the existing units will be installed north of the existing facilities. Details are listed as follows:

- Liquid Oxygen
  Capacity – 9000 gallons
  Diameter – 10 ft (maximum)

  Liquid Nitrogen
  Capacity – 540 gallons
  Diameter –5.5 ft (maximum)

Pre-procurement documents for the liquid oxygen and nitrogen tanks will be provided.

Item 2 – Electrical

The City of Flint Water Treatment Plant (WTP) represents a combination of administrative, process, and maintenance facilities which all require electrical power. At the completion of Phase I of the water treatment plant rehabilitation projects, much of the electrical distribution equipment such as motor control centers (MCCs), power/lighting panels, transformers, and electrical power feeders will have been upgraded. There is, however, significant additional work required to address remaining electrical equipment that has reached a point of obsolescence.

Switchgear in the sub-station was installed around 1960. It is antiquated and difficult to maintain. Very little work has been done to the station since its original installation. The plant has two 46 kV primary feeds into the sub-station. Replacement of the distribution switchgear with current technology

equipment would allow a higher degree of load protection, be serviceable by numerous sources, and have replacement parts availability. When the switchgear is replaced, the plant will have to stay in operation. Brief interruptions of power of selected plant processes could be accommodated during cut over to new equipment.

Proposed Substation Upgrade

- Coordinate upgrades to Consumers 46kV primary feeders to provide a single overhead 46KV primary service
- Replace the two Consumers 2.5kVA substation transformers and overhead structure with two 2.0 to 2.5 kVA 46KV pad-mounted transformers.
- Replace the City's substation switchgear in the substation building.

Pre-procurement documents for the pad mounted transformers and switchgear will be provided.

Pump Station No.4 contains the largest electrical loads in the plant. Four low service pumps and five high service pumps represent a combined total of approximately 4000 horsepower. Additional loads from HVAC, lighting, controls, and chemical feed are about 60 kVA. This represents a total load of 531 amps @ 2400 volts. The existing switchgear in Pump Station No.4 is antiquated and difficult to maintain. Current technology equipment will allow a higher degree of load protection.

Proposed Pump Station No. 4 Improvements

- Replace 2400V switchgear
- Provide one 15 MGD medium voltage VFD

Pre-procurement documents for the medium voltage VFD and switchgear will be provided.

As a base load facility capable of producing water at any time the Flint WTP must have the ability to deal with power outages. In order to meet these electrical need in the event of a loss of power to the plant site or the loss of one of the substation transformers a new standby diesel generator is proposed to be located adjacent to the new substation.

Proposed Standby Power Improvements

- One 2.0 to 2.5 mVA generators and fuel tank. - Planning, But no actual generator

Pre-procurement documents for the generator set will be provided.

There are four 2400V to 480V transformers in Plant 2 that are antiquated and difficult to maintain. Replacement parts are no longer available and reliability is questionable.

Proposed Plant 2 Improvements

- Replace two 300kVA 2.4KV transformer/switchgear.
- Replace two 100kVA 2.4KV transformer/switchgear.

Pre-procurement documents for the transformers and switchgear will be provided.

Item 3 – Mid-Point Chlorination

Mid-point chlorination facilities are proposed to increase reliability of the disinfection process and improve Ct. For this initial stage the existing chlorine equipment in Pump Station No. 4 will be used and a new chlorine solution line will be installed from Pump Station No. 4 to the filter influent channel in Plant 2. A chlorine scrubber system will be installed in Pump Station No.4 to protect against a leaking chlorine ton container.

Proposed Chlorine Improvements

- New chlorine solution line to filter gallery.
- Chlorine system improvements.
- Dry scrubber system.

Item 4 – Low and High Service Pump Station No. 4

As a result of decreased demands, pumps at Pump Station No. 4 are "over-sized" and do not efficiently operate. Some of the pumps experience vibrations in the shafts and steady bearings. The existing pump station will be rehabilitated to replace "over-sized" pumps and obsolete equipment and provide needed maintenance.

Proposed Pump Station No. 4 Improvements

- Install one new High Service Pump (15 MGD @190 feet TH, vertically mounted pumps with 800 HP 2400/4160 V inverter duty motors, with 20 feet of shaft and steady bearings)
- Replacement of existing piping, valves, supports, and bearings
- New intermediate platforms, ladders, & stairs
- New ventilation (for exhausting heat from VFD's)
- Demolition of existing equipment to accommodate new equipment

Pre-procurement documents for the pump, motor, control valves and isolation valves will be provided.

Item 5 – Raw Water Piping Connection

The proposed KWA raw water pipeline will connect to the existing 72" PCCP finished water supply line near Center and Pierson Roads. (East of this connection, the 72" PCCP will be utilized by GCDC-WWS for distribution of finished water in the GCDC-WWS service area.) Raw water from Lake Huron will be conveyed to the WTP site via the 72" PCCP pipeline. On the WTP site, the 72" pipeline will be tapped for a 42" pipe and for a 36" pipe to convey raw water for treatment. Connections to the existing pipe will be made at this time to avoid future plant shutdowns for connections.

Proposed Pump Station No. 4 Improvements

- 48-inch pipe connections
- 36-inch pipe connection
- 54-inch pipe connection

Pre-procurement documents for the valves and connection fittings will be provided.

Phase II – Segment II:

The proposed upgrade for item 6 has been categorized as Phase II – Segment II and is to be completed with the same urgency as the rest of the work so that the WTP can be utilized to treat water from the river in the spring of 2014. However, the use of the Bray Road lagoon for other disposal activities will require that this issue be addressed independently to certain extent as to isolate the problem areas while working with MDEQ to permit its use for lime sludge disposal.

Item 6 – Softening Residuals Disposal

Develop, evaluate, design and implement a lime residuals disposal plan to handle softening sludge for the interim period of operation using the Flint River as a water source. These options may include the use of Bray Road lagoon, construction of temporary dewatering and loading facilities, and other temporary storage options.

The use of Bray Road Lagoon will require additional survey, geotechnical and environmental testing at the site in order to assess the condition of the lime sludge in the basin and to verify the capacity of the lagoon system. Based on the findings of this evaluation, proposed improvements will be designed to accommodate the use of the facility in the interim basis while addressing some of the MDEQ concerns about the site and any unauthorized discharges into the nearby stream. Permitting for site use will be incorporated as part of the overall design improvements at the WTP and submitted to the MDEQ at the 80% design stage for their pre-permit review and comments. A final package will be submitted to the MDEQ at the 100% design stage for permit issuance and approval of work plan.

Pre-procurement documents for specific equipment may be provided as needed.

3. Schedule

The work included in this work authorization is anticipated to be performed in accordance with the following schedule, based on the Notice-To-Proceed (NTP) date of November 1, 2013. For the purposes of this proposal, we anticipate a 3 month design phase and 1 month bid phase. Schedule revisions may be necessary as information becomes available and work priorities change.

Project Milestone	Date
Project Kickoff Meeting	November 6, 2013
Equipment Procurement Documents	December 6, 2013
Submit 40% Bidding Documents	December 18, 2013
Submit 80% Bidding Documents	January 10, 2014
Submit Final Draft Bidding Documents	January 31, 2013
Submit Final Bidding Documents	February 7, 2014
Bid Advertising	February 10, 2014
Pre-Bid Meeting	February 17, 2014
Bid Opening	TBD by City
Recommendation of Contract	TBD by City
Contract Award issued by City	TBD by City

4. Compensation

The Reimbursable Compensation method with a maximum not-to-exceed limit will be used for this contract. Labor rates shall be based on personnel classifications according to the existing rate sheet. Reimbursable expenses shall be invoiced at the actual cost times a factor of 1.0 for processing and handling. The estimated maximum not-to-exceed fee for this project is $962,800 which includes a $15,000 allowance for surveying and $15,000 allowance for geotechnical services.

Description	Fee
Design and Bidding Assistance	$ 752,800
Surveying Allowance	$ 15,000
Geotechnical Allowance	$ 15,000
Construction Phase Services	$ 180,000
Total Maximum Not to Exceed Fee	**$ 962,800**

Any other work beyond the Scope of Services herein will require a subsequent Work Authorization with prior approval from the City.

May 21, 2013

TO: Brent Wright, Supervisor
Water Plant

FROM: Derrick F. Jones,
Purchasing Manager

SUBJECT: SEALED BIDS

Attached are the sealed bids that were received for the annual supply of LOX-Liquid Oxygen for your review. These copies are yours to keep. The proposals were opened on May 14, 2013 under proposals #14-513.

Your review and recommendation are needed as soon as possible. Attach a staff resolution form when you send back your recommendation and make sure that your requisition has been updated and pre-encumbered with the correct price. If your recommendation is under $10,000.00, you do not need to include a staff resolution form.

Please note: if your project is being funded by any grants issued by the federal government, you must go to www.sam.gov to ensure that the selected vendor has not been debarred.

Attachment

AIR LIQUIDE

Mr. Brent Wright

City of Flint, Water Treatment Plant

4500 N. Dort Highway

Flint, MI 48505

Mr. Wright,

Air Liquide Industrial U.S. LP appreciates your business and the opportunity to provide the City of Flint with a reliable and economic supply of bulk liquid oxygen. Air Liquide strives for quick and reasonable turn-around time for your oxygen deliveries when your order is placed with the National Scheduling Center. Air Liquide's typical standard delivery time frame is within 24 to 48 hours upon order.

Thank you and please call me directly at 708-579-7977.

Sincerely,

Amy Waszczak

Amy Waszczak

National Municipal Business Coordinator

Air Liquide Industrial U.S. LP

REQUIREMENTS / TABULATION

Treatment Chemical Specifications

Flint Water Plant

- Product to meet or exceed AWWA Standard B510-00 Column H of Table 1 and ANSI/NSF 60, see attached table.
- Delivery to be by pressurized vessel tanker truck, not to exceed 20 ton deliverable product and conforming to all applicable local, state and federal regulations.
- Trailer must have proper DOT markings, including the nomenclature "Guaranteed by VENDOR to meet the requirements of AWWA B510 Standard for".
- Weight Certificate from certified weigher, supplied by selected vendor for each delivery. Certified liquid meter tickets may be acceptable substitute.
- Purity Standards with certification for every load. Affadavit of certified analysis. 02 Purity must be 99.5%
- Copy to owner of selected vendor's QC/QA program.
- Water Plant Staff training for the initial load to bulk storage.
- The vendor shall contact the Water Plant Supervisor 24 hours prior to delivery to confirm. 810-787-6537.

LOX-LIQUID OXYGEN 99.5%
FOR USE IN STATE MANDATED PLANT TEST RUNS

CONTACT PHONE#: 810.785.7877

FURNISH AS REQUESTED FOR THE PERIOD 7/1/13 - 6/30/14.
APPROXIMATE QUANTITIES, NOT GUARANTEED

FOR MORE INFORMATION CONTACT:
BRENT WRIGHT @810.787.6537 EXT# 3510

LIQUID OXYGEN TO BE USED IN OZONE PROCESS.

$ 0.381 /cu ft. *

Only the specifier has the responsibility and judgment for determining whether a proposed substitution is an "or equal or exceeding" specification. Mfg., model #, and supporting documentation of specifications for alternates must be provided.

* Amendment Number 2 to the existing Bulk Product Agreement is made a part of Air Liquide's bid for bulk liquid oxygen.

THIS PAGE MUST BE COMPLETED AND INCLUDED WITH SUBMITTAL:
The undersigned herby certifies, on behalf of the respondent named in this Certification (the "Respondent"), that the information provided in this offer submitted to the City of Flint is accurate and complete, and that I am duly authorized to submit same. I hereby certify that the Respondent has reviewed all documents and requirements included in this offer and accept its terms and conditions.

Cash Discounts will be computed from the date of receipt of invoice. Prices firm unless stated otherwise by bidder. Delivery can be made in ( ) days ARO (after receipt of order).

Payment Terms: 30 Delivery Dest.: F.O.B. Fed. ID #: 90 0186946
(All Freight Terms are considered F.O.B., Prepaid unless otherwise noted by seller)

COMPANY NAME (Respondent): Air Liquide Industrial US LP
(Printed)
ADDRESS : 5220 East Avenue
CITY/STATE/ZIP : Countryside IL 60525
PHONE : 708-579-7977 FAX: 708 579 7933
EMAIL : amy.waszczak@airliquide.com
PRINT NAME and Title : Amy Waszczak, Municipal Business Coordinator
(Authorized Representative)
SIGNED : Amy Waszczak DATE: 5/13/2013
(Authorized Representative)

Please submit original documents plus one copy.

New vendors are required to complete and submit an IRS W-9 Form and Vendor ACH Form with the City of Flint. Link is available at www.cityofflint.com/finance/purchasing.

Bid results may be viewed next business day online at www.cityofflint.com/finance/purchasing

Technical Bulletin
Vacuum Tubing & Piping

Vacuum Tubing / Piping Sizing Guide for Chlorine & Sulfur Dioxide

Gas Feed Rate	100 ft.	200 ft.	300 ft.	500 ft.	1000 ft.	1500 ft.
50 PPD / 1 kg/h	3/8"	3/8"	1/2"	1/2"	1/2"	5/8"
[illegible]	3/8"	1/2"	5/8"	5/8"	3/4"	3/4"
[illegible]	1/2"	5/8"	3/4"	3/4"	1"	1"
[illegible]	5/8"	3/4"	1"	1"	1-1/2"	1-1/2"
1000 PPD / 20 kg/h	1"	1"	1-1/2"	1-1/2"	1-1/2"	1-1/2"
2000 PPD / 40 kg/h	1"	1-1/2"	1-1/2"	2"	2"	2"
4000 PPD / 80 kg/h	1-1/2"	1-1/2"	2"	2"	2"	3"
6000 PPD / 120 kg/h	1-1/2"	2"	2"	2"	3"	3"

NOTES:

1. In the above table:
   a. 3/8", 1/2" and 5/8" refer to the OD (outer diameter) of flexible polyethylene plastic tubing.
   b. 3/4", 1", 1-1/2", 2" and 3" refer to Schedule 80 PVC rigid piping.

2. The above recommendations are based on calculations limiting friction loss to 0.5" Hg or less.

Hydro Instruments
600 Emlen Way
Telford, PA 18969
Phone: 215.799.0980
Fax: 215.799.0984
Email: sales@hydroinstruments.com
Web Address: www.hydroinstruments.com

Specifications subject to change without notice 2011 Hydro Instruments

WTP - Rehab
phase 2 - Seq 1

CL_2 B&D

GAS CL_2 cut shts

LOX, LN CA/Cs

City of Flint
Water Treatment Plant Improvements
Midpoint Chlorination System Basis of Design

Basis of Design for Midpoint Chlorination:

Q, Design Max Day = 18 MGD
Cl_2 Dosage, Max = 5.5 mg/L [per City of Flint plant staff]
Cl_2 Usage, Max = 18 x 5.5 x 8.34 = 826 ppd Cl_2
Provide minimum 1,000 ppd gas chlorination system.

assume 3.0 mg/l demand
leaves 2.5 mg/l Avail
→ meets 10 states of 4.4.1.2 2.0 mg/l MIN

→ Provides adequate stand-by — 4.4.1.3

Proposed Gas Chlorination System:

1. Four (4) 500 ppd Cl_2 vacuum gas feed systems with chlorine solution piping manifold for total installed capacity of 2,000 ppd Cl_2.
2. Each 500 ppd Cl_2 vacuum gas feed system shall consist of the following:
   a. One (1) 500 ppd vacuum regulator (direct mounted to chlorine ton containers or remote mounted). Each unit shall include an actuator for emergency closure of the chlorine container valve. Vacuum regulators shall be Hydro Instruments Series 700 with integral drip leg and heater.
   b. One (1) wall mounted control panel with the following equipment:
      i. One (1) automatic valve for feed rate control, Hydro Instruments Omni-Valve Model OV-110.
      ii. One (1) 500 ppd rotameter, Hydro Instruments Model RM-701.
      iii. One (1) vacuum monitor, Hydro Instruments Model VM-150.
      iv. One (1) 500 ppd differential pressure regulator, Hydro Instruments Model DP-500.
      v. PVC bypass piping.
   c. One (1) 500 ppd ejector nozzle/check valve assembly, Hydro Instruments Model EJ-5000
3. One (1) existing chlorine gas leak detector as manufactured by MSA.
4. Four (4) existing ton container load cells.

Note: All new equipment shall be as manufactured by Hydro Instruments of Telford, PA. Catalog cutsheets for all new equipment are attached.

Description of Operation:

Each 500 ppd Cl_2 gas feed system will operate based on signals from the plant PLC. Based on operator set dosage, the PLC will send a signal to open the water supply solenoid valve(s) that will allow supply water to flow through the ejector(s) to create the vacuum necessary for gas flow from the ton container(s). If the set point is less than 500 ppd, only one solenoid valve will open. If the set point is greater than 500 ppd, two solenoid valves will open, and the other two 500 ppd systems will remain as standby units. Initially, the dosage will be controlled by the operator manually adjusting the setpoint at the PLC. However, the system has the capability of automatically controlling the feed rate through a flow pacing signal or through a chlorine residual analyzer compound feedback loop. → Auto Proportioning 4.4.1.5

Each 500 ppd system will be fed from a single one ton chlorine container with its own load cell to monitor chlorine usage. The PLC will monitor each load cell and will signal an alarm when the container is empty; the PLC will automatically close the solenoid valve for the 500 ppd system with the empty container and will start one of the standby units so that the empty ton container can be changed out. — auto switch yes

Mark
4.4.1.4

Estimated Chlorine Feed Rates - lbs./day

Examination of previous chlorine demand tests and past plant operation data using Flint River water, shows a chlorine demand around 3.0 mg/L on average. The chart below shows the pounds per day of chlorine that will need to be applied for different flows and different chlorine dosages that may be encountered.

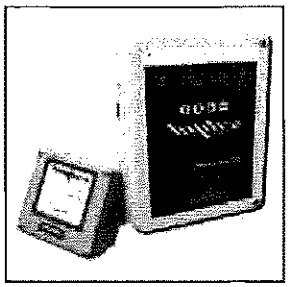
Flow (MG)	Chlorine dosage (mg/L) 3	4	4.5	5	5.5	6	6.5
12	300.2	400.3	450.4	500.4	550.4	600.5	650.5
18	450.4	600.5	675.5	750.6	825.7	900.7	975.8
24	600.5	800.6	900.7	1000.8	1100.9	1201.0	1301.0

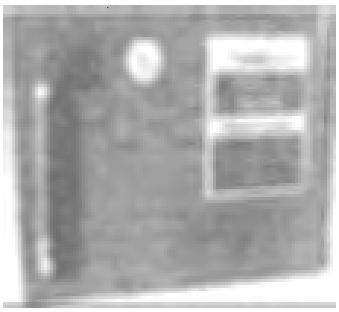
In order to produce a 1.5 mg/L chlorine residual in finished water to meet Ct requirements, the dosage will most likely be between 4.5 & 5.5 mg/L. The demand may increase if ozone production decreases, or if the source water contains large amounts of turbidity during spring runoff, or heavy rains.

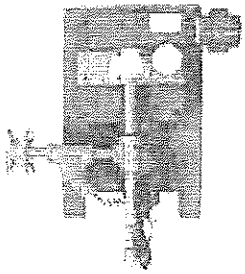
hydro INSTRUMENTS™

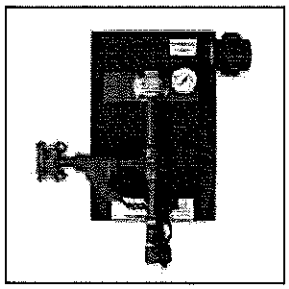
Highest Quality

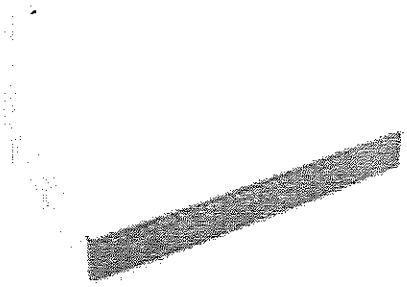
Gas Chlorination Systems

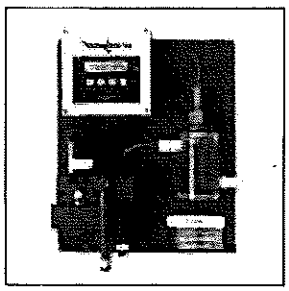












Application: Gas chlorination systems are used for water disinfection and other purposes in a variety of applications. Compared to other disinfection methods, chlorine offers the advantage of a stable and long lasting residual that can remain in the water protecting it from recontamination after treatment. Among chlorination methods, chlorine gas is the most economical and the equipment is also the most reliable and easy to operate. Some of the most common applications for large scale gas chlorination systems are surface water treatment plants, waste water treatment plants, and cooling towers for power plants, oil refineries, etc...Gas chlorination systems are also used in a variety of industrial, mining, and agricultural applications.

Purpose: Regardless of the application, the gas chlorination system will be required to inject chlorine gas into the process water at one or more locations (with the goal of achieving a desired level of residual chlorine to the process water). Different applications have different requirements for the residual chlorine concentration depending on the water quality and the application. Chlorine residual is quantified in units of parts per million (PPM or mg/L). In order to maintain a constant residual in the water, as the process water flow rate increases and decreases the chlorine feed rate should proportionally increase and decrease. It also must be realized that a certain amount of chlorine will be consumed in reactions upon entering the process water and that this amount of chlorine will not be available as chlorine residual. The amount of chlorine residual consumed in this way is sometimes referred to as the chlorine demand of the water (in units of PPM). The chlorine demand is different for every process water and can range from close to zero to over 20 PPM. Keeping the above points in mind, the following equation is used to determine the required chlorine gas feed rate for each chlorine gas injection point:

[Process Water Flow (m^3/hr)] x [Dosage (PPM)] = Chlorine Gas Feed Rate (gr/hr)

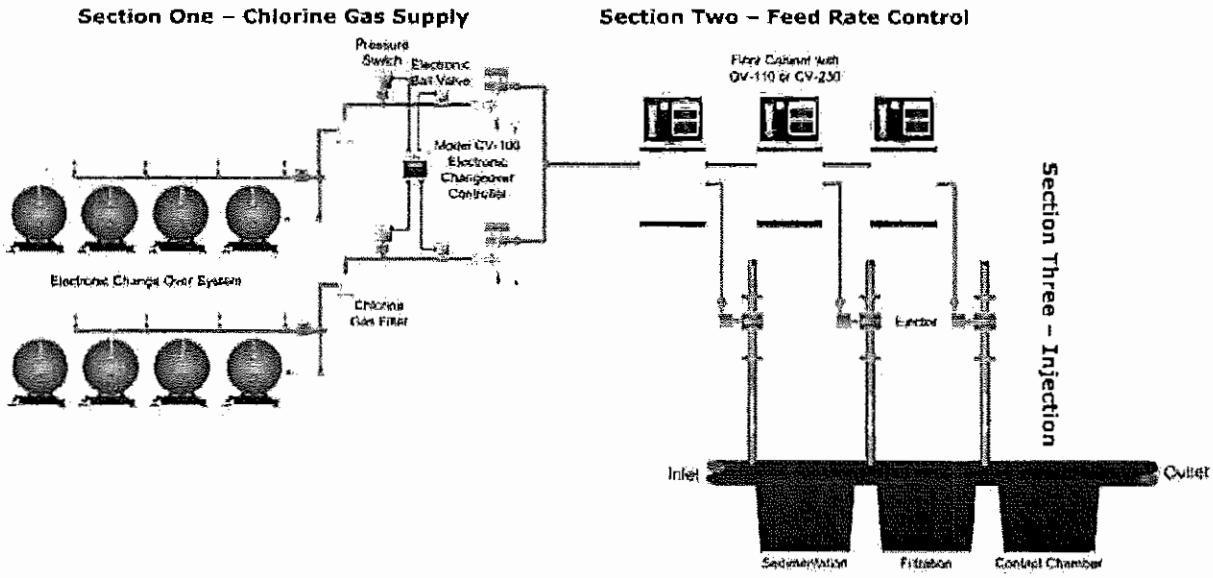
NOTES:

Water Flow (m^3/hr) = Process water flow rate in cubic meters per hour

Dosage (PPM) = [chlorine demand] + [desired chlorine residual]

System Example (Surface Water Treatment Plant): Figure 1 shows a very basic schematic of a surface water treatment plant. The diagram shows three chlorine gas injection points. One gas chlorination system with three injection points is shown in the diagram. The gas chlorination system can be broken down into three sections as indicated in Figure 1.

Figure 1: Surface Water Treatment Plant (Example)



Typical: Gas chlorination systems follow a modular design principle. As seen in Figure 1 above, the gas chlorination equipment can be divided into three sections starting from the chlorine gas containers and ending at the ejectors as follows:

(1) **Chlorine Gas Supply** – This part of the system is designed to provide an uninterupted supply of chlorine gas flowing under vacuum.

(2) **Feed Rate Control** – In this section, equipment is provided to monitor and control the feed rate of chlorine gas to each injection point. The feed rate control can be manual or automatic based on 4-20mA input signals from water flow meters or residual chlorine analyzers. (Step feed control based on switch inputs is also available.)

(3) **Ejector System** – The ejectors create the vacuum that operates the system in an on-off fashion. The chlorine gas enters the water inside the ejector and then the chlorinated water solution is piped to the injection point where it is delivered to the main process water flow.

Safety and monitoring equipment such as gas leak detectors, residual chlorine analyzers, container scales, emergency valve closure systems, emergency repair kits, and chlorine leak absorption systems (scrubber systems) are also available from Hydro Instruments and our sales representatives.

There are many options available for designers to select. This document will review general options for each stage of the system. Please also refer to additional Hydro Instruments product literature for additional details.

Figure 2 is a diagram depicting several of the more common equipment configurations for each part of the gas chlorination system. This figure shows three different options for the chlorine gas supply section and four different options for the feed rate measurement and control section of a system.

Note that one chlorine gas supply section is frequently used to supply chlorine gas to multiple injection points.

Figure 2: System Layout Options

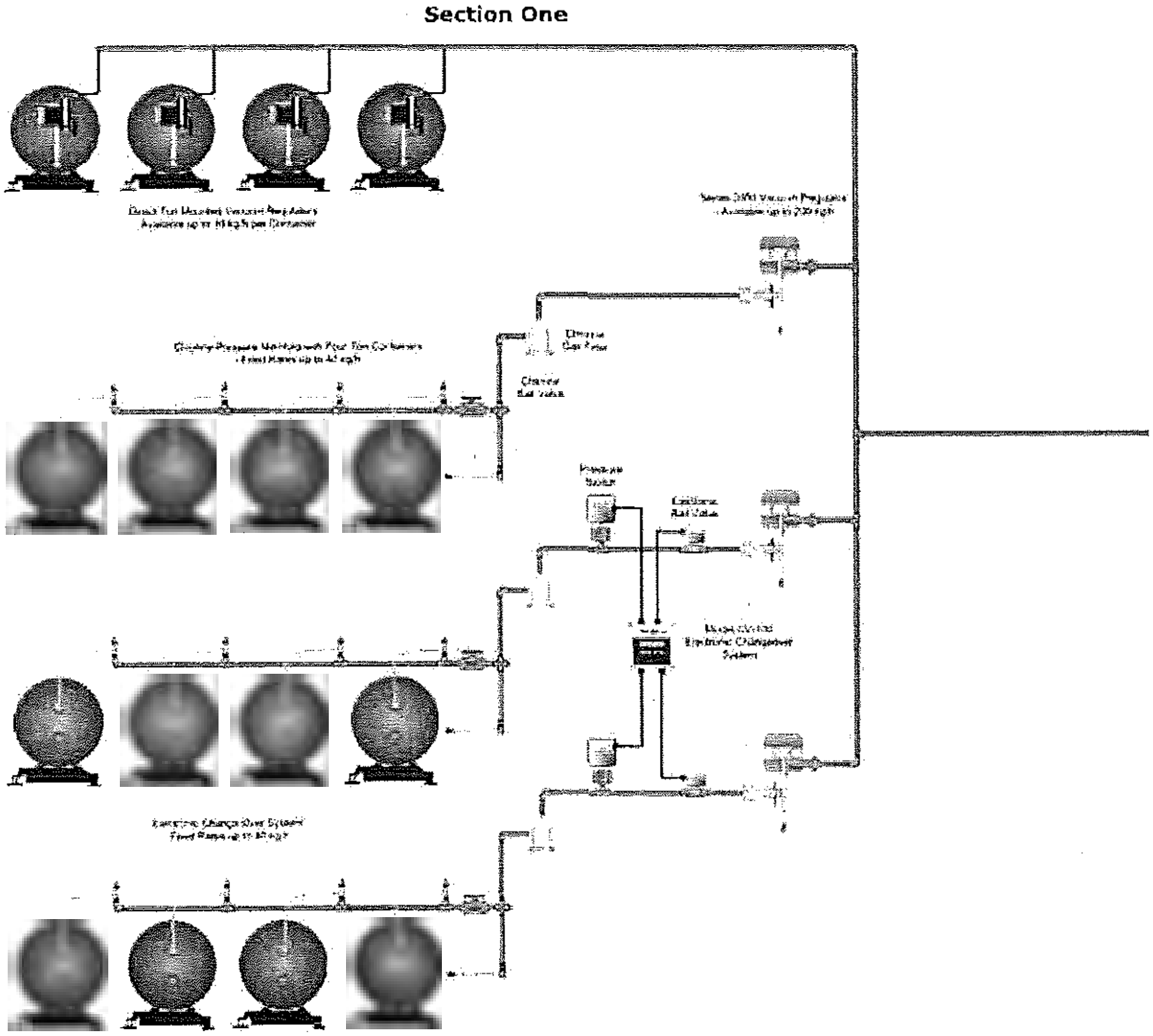
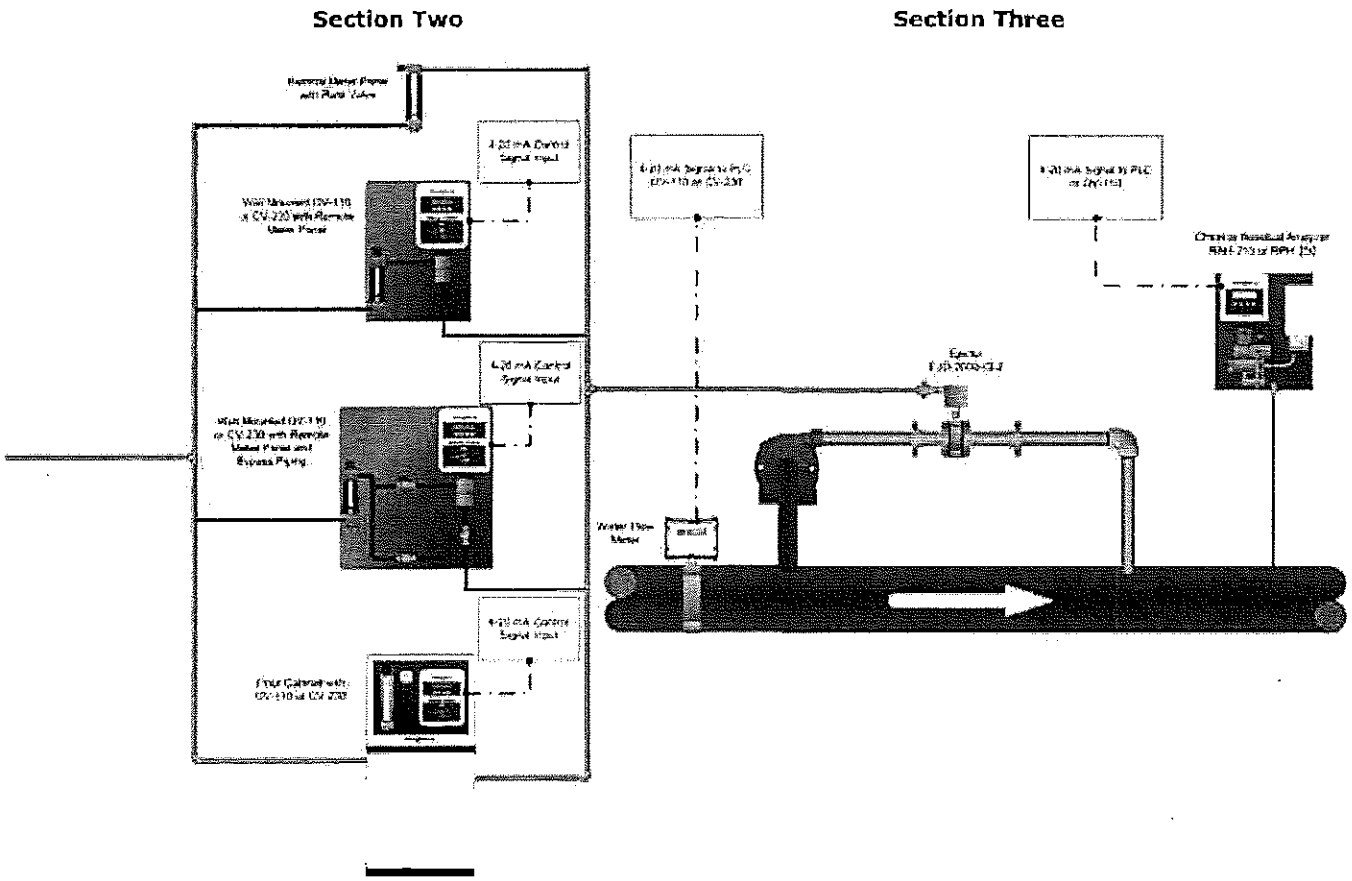


Figure 2: System Layout Options

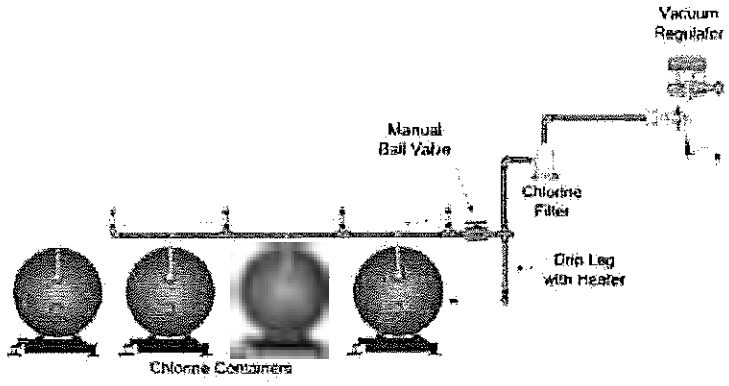


Section 1 – Chlorine Supply: This section of the equipment consists of the chlorine containers, manifolds, vacuum regulators and changeover system.

1a. **Ton Containers & Chlorine Manifolds:** NOTE: For more detailed technical information, please refer to the latest copy of Hydro Instruments TCM-DC design guide for ton container mounted manifolds.

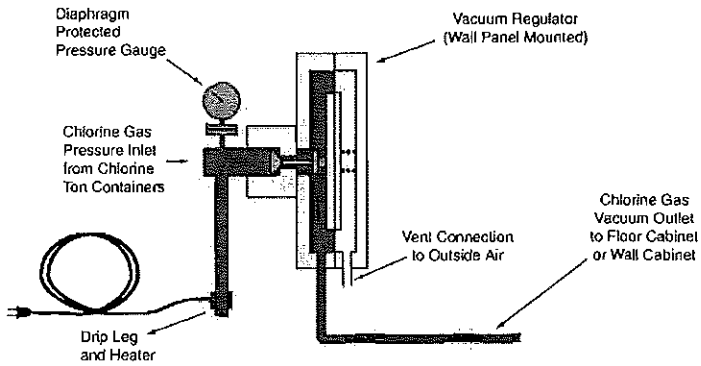
Evaporation cooling limits the chlorine gas withdrawal rate for a single chlorine ton container to approximately 10 kg/hr (500 PPD). Therefore, a 40 kg/hr (2000 PPD) system should be designed so that four ton containers are feeding simultaneously. This can be accomplished by mounting a vacuum regulator on each ton container or by connecting four ton containers together with a pressurized manifold. Pressurized chlorine manifolds are used to collect chlorine gas from one or more chlorine ton containers. The manifold must trap and evaporate liquid chlorine to prevent it from entering and damaging the vacuum section of the equipment.

Figure 3: Chlorine Pressure Manifold

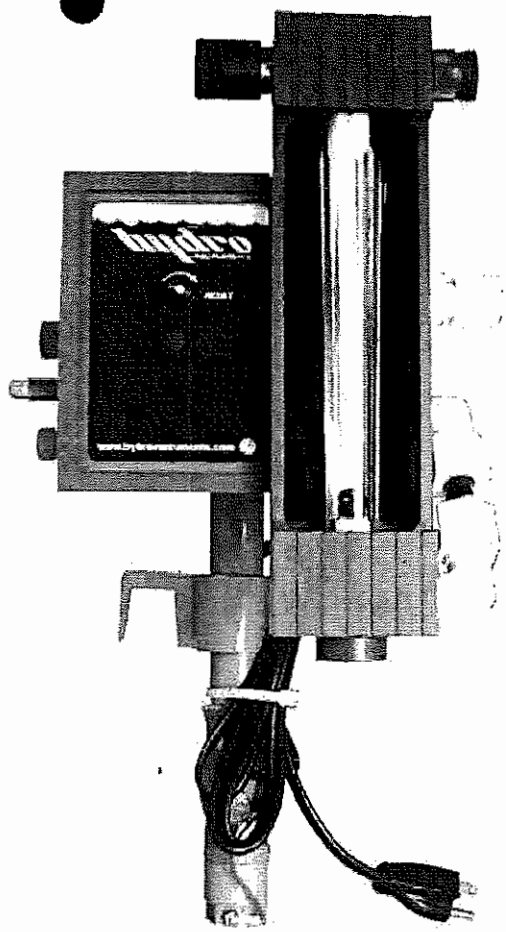


1b. **Vacuum Regulators:** Chlorine gas enters the vacuum regulator under pressure. When the ejector is in operation it creates a vacuum (that vacuum extends to the rear cavity of the vacuum regulator) that causes the diaphragm assembly to press back against the spring loaded normally closed inlet valve, causing it to open and allow chlorine gas to flow in under vacuum conditions. When vacuum is lost for any reason, the inlet valve spring will close the valve and stop the flow of chlorine immediately.

Figure 4: Vacuum Regulator



The most durable gas chlorinator on the market...



SERIES 700 AND 750

GAS CHLORINATORS

FOR:

- **Potable Water Systems**
- **Industrial Process Water**
- **Sanitary Sewage**
- **Industrial Waste Water**
- **Community Water Systems**
- **Power Plants**
- **Swimming Pools & Fountains**

EASY INSTALLATION: Advanced product design eliminates the probability of troublesome installations.

FEWER PARTS: Proven product engineering results in fewer parts for exceptional operating reliability, lower cost, and longer life.

TOTAL RELIABILITY: Every part is optimally designed and manufactured using materials proven to be chemically resistant to chlorine gas. Therefore, Hydro Instruments' Series 700 and 750 components can be used to handle chlorine gas with safety and complete control at capacities up to 500 lbs/day (10,000 grams/hour).

hydro INSTRUMENTS

PROUDLY MADE IN USA

ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

BULLETIN 700/750 Rev. 6/10

hydro GAS CHLORINATORS

Principle of Operation

For a particular ejector back pressure, a minimum water supply is required at the ejector inlet to create vacuum at a level strong enough to operate the chlorinator. This vacuum originates in the throat of the ejector's Venturi nozzle and after opening the ejector check valve, extends into the body of the chlorinator. There it causes the regulating diaphragm to open the inlet safety valve, allowing gas under pressure to pass into the drip leg where the initial liquid is collected. A heater attached to the drip leg evaporates the liquid that is in the eduction tube of the gas valve on startup of a new ton container. This heater remains on constantly, permitting only gas to flow to the vacuum regulator. As it flows across the inlet safety valve assembly, it is filtered and reduced to a vacuum.

The gas then enters a chamber where the vacuum level is maintained by a spring-opposed, sealed regulating diaphragm. It is then drawn through the chlorine flow meter, across the rate control valve and on to the ejector where it dissolves in water. The resultant, highly concentrated solution exits at the ejector outlet and flows to the desired point of application.

Accuracy

Flow meter accuracy is within 4% of the meter's maximum capacity.

Capacities Available

Maximum total operating rate is 500 pounds per day (10,000 grams per hour). Minimum feed rate is 5% of maximum.

Installation of Hydro Gas Chlorinators

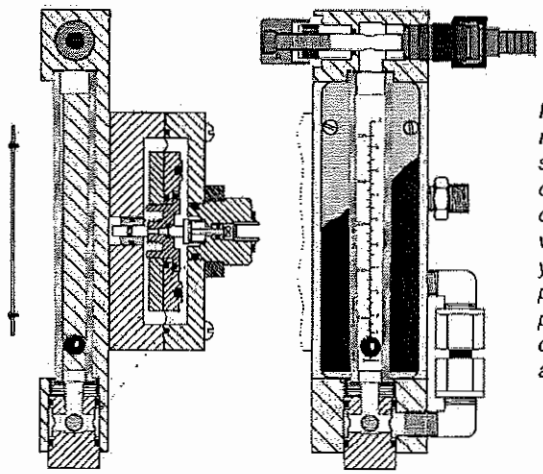
Units of the **Hydro Gas Chlorinator System** can be used for practically any requirement. The schematics show various types of installations using single or multiple containers as well as application of chlorine to pool, basin or pipeline...direct or remote. Basic **Hydro** gas chlorinator units are simply combined to cover all applications.

CHLORINATOR SIZE SHOULD BE BASED ON MAXIMUM POSSIBLE FLOW.

GPM x 0.012 x (PPM) Dosage = PPD

Example:
600 GPM x 0.012 x 3 PPM = 21.6 PPD

In this example a **Hydro** 50 PPD chlorinator would be adequate.



***Hydro Series 700* ton-container mounted gas chlorinators** are designed for manual or semi-automatic operation to meet the highest standards of reliability. They incorporate advanced design features gained through years of research and in-the-field experience. Simplified design and fewer parts mean less maintenance, lower cost with better performance, reliability and long life.*

HYDRO Series 700 Chlorinator

A ton ironwork* is used to mount the **Hydro** chlorinator directly to the container. **This eliminates all pressure lines.** Chlorine gas is taken under vacuum to the point of injection. **This eliminates pressurized solution lines.**

Operator Indicator

During operation the indicator window remains gray; red indicates depletion of the chlorine source.

Inlet Safety Valve

Spring opposed safety valve seals off chlorine in container upon loss of vacuum. Safety valve is encapsulated to permit quick disassembly and cleaning without special tools.

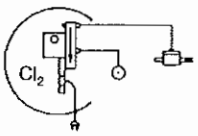
Inlet Sealing Valve

A sealing valve at the chlorinator inlet closes if chlorine supply is interrupted or depleted, sealing the entire vacuum system. Dirt or moisture cannot enter the system when containers are changed.

Regulating Diaphragm

Constant vacuum level is maintained inside the chlorinator by the diaphragm which is O-ring sealed along its entire inner and outer surface to prevent leakage or warping of parts from excessive tightening of the body bolts.

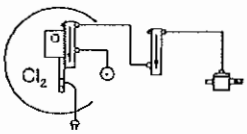
500 PPD systems with one or more wall mounted remote meter(s) (701, 701-2, 702, 702-2, etc.) are standard with chlorinatc chlorinator body(ies). The price is reduced if the customer wishes to receive chlorinator(s) with no meter assembly(ies) ("blank at the source (only at the wall mounted remote meter) and on automatic standby systems one will not be able to visually deten



Hydro Model 700
Single-Point Application

Hydro chlorinator mounted on a single container with direct ejector to pipeline or basin. Chlorine capacity to 500 PPD (10,000 grams/hr).

⊙ Vent to safe outside location

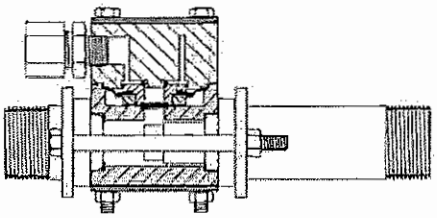


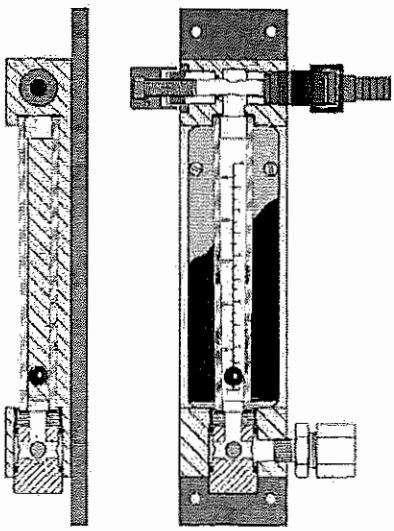
Hydro Model 701
Remote Meter for Single Point of Application

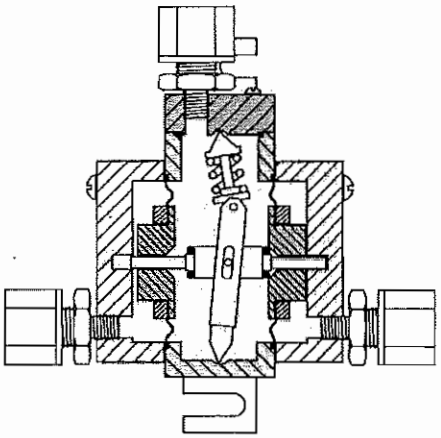
Hydro chlorinator mounted on a single container feeding a remote wall mounted meter with rate valve supplying a single ejector. Chlorine capacity to 500 PPD (10,000 grams/hr).

*** The Series 750 is the same as the Series 700 but without the ton ironwork. The Series 750**

A complete system for totally reliable control.







HYDRO EJ-5000 Ejector

The **Hydro** ejector utilizes a specially designed O-ring seal check valve which prevents the backflow of water into the chlorinator. The ejector operates on a venturi created by water passing through the ejector nozzle causing the spring opposed diaphragm check valve to open and mix the chlorine gas with the water. The ejector should be supplied with reasonably clean water at temperatures below 80°F (27°C). The **Hydro** ejector is made of durable materials that are resistant to wet and dry chlorine gas use.

HYDRO RM-701 Remote Meter

Any number of **Hydro** Remote Meters may be used in an installation if required. Only the vacuum line is required to the individual ejector which it supplies. Chlorine gas can then be precisely metered at each remote location. If more (or less) is required at one location the meter is simply set at the desired level for that location. By this control of metering at remote locations a perfectly balanced system can be maintained. **Hydro** Remote Meters are practically maintenance free. **Hydro** Remote Meters use a solid silver rate valve. Flow meters are accurate to ±4%.

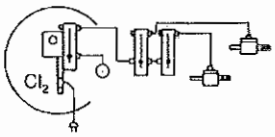
HYDRO SW-500 Automatic Switchover

Multiple chlorine containers, which prolong the time span before depletion, are easily installed and automatically switch over from a depleted container to the unused container. A **Hydro** Chlorinator is installed on each container and only one Automatic Switchover is required to handle the two containers. The **Hydro** Automatic Switchover can be used with either one remote meter or with two or more remote meters. Use of this switchover module is a great time saver and is a great aid in assuring a more constant supply of chlorine. Once installed, the **Hydro** Automatic Switchover is completely automatic and needs no adjustment or setting.

hydro INSTRUMENTS

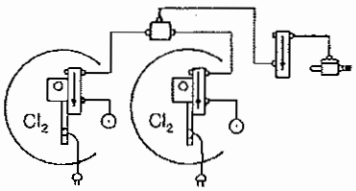
600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

ors that have a remote meter without a rate valve ("plugged") on the ed"), however it will not be possible to measure the chlorine feed rate mine which unit is regulating the chlorine supply.



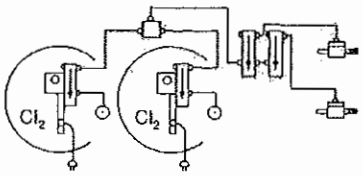
Hydro Model 701-2
Multi-Point Application

Hydro chlorinator mounted on a single container feeding two remote meters for two points of injection using two ejectors. Each meter and ejector operates independently. Chlorine capacity to 500 PPD (10,000 grams/hr).



Hydro Model 702
Automatic Stand-By

Hydro chlorinators – two chlorinators mounted on two containers with switchover module feeding one remote meter with rate valve feeding a single ejector. Capacity to 500 PPD (10,000 grams/hr) maximum.



Hydro Model 702-2
Automatic Stand-By with Multi-Point Feeding

Hydro chlorinators – two chlorinators mounted on two containers with switchover module feeding two or more remote meters with rate valves supplying two ejectors. Capacity to 500 PPD (10,000 grams/hr) maximum.

chlorinator comes complete with a yoke assembly and is used for manifold mounting.

Series 700 and 750

GAS CHLORINATORS

The installation of **Hydro Gas Chlorinators** is easily accomplished. The following will be useful information.

System Operating Temperatures

For best operation and safety, the chlorinator and chlorine supply should be protected from the elements and from direct sunlight.

Methods of Control

Manual

Adjustment of rate valve and start/stop of water to ejector.

Semi-Automatic

- Shutting off booster pump to ejector.
- Using solenoid valve to close vacuum line to ejector.

Step-Feed to multiple flow meters is available using solenoid valves in the vacuum line or water line to the ejector.

STANDARD TUBING CONNECTIONS

Vacuum Tubing Size				Vent
Feed Rate		Length of Tubing		
PPD	Gr/Hr	100 Feet (30m)	200 Feet (60m)	25 Feet (7.5m)
50	1000	3/8" (9.52mm)	3/8" (9.52mm)	3/8" (9.52mm)
100	2000	3/8" (9.52mm)	1/2" (12.7mm)	3/8" (9.52mm)
200	4000	1/2" (12.7mm)	5/8" (15.8mm)	3/8" (9.52mm)
500	10,000	5/8" (15.8mm)	3/4" (19mm)	3/8" (9.52mm)

ACCESSORY EQUIPMENT AVAILABLE

- Loss of Chlorine Alarm
- Multiple Remote Flow Meters and Ejectors
- Inlet Water Assemblies
- Automatic Switchover System
- Booster Pumps
- Gas Masks
- Analyzers
- Leak Detectors

CHLORINE WITHDRAWAL RATE from Horizontal Ton Container

Maximum Chlorinator Withdrawal Capacity		Minimum Ambient Temperature	
PPD	gr/hr	°F	°C
500	10,000	40	4
250	5000	16	-9
150	3000	0	-18
100	2000	-6	-21
50	1000	-20	-29

Ejector Installation

1. Ejector connections must be kept above freezing temperatures.
2. At point of application maximum back pressure for standard ejector is 100 psig. (High pressure ejectors are available.)
3. Long solution lines from ejector should be avoided and if not, solution lines must be of adequate ID to reduce friction loss.
4. To create a vacuum the water supply to the ejector inlet must be higher than the pressure at the point of application (approximately 40 psig differential).
5. Maximum ejector operating temperature is 110° F (43° C).
6. Ejector may be wall mounted for remote applications.

Series No.	(PPD) Maximum Capacity	Mounting
500 Series	100 PPD (2000 gr/hr)	150 lb. cylinder, manifold*, or ton container
200 Series	200 PPD (4000 gr/hr)	150 lb. cylinder, manifold*, or ton container
700 Series	500 PPD (10,000 gr/hr)	Ton container
750 Series	500 PPD (10,000 gr/hr)	Manifold

* For manifold units there is the additional cost of wall mounting manifolds.

Hydro Model EJ-5000 (500 PPD) Ejector Connections

	Standard	Options
Ejector Water Inlet (Nozzle)	EN-296 Nozzle for 1 1/4" NPT	EN-275 Nozzle for 1 1/4" NPT
Ejector Water Outlet (Diffuser)	EDH-560 Diffuser for 1 1/2" ID Hose	EDT-560 Diffuser for 1 1/4" NPT

Represented by

hydro INSTRUMENTS

PROUDLY MADE IN USA

ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984

Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

Vacuum Regulators

Hydro Instruments manufactures many different designs of vacuum regulators. Some of the most common configurations are shown in the following table. Other designs and configurations are available. Please review our website for more information.

750

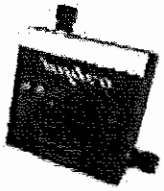
- 10 kg/hr
- Optional flow meter
- Optional direct ton container mounting

750W-DL

- 10 kg/hr
- Optional flow meter
- Wall-mounted
- Optional drip leg and heater
- Diaphragm protected pressure gauge

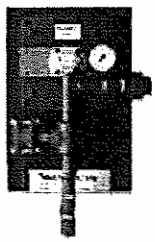
SVR-500-CL2

- 10 kg/hr
- Integral vacuum switchover design
- Optional flow meter (5 kg/hr maximum)
- Wall-mounted
- Optional direct ton container mounting



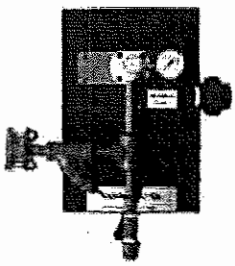
VRH-2000-CL2

- 40 kg/hr
- Drip leg and heater
- 3/4" Steel Union Inlet
- 1" PVC Union Outlet
- Diaphragm protected pressure gauge
- Optional flow indication tube



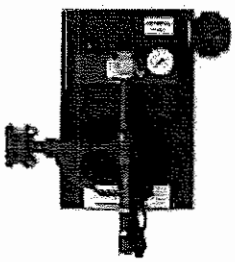
VRH-8000-CL2

- 150 kg/hr
- Drip leg and heater
- 3/4" Steel Union Inlet
- Y-Strainer Inlet Filter
- 1.5" PVC Union Outlet
- Diaphragm protected pressure gauge
- Optional flow indication tube



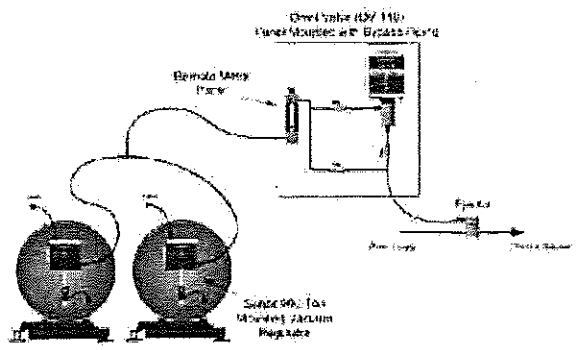
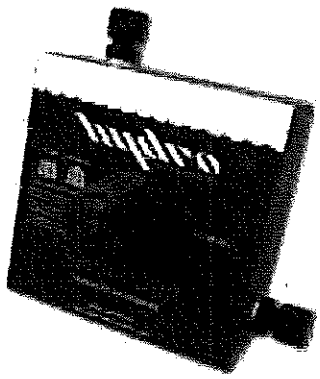
VRH-10000-CL2

- 200 kg/hr
- Drip leg and heater
- 3/4" Steel Union Inlet
- Y-Strainer Inlet Filter
- 2" PVC Union Outlet
- Diaphragm protected pressure gauge
- Optional flow indication tube

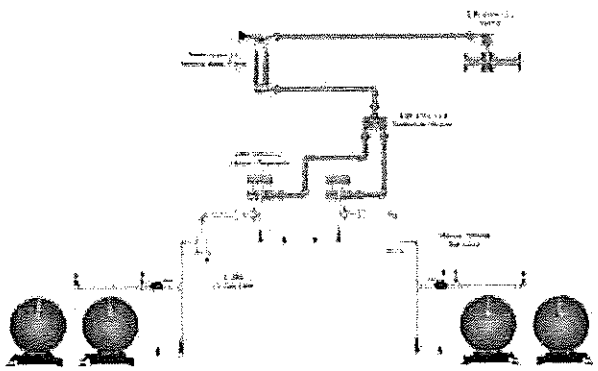
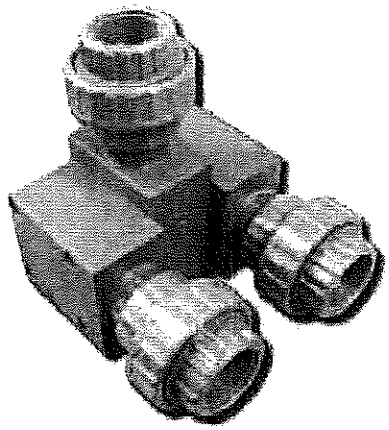


1c. **Changeover Equipment:** Hydro Instruments offers three types of automatic changeover equipment. The function of this equipment is to automatically switch the chlorine gas supply to the standby manifold when the duty manifold containers are empty.

i. **Vacuum Switchover by integral switchover vacuum regulators (Series 900):** This equipment is only available for feed rates up to 10 kg/hr (500 PPD). The Series 900 vacuum regulator design offers automatic switchover based on the high vacuum condition that occurs when the duty chlorine containers are going empty. Once the duty containers are nearly empty, the vacuum level in the system will increase and cause the standby vacuum regulator to switch automatically into the feeding position. The advantage of this system is its simplicity and low cost.

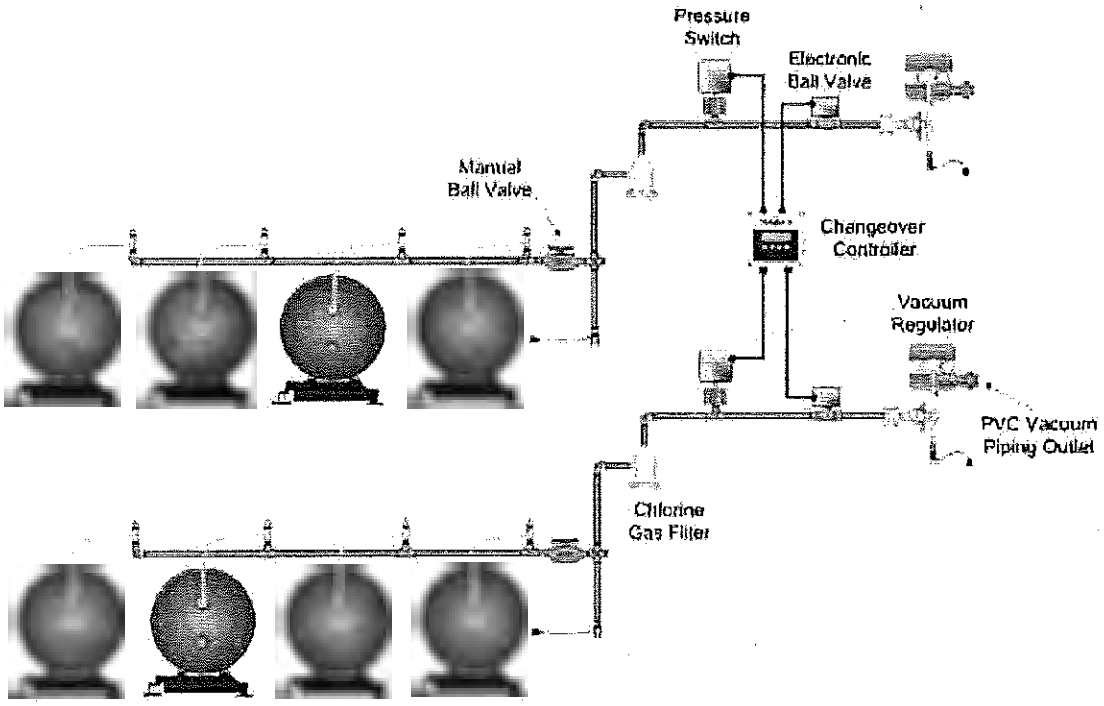
Series 900 System (10 kg/hr)	Series 900 Vacuum Regulator
	

ii. **Vacuum Switchover Modules:** The operation of the vacuum switchover is also based on the rising vacuum level that accompanies the duty manifold ton containers going empty. The switchover module includes a spring loaded mechanism and two diaphragm assemblies. The advantage of this type of switchover mechanism is again the simplicity and relatively low cost.

Model 3105C System (20 kg/hr)	SOH-4000-CL2 (80 kg/hr max.)
	

iii. **Electronic Changeover System (Series CV-100):** The Hydro Instruments Series CV-100 automatic changeover system is designed to allow continuous supply of chlorine gas when using a duty/standby gas container system layout.

Figure 5: Series CV-100 Electronic Changeover System



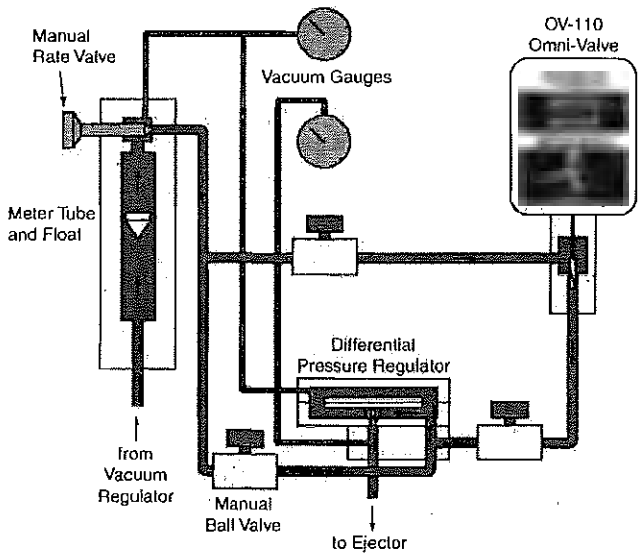
The system consists of a dedicated controller Model CV-100 designed for this application, two pressure switches, and two electronically actuated ball valves. In normal operation, the Model CV-100 controller will keep one of the ball valves open (duty) and the other closed (standby). Upon receiving a low pressure alarm relay signal indicating that the duty gas supply source is nearly depleted, the controller will close the duty ball valve and open the standby ball valve. After such a changeover event, the operator will be required to silence the changeover alarm, change the empty containers, and then acknowledge the container empty alarm.

The Model CV-100 controller also can be used to manually change which ball valve is in operation and to shut down both valves simultaneously. The Model CV-100 controller records the time that each ball valve has been in the duty condition and displays the time of day, day of the week and date of the year on the screen. LEDs on the controller also indicate operation and container empty status for both sides.

Section 2 – Feed Rate Control: This section of the equipment consists of a rotameter type flow meter, manual control valve, automatic control valves and other optional equipment.

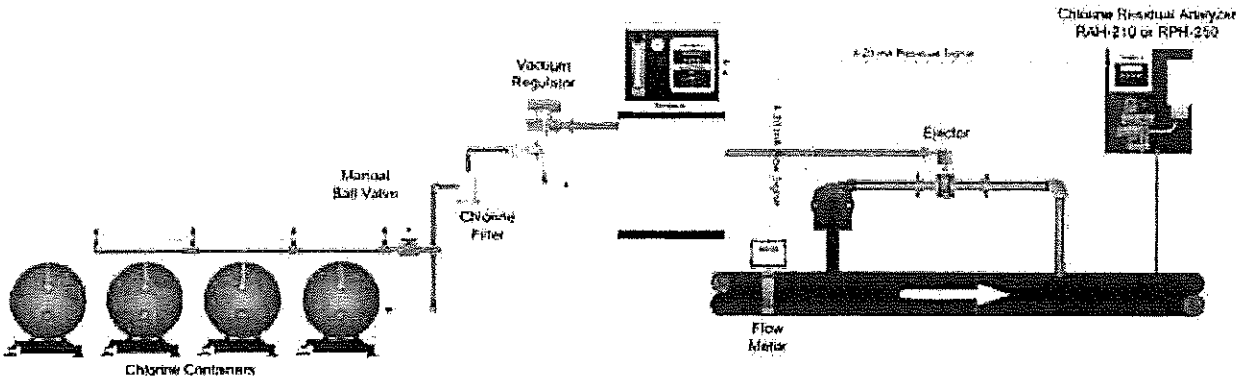
Between the vacuum regulator and the ejector, the chlorine gas flows under vacuum. A chlorine gas flow meter is installed in this section of the system to give a visual indication of the chlorine gas feed rate. Each gas chlorination system will have a manual rate control valve installed after the flow meter tube. An automatic control valve can also be installed in between the flow meter tube and the ejector. Differential pressure regulators, vacuum gauges, vacuum alarms etc. are optional.

Figure 6: Feed Rate Control Equipment



Control Type: The goal of a chlorine gas system is to inject chlorine into the water at a rate that will maintain a desired residual level in the treated process water. Therefore, as the water flow rate and the water quality change, the chlorine feed rate must also be adjusted accordingly to maintain the desired residual in the treated process water. Manual feed rate control can be used in systems where the process water flow and the water quality are both constant. If the water flow rate or water quality are variable, then it is best to use an automatic control system.

Figure 7: Automatic Control System (Compound Loop Control)

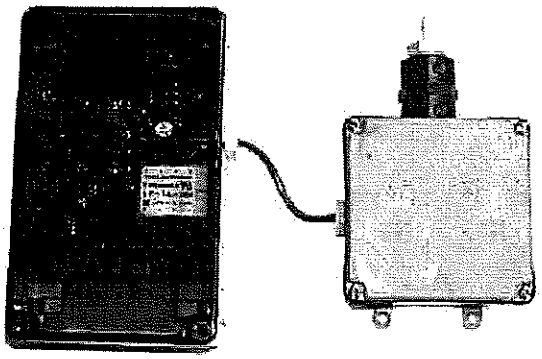


VM-150 Vacuum Monitor

The VM-150 vacuum monitor is 100% electronic, full featured monitoring system with a three digit digital readout. The system utilizes the latest in integrated sensor technology that results in improved accuracy, reliability, versatility , and chemical compatibility. All monitors come standard with an analog output for connection to local monitoring equipment.

The VM-150 comes standard with an oil based protection device that allows direct contact with many gases and liquids including chlorine and sulfur dioxide.

This unit has three alarm relays. One low alarm, one high alarm and one latch relay. All relays are general purpose NO/NC type. These relays give the end user many options on how to respond to an alarm condition.



Specifications & Features

- Input Voltage
  - 115V 60 Hz, 0.1 AMPS
  - 230V 50 Hz, 0.1 AMPS
- Alarm Relays
  - 120V @ 5 AMPS
  - 240V @ 5 AMPS
- NEMA 4X Enclosure
- 1 - 100 Second Alarm Delay
- Temperature Range: -20 - 50 C
- Three Digit LED Digital Readout
- Analog Output: 0 - 30V DC, 0 - 3.0 mA
- One Year Warranty
- Water Tight Fittings
- Three Alarm Relay Outputs:
  1. One NO/NC High
  2. One NO/NC Low
  3. One NO/NC Latch
- Independently Adjustable High/Low Trip Points
- LED Indicator for High/Low Latch Alarm
- IP65 External Latch Alarm Reset Switch

Ordering Information

Model #	Range	Low Alarm	High Alarm	Pressure	Gauge Guard
VM-150-115	0-30 in. Hg	0-15 in. Hg	15-30 in. Hg	30 PSI	Oil
VM-150-230	0-30 in. Hg	0-15 in. Hg	15-30 in. Hg	30 PSI	Oil

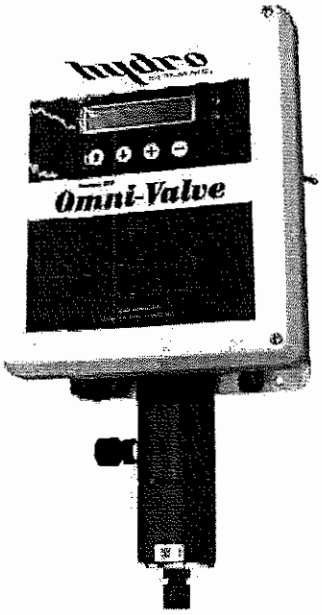
Hydro Instruments 600 Emlen Way Telford, PA 18969 Phone: 215.799.0980 Fax: 215.799.0984 Email: sales@hydroinstruments.com Web Address: www.hydroinstruments.com

Specifications subject to change without notice. 2011 Hydro Instruments

Series 110
Omni-Valve

The valve that does it all...

- **Excellent Accuracy and Repeatability**
- **Maximum Versatility**
- **Remote adjustment and monitoring**
- **Gas or Liquid Metering**
- **Designed for Minimal Wear and Long Life**



With the capability of operating in eight different control modes, handling a wide range of chemicals, covering a wide range of capacities and having a multitude of control options, adjustable features and settings, the Hydro Instruments Omni-Valve is truly an all-in-one automatic control valve for chemical feed.

Control Options (all standard)

Manual Control
Proportional (Flow) Control
Set Point (Residual) Control
Set Point (ORP) Control
Compound Loop (PID) Control
Step Feed Rate Control
Dual Input Feed Forward Control
Dual Set Point Control

Control modes are field selectable and can be changed at any time.

Highlighted Features

2 x 20 Character Liquid Crystal Display
Modbus Communication (RS-485)
3 Analog Inputs
(Flow, Residual and Remote Dosage)
Adjustable: Dosage, Set Points, Lag Time, Signal Filters, Display Ranges, Alarms & More
Linear Operation Eliminates Rotary Drive Gears & All Rotating Motion
Broad Range of Chemicals & Capacities
Two 4-20 mA Outputs
Password Protected Settings

Because of Hydro Instruments' innovative approach to manufacturing, the ***Omni-Valve*** is the industry's first true directly linear drive control valve design. This linear design provides vast improvements over problematic rotary-driven valves. The ***Omni-Valve*** is the industry leader in terms of offering 8 different control modes (all standard) and a wealth of flexible settings and features. Our state-of-the-art microprocessor technology, highest quality materials of construction, precision machining and a minimal number of moving parts combine to make the ***Omni-Valve*** extremely reliable over long periods of continuous operation and truly the best automatic control valve available on the market.

INSTRUMENTS

PROUDLY MADE IN USA

ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

BULLETIN OV-110 Rev. 5/13

Series 110 Omni-Valve

OV-110 Ordering Information

Model: OV-110 - ____ - ____ - ____ - ____ - ____ - ____ - ____ - ____

MAXIMUM CAPACITY

1. 500 ppd (10 kg/hr)
2. 2000 ppd (40 kg/hr)
3. 6000 ppd (120 kg/hr)

GAS OR LIQUID

A. Ammonia (NH_3)
B. Sodium Bisulfite ($NaHSO_3$)
C. Chlorine (Cl_2)
S. Sulfur Dioxide (SO_2)
H. Sodium Hypochlorite (NaOCl)
Other: Consult Factory

RANGE

1. 10 ppd (200 gr/hr)
2. 25 ppd (500 gr/hr)
3. 50 ppd (1 kg/hr)
4. 100 ppd (2 kg/hr)
5. 250 ppd (5 kg/hr)
6. 500 ppd (10 kg/hr)
7. 1000 ppd (20 kg/hr)
8. 2000 ppd (40 kg/hr)
9. 3000 ppd (60 kg/hr)
10. 4000 ppd (80 kg/hr)
11. 6000 ppd (120 kg/hr)

Note: For liquid use please specify the desired max capacity.

POWER REQUIREMENTS

1. 120V 60Hz
2. 240V 50Hz

CONTROL CONFIGURATION

1. Flow Pacing
2. Residual
3. ORP
4. Compound Loop (Residual)
5. Compound Loop (ORP)
6. Step Feed
7. Dual Input Feed Forward
8. Dual Set Point

POWER CABLE LENGTH

1. 6 feet (1.5 m) standard
2. Other (consult factory)

SIGNAL CABLE LENGTH

1. 25 feet (8 m) per input channel
2. Specify length required

POWER LINE ISOLATOR

1. None (standard)
2. Included

Capacity Ranges	
Gas Feed	10, 25, 50, 100, 250, 500, 1000, 2000, 3000, 4000, & 6000 PPD
Liquid Feed	4 GPH through 10 GPM

hydro INSTRUMENTS

PROUDLY MADE IN USA

ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

Automatic Control Valves

Hydro Instruments offers two different automatic control valves with the below listed general specifications. The Model 0V-110 offers complete Compound Loop (PID) control capabilities, while the CV-230 is more economical in price for applications that only require proportional control. Both valves use the same 10 point linearization process and automatic self calibration checking. These valves can be provided on wall panels or in floor cabinets.

CV-230

- Flow Pacing Control Only
- One 4-20mA Input Channel
- One Relay Alarm Output
- Two 4-20mA Output Channels
- 120 kg/hr maximum capacity (Cl_2)
- 2 line, 20 character LCD Display
- Linear Stepper Motor

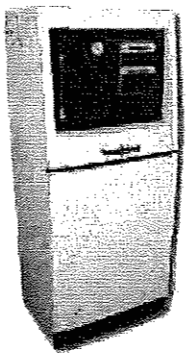
OV-110

- Flow, Residual, Compound Loop & Step Feed
- Three 4-20mA Input Channels
- Four Relay Input Channels (step feed)
- One Relay Alarm Output
- Two 4-20mA Output Channels
- 120 kg/hr maximum capacity (Cl_2)
- 2 line, 20 character LCD Display
- Linear Stepper Motor

Wall Panel

Hydro Instruments offers prefabricated and tested wall panel mounted chlorine gas feed rate control panels in a variety of configurations. An example of the most common configuration with Model 0V-110 Omni-Valve, bypass piping with true union ball valves, and remote meter with rate valve is shown here. Such wall panels can be provided with vacuum gauges, differential pressure regulators, high/low vacuum alarms, etc.

Floor Cabinet



Hydro Instruments offers prefabricated and tested free standing floor cabinets with a variety of optional features to chose from. Floor cabinets offer a convenient and aesthetic appearance for mounting the control and indication equipment for each chlorine gas feed point. Floor cabinets house the automatic control valve (CV-230 or OV-110), the flow meter tube and manual rate valve, and at least one vacuum gauge with diaphragm protection. Optional equipment includes a second vacuum gauge, high/low vacuum alarm, and differential pressure regulator.

Differential Pressure Regulators

- Recommended for feed rates 40 kg/hr and higher
- Not necessary for 10 kg/hr and below
- Used for stabilizing rotameter indicator float

will install DP-500

Section 3 – Ejectors: This section creates the vacuum that operates the system and mixes the chlorine gas with the water.

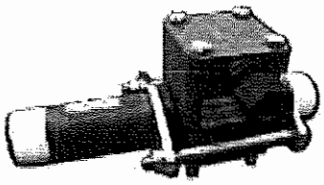
High velocity water flow through the ejector venturi nozzle creates the vacuum that operates the gas chlorination system. Chlorine gas feed is stopped by stopping the water flow to the ejector. When the system is not operating and there is no water flow through the ejector nozzle, there will be no vacuum. Each ejector includes at least one check valve to prevent water from flowing back into the gas chlorination equipment when the system is turned off. Hydro Instruments manufactures a variety of different ejector designs. Refer to the nozzle performance charts and curves that can be found in the Hydro Instruments instruction manuals to consider the water flow and pressure requirements for each ejector. In general, several nozzles are available for each ejector. A list of common ejectors is given here.

EJH-142-CL2, EJH-242-CL2, EJH-542-CL2

- 10 kg/hr Maximum Capacity
- 3/4" NPT (2 kg/hr)
- 1 1/4" NPT (5 & 10 kg/hr)
- 10 kg/cm² (standard b.p.)
- 20 kg/cm² (high b.p. option)
- Check Valve without diaphragm

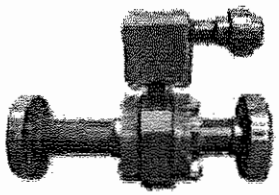
EJ-1000, EJ-2000, EJ-5000

- 10 kg/hr Maximum Capacity
- 3/4" NPT (2 kg/hr)
- 1 1/4" NPT (5 & 10 kg/hr)
- Double Check Valve option available
- 10 kg/cm² (standard b.p.)
- 20 kg/cm² (high b.p. option)
- Diaphragm Check Valve



EJH-2000-CL2 and EJH-3000-CL2

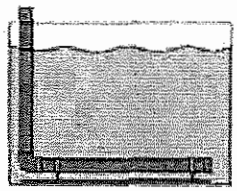
- 120 kg/hr Maximum Capacity
- 2" Flanged and 3" Flanged sizes
- 10 kg/cm² (maximum b.p.)
- Diaphragm Check Valve



The water exiting the ejector contains highly concentrated chlorine solution. Hydro Instruments manufactures a variety of diffusers and corporation stop assemblies that can be used to conveniently and safely inject this solution into the process stream. Secondary check valves are also available for greater protection against water backflow during system stop conditions.

Open Channel Diffusers

Provides more effective mixing in open channels and contact chambers 1/2" through 4" pipe diameter. Every unit is custom-built: pipe size, length, hole diameter, hole quantity, hole spacing and inlet connection.



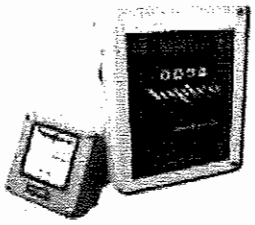
Spray Diffusers and Corporation Stops

Prevents corrosion of the solution & process piping and provides better mixing in the process line. Corporation stops are designed to allow removal of the diffuser while the process pipe remains pressurized. Available in a range of sizes and materials.

Gas Leak Detectors

Hydro Instruments manufactures two series of gas leak detection equipment. Both series use the same sensors and therefore offer detection of the same set of gases. Sensors are available for Cl_2, SO_2, NH_3, O_3, ClO_2, H_2S, CO_2, H_2, O_2, NO, NO_2, & HCl. The general specifications are shown here below.

GA-170



- 1 to 4 sensors per monitor
- 2 line, 16 character display
- Integral 90 dB audible alarm
- Optional battery backup
- 6 adjustable relay outputs
- 2 LED indicators per sensor
- RS-232 and 4-20mA outputs

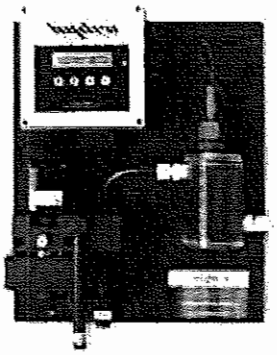
GA-171

- 1 to 2 sensors per monitor
- 2 line, 16 character display
- 1 adjustable common relay output
- 2 LED indicators per sensor
- RS-232 and 4-20mA outputs

Residual Analyzers

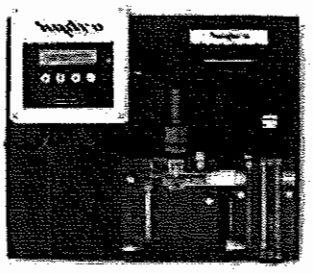
Hydro Instruments produces two series of residual analyzers for online measurement. Both instruments utilize the amperometric method of measurement. The Series RAH-210 incorporates an open flow cell design with large electrode surface area and continuous motor driven cleaning for rugged operation. The Series RPH-250 incorporates a semipermiable membrane and electrolyte design.

RAH-210



- Free Chlorine, Total Chlorine, & ClO_2
- Continuous Self Cleaning
- PID controller included
- One 4-20mA input channel
- Two 4-20mA output channels
- One alarm relay output
- 2 line, 20 character display
- 2 LED indicators
- RS-232 output
- Temperature Sensor
- Optional pH probe
- Optional Buffer Chemical Feed Systems
- Optional pH Compensation in software

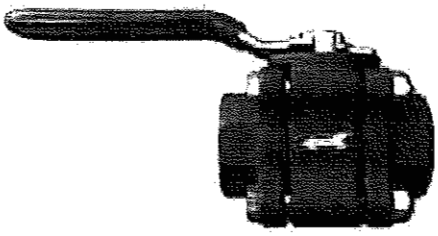
RPH-250



- Free Chlorine & ClO_2
- PID controller included
- One 4-20mA input channel
- Two 4-20mA output channels
- One alarm relay output
- 2 line, 20 character display
- 2 LED indicators
- RS-232 output
- Temperature Sensor
- Optional pH probe
- Optional pH Compensation in software

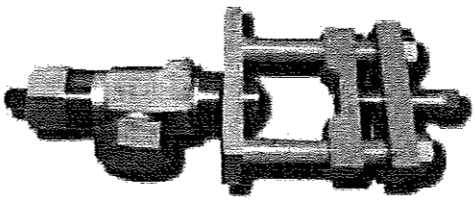
Additional Gas Chlorination Equipment

Chlorine Service Ball Valves



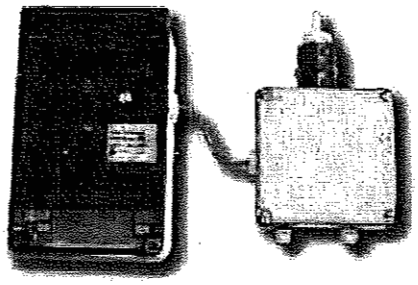
Manual and electronic with a range of connection sizes. Teflon seals and Carbon Steel housings. Optional Monel or Hastelloy C ball and stem.

Isolation Valve Assemblies



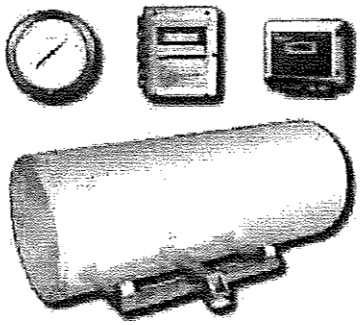
Eliminate the stress on flexible connectors during cylinder changes. Increase the safety and convenience of changing chlorine containers.

Vacuum Monitor



Continuously monitor the chlorine gas vacuum level with digitial display. Adjustable high and low alarm relays. Specifically designed for chlorine gas application.

Chlorine Container Scales



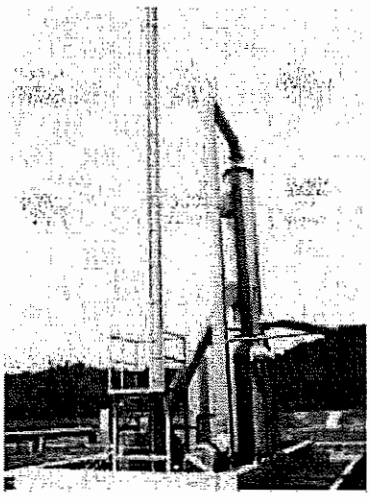
Used for monitoring and recording chlorine supply and usage. Electronic and hydraulic scales are available from Hydro Instruments in a variety of configurations. Scale sets are available for weighing the contents of one, two or more chlorine containers simultaneously.

Pressure Reducing Valve

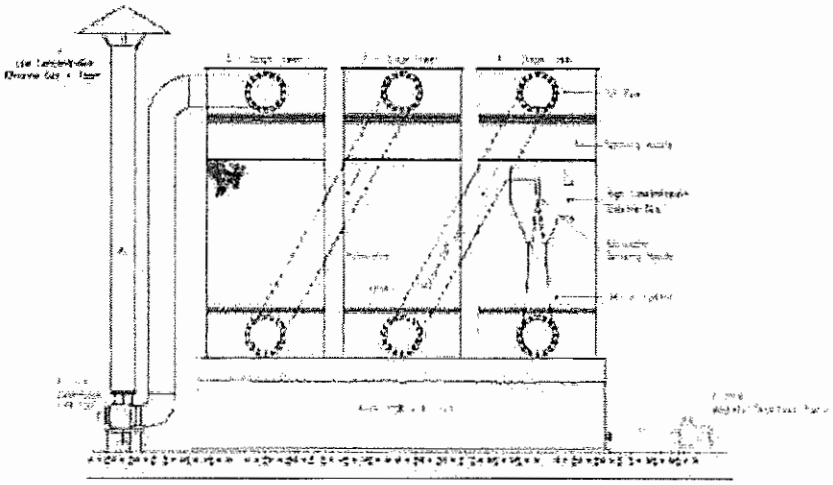
The Hydro Instruments Series PRV-71H Pressure Reducing Valve is used to reduce and control the gas pressure downstream of the valve. The PRV-71H is designed for chlorine or sulfur dioxide gas service.

Chlorine Leak Absorption Systems

The chlorine scrubber system operation is activated by an alarm relay signal from a gas leak detector. Chlorine storage room air is drawn into the scrubber system where the chlorine is chemically extracted before exhausting the cleaned air to the outside environment. Chlorine scrubber systems are available from Hydro Instruments and our sales representatives in a variety of configurations and sizes.



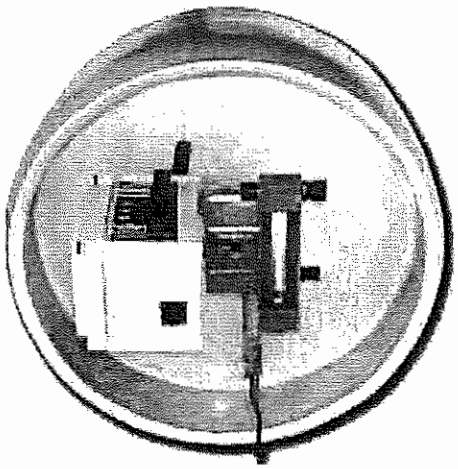
SINGLE STAGE SCRUBBER



3 STAGE SCRUBBER

Emergency Shut-Off Systems

These systems are activated by an alarm relay signal from a gas leak detector. A valve closure acutator (shut-off device) is mounted directly on the chlorine container valve. In the event of a leak, the device will close all of the chlorine container valves immediately to stop the leak. Emergency shut-off systems are available from Hydro Instruments and our sales representatives in a variety of configurations and sizes.



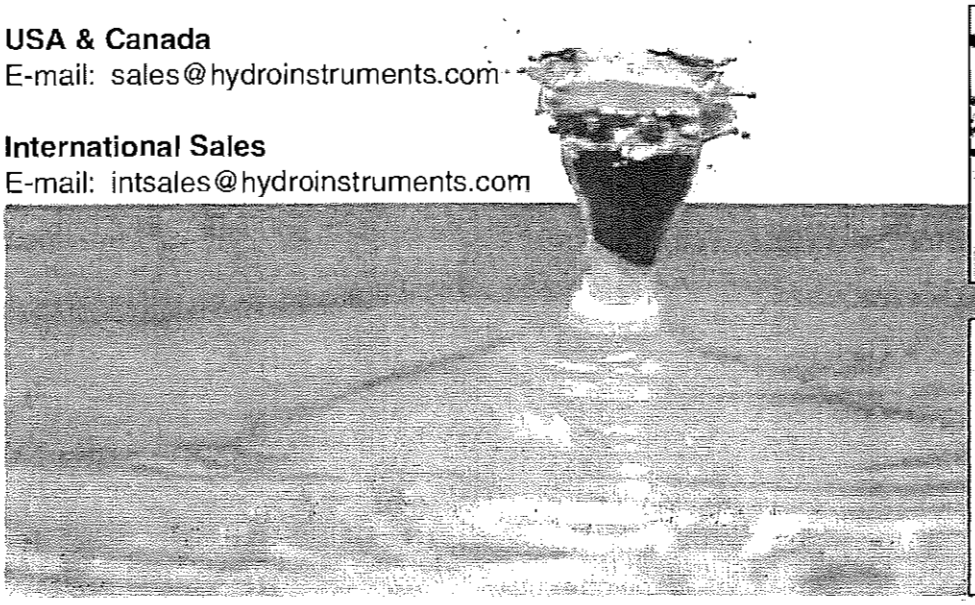
hydro INSTRUMENTS™

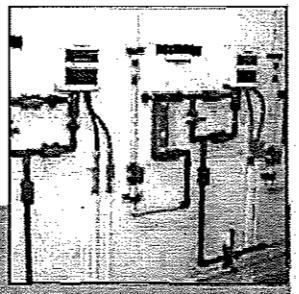
Contact us:

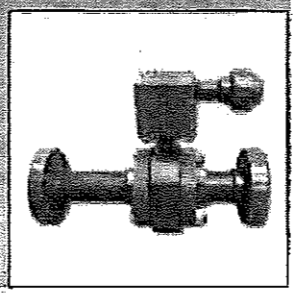
Hydro Instruments
600 Emlen Way
P.O. Box 387
Telford, PA 18969 USA
TEL: 215-799-0980
FAX: 215-799-0984
Website: http://www.hydroinstruments.com/

USA & Canada
E-mail: sales@hydroinstruments.com

International Sales
E-mail: intsales@hydroinstruments.com







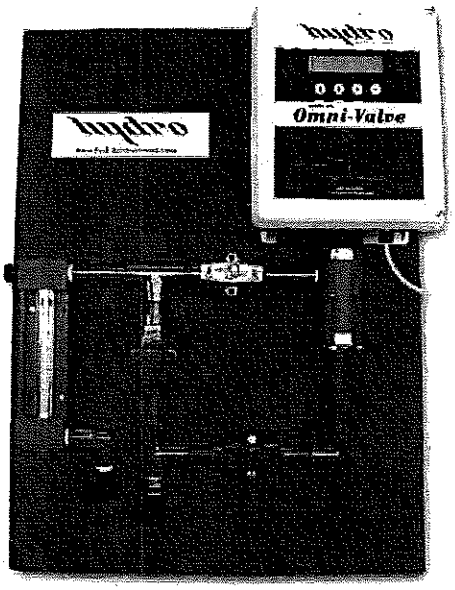
Represented by:

Wall Panel Series
Panel Mounted Products

Wall Panel Series

The Wall Panel Series offers the ability to panel mount the OV-110 and CV-230 automatic feed rate control valves offered by Hydro Instruments.

- Wall panel mounting simplifies the installation process providing easy access to the equipment for operation and maintenance. Panel mounting minimizes the equipments footprint which conserves space and eliminates the use of cabinets.
- Every panel is constructed from the highest quality "high density polyethylene" plastic and schedule 80 PVC piping. Panels are available in standard sizing for the most common configurations. Custom panels are also available. The bypass piping and valve arrangements allows for simple manual feed control whenever maintenance or calibrations are needed on the control valve.



OV-110 Control Options (all standard)

Manual Control
Proportional (Flow) Control
Set Point (Residual) Control
Set Point (ORP) Control
Compound Loop (PID) Control
Step Feed Rate Control
Dual Input Feed Forward
Dual Set Point Control

Control modes are field selectable and can be changed at any time.

OV-110 Highlighted Features

2 x 20 Character Liquid Crystal Display
Modbus Communication (RS-485)
3 Analog Inputs (Flow, Residual and Remote Dosage)
Adjustable: Dosage, Set Points, Lag Time, Signal Filters, Display Ranges, Alarms & More
Linear Operation Eliminates Rotary Drive Gears & All Rotating Motion
Broad Range of Chemicals & Capacities
Two 4-20 mA Outputs
Password Protected Settings
External control of: Duty/Standby & Auto/Manual

INSTRUMENTS

PROUDLY MADE IN USA
ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

Custom Configurations and Options

Wall Panel Series 110 Omni-Valve Order Information

Model: WPOV-110 – ____ – ____ – ____ – ____ – ____ – ____ – ____ – ____ – ____ – ____ – ____

A B C D E F G H I J K

Position	Feature	Description
A. MAXIMUM CAPACITY	1	500 ppd (10 kg/hr):
	2	2000 ppd (40 kg/hr):
	3	6000 ppd (120 kg/hr):
B. GAS OR LIQUID	A	Ammonia (NH_3)
	B	Sodium Bisulfite ($NaHSO_3$)
	C	Chlorine (Cl_2)
	S	Sulfur Dioxide (SO_2)
	H	Sodium Hypochlorite (NaOCl)
	Other	Consult Factory
C. FLOW METER CAPACITY *Note: For liquid use please specify the desired max capacity.*	1	10 ppd (200 gr/hr)
	2	25 ppd (500 gr/hr)
	3	50 ppd (1 kg/hr)
	4	100 ppd (2 kg/hr)
	5	250 ppd (5 kg/hr)
	6	500 PPD (10 kg/hr)
	6A	500 PPD (10 kg/hr) RM-702 *RM-702 Rate Valve Knob protrudes from front of meter*
	7	1000 ppd (20 kg/hr)
	8	2000 ppd (40 kg/hr)
	9	3000 ppd (60 kg/hr)
	10	4000 ppd (80 kg/hr)
	11	6000 ppd (120 kg/hr)
D. POWER REQUIREMENTS	1	120V 60Hz
	2	240V 50Hz
E. CONTROL CONFIGURATION	1	Flow Pacing
	2	Residual
	3	ORP
	4	Compound Loop (Residual)
	5	Compound Loop (ORP)
	6	Step Feed
	7	Dual Input Feed Forward
	8	Dual Set Point
F. POWER CABLE LENGTH	1	6 feet (1.5 m) standard
	2	Other (consult factory)
G. SIGNAL CABLE LENGTH	1	25 feet (8 m) per input channel
	2	Specify length required
H. 4-20 mA OUTPUT	1	Not Included
	2	Included
I. POWER LINE ISOLATOR	1	None (standard)
	2	Included
J. BYPASS PIPING ARRANGEMENT	1	None
	2	Up to 500 ppd (10 kg/hr)
	3	2000 ppd (40 kg/hr)
	4	3000 ppd (60 kg/hr)
	5	6000 ppd (80 kg/hr)
K. DIFFERENTIAL PRESSURE REGULATOR	1	None
	2	Up to 250 ppd (5 kg/hr)
	3	500 ppd (10 kg/hr)
	4	2000 ppd (40 kg/hr)
	5	3000 ppd (60 kg/hr)
	6	4000 ppd (80 kg/hr)
	7	6000 ppd (120 kg/hr)

NOTES:

1. Standard flow tubes for up to 250 PPD (5 kg/hr) are 3" length. For 6" flow tubes on Item C=1-5, add an "A" after this number (i.e., 3 becomes 3A).
2. Port sizes are as follows:
   - up to 250 PPD (5 kg/hr) has ¼" NPT
   - 500 PPD (10 kg/hr) has ½" NPT
   - 1000 & 2000 PPD (20 & 40 kg/hr) has 1" NPT
   - 3000, 4000, & 6000 PPD (60, 80, & 120 kg/hr) has 1.5" Socket

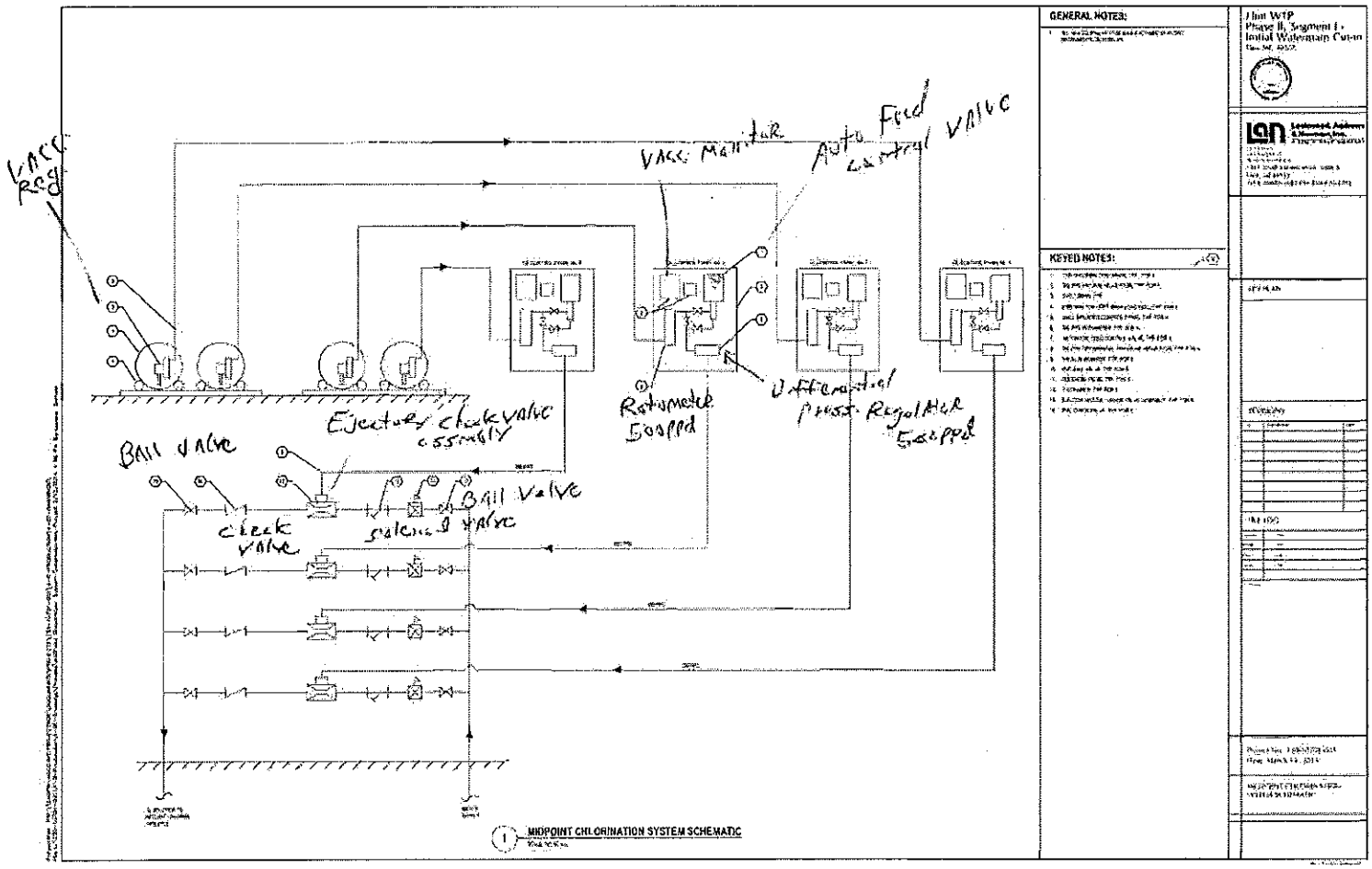
hydro INSTRUMENTS

PROUDLY MADE IN USA

ISO 9001 Certified

600 Emlen Way, Telford, PA 18969 • Telephone: (215) 799-0980 • Fax: (215) 799-0984
Toll Free in the U.S.: 1 (888) 38-HYDRO • www.hydroinstruments.com • sales@hydroinstruments.com

Appears that feeder
feed rate control - not make-up water
- piping not from tank to feeder?
- then from feed to make-up line?



Provide Full size

OZONE CALCULATIONS

Flint WTP

OXYGEN AND NITROGEN SYSTEMS CAPACITIES

DATA LEGEND

REQUIRED DATA
FIXED DATA - DO NOT CHANGE UNLESS EQUIPMENT IS REPLACED
DATA SHOULD NOT CHANGE (MAY BE TWEAKED BASED ON OPERATIONAL RESULTS)
CALCULATION RESULTS

LOX SYSTEM (AVG DAY - AVG DOSE)	
PRESSURE RATING (psig)	175
OPERATING WT (lbs)	119,600
TARE WT (lbs)	33,000
EFFECTIVE VOLUME (lbs)	86,600
EFFECTIVE VOLUME (gals)	9,084
OXYGEN USAGE (ppd)	2833
OXYGEN GAS FLOW (scfm)	23.8
EFFECTIVE STORAGE (days)	30.6

9.53 LBS / GAL

LN SYSTEM (AVG DAY - AVG DOSE)	
PRESSURE RATING (psig)	250
OPERATING WT (lbs)	7,100
TARE WT (lbs)	3,800
EFFECTIVE VOLUME (lbs)	3,300
EFFECTIVE VOLUME (gals)	540
NITROGEN USAGE (ppd)	71
NITROGEN GAS FLOW (scfm)	0.7
EFFECTIVE STORAGE (days)	46.6

6.11 LBS / GAL

OPERATING CONDITIONS (AVG DAY)	
WATER PLANT FLOW (MGD)	10
OZONE DOSE (mg/l)	2.5
OZONE CONCENTRATION (%)	8
TRANSFER EFFICIENCY (%)	92
OZONE FEED RATE (ppd)	227

2833 ok

OPERATING CONDITIONS (MAX DAY)	
WATER PLANT FLOW (MGD)	18
OZONE DOSE (mg/l)	4
OZONE CONCENTRATION (%)	8
TRANSFER EFFICIENCY (%)	92
OZONE FEED RATE (ppd)	653

8159

STORAGE REQUIREMENTS		
DAYS @ AVG DAY - AVG DOSE	30	
LIQUID OXYGEN (lbs)	84986	
LIQUID NITROGEN (lbs)	2125	Use
NUMBER OF LOX TANKS	0.98	1
NUMBER OF LN TANKS	0.64	1

SUMMARY OF RESULTS

Based on Average Day Demand of 10 MGD and Average Dosage of 2.5 mg/L ozone at 8% concentration, a single 9,084 gallon LOX tank and a single 540 gallon LIN tank will provide the 30 days of storage. Two LOX tanks and two LIN tanks are provided for redundancy.

LOX — Avg Day Feed Rate: 2.5 mg/l * 10 * 8.34 = 208.5 ppd * 100 LBS LOX / 8 LBS LOX * 100/92 = 2833 LBS/DAY = 30.5 DAYS

at 12 MGD → 34 MLB/DAY (OR 25 DAYS)

Ref. WTP BOD Sec 3.5 — Max Day: 4.5 * 18 * 8.34 * 100/8 * 100/92 = 8159 LBS/DAY

~~LIN → Avg Day 2.5 * 10 * 8.34 = 208.5 LBS LOX~~

LN → 2833 * 0.025 = 71 ppd LN → 46 DAYS

& 12 MGD → 85.2 PPD → 39 DAYS

at 12 MGD Max 4.0 mg/l = 5490 LB / DAY (OR 15 DAYS)

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT APPLICATION FOR WATER SUPPLY SYSTEMS

(CONSTRUCTION - ALTERATION - ADDITION OR IMPROVEMENT) AS DESCRIBED HEREIN

Required under the Authority of 1976 PA 399, as amended

This application becomes an Act 399 Permit only when signed and issued by authorized Michigan Department of Environmental Quality (DEQ) Staff. See instructions below for completion of this application.

1. Municipality or Organization, Address and WSSN that will own or control the water facilities to be constructed. This permit is to be issued to: City of Flint 4500 North Dort Highway Flint, MI 48505 **WSSN:** 02310	Permit Stamp Area (DEQ use only) MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY PERMIT NO. W 140026 APR 09 2014 EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976
2. Owner's Contact Person (provide name for questions): Contact: Brent Wright Title: Plant Supervisor Phone: 810-787-6537	

3. Project Name (Provide phase number if project is segmented):	4. Project Location (City, Village, Township):	5. County (location of project):
Flint WTP Phase II, Segment II - Lime Residual Disposal	City of Flint	Genesee County

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR OF THE DEPARTMENT OF ENVIRONMENT QUALITY

cc:

Issued by: [signature]

Reviewed by: Patrick Cook for MFP for Mike Prusby

☐ **If this box is marked see attached special conditions.**

Instructions: Complete items 1 through 5 above and 6 through 21 on the following pages of this application. Print or type all information except for signatures. Mail completed application, plans and specifications, and any attachments to the DEQ District Office having jurisdiction in the area of the proposed construction.

Please Note:

a. This **PERMIT** only authorizes the construction, alteration, addition or improvement of the water system described herein and is issued solely under the authority of 1976 PA 399, as amended.
b. The issuance of this **PERMIT** does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other DEQ permits, or approvals from other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the date of issuance in accordance with R 325.11306, 1976 PA 399, administrative rules, unless construction has been initiated prior to expiration.
d. Noncompliance with the conditions of this permit and the requirements of the Act constitutes a violation of the Act.
e. Applicant must give notice to public utilities in accordance with 1974 PA 53, (MISS DIG), being Section 460.701 to 460.718 of the Michigan Compiled Laws, and comply with each of the requirements of that Act.
f. All earth changing activities must be conducted in accordance with the requirements of the Soil Erosion and Sedimentation Control Act, Part 91, 1994 PA 451, as amended.
g. All construction activity impacting wetlands must be conducted in accordance with the Wetland Protection Act, Part 303, 1994 PA 451, as amended.
h. Intentionally providing false information in this application constitutes fraud which is punishable by fine and/or imprisonment.
i. Where applicable for water withdrawals, the issuance of this permit indicates compliance with the requirements of Part 327 of Act 451, Great Lakes Preservation Act.

6. **Facilities Description** – In the space below provide a detailed description of the proposed project. Applications without adequate facilities descriptions **will be returned**. SEE EXAMPLES BELOW. Use additional sheets if needed.

Improvements to the City of Flint Lime Sludge Lagoons at Bray Road to allow lime sludge from the the Flint WTP to be stored during the interim period when the plant will be treating Flint River water. The lagoons will not be needed for continuous use when the plant switches to treatment of raw water from the KWA Lake Huron Water Supply:

PHASE II, SEGMENT II - LIME RESIDUAL DISPOSAL (@BRAY ROAD):
* Plugging and abandonment of 8" inlet piping; construction of 306 LF of new 10" inlet piping; installation of bulkhead on existing outlet structure to prevent discharge to surface water.
* Clay Berm barrier improvements to separate concrete debris pile from lime sludge.
* Construction of new decant tower structure, 8" gravity sewer, and decant pump station (duplex submersible) with CO2 feed system for pH adjustment. Vortex impeller pumps (2) shall each be rated at 140 gpm at 22' TDH; CO2 feed consists of 6 ton storage tank, 15 pph pH controlled feed system, SS gas piping, and diffusers installed in the decant tower.
* Construction of approx. 3,800 LF of 6" HDPE decant forcemain and connection to existing City santiary sewer system.

EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES	
Water Mains	500 feet of 8-inch water main in First Street from Main Street north to State Street. **OR** 250 feet of 12-inch water main in Clark Road from an existing 8-inch main in Third Avenue north to a hydrant.
Booster Stations	A booster station located at the southwest corner of Third Avenue and Main Street, and equipped with two, 15 Hp pumps each rated 150 gpm @ 200 feet TDH. Station includes backup power and all other equipment as required for proper operation.
Elevated Storage Tank	A 300,000 gallon elevated storage tank located in City Park. The proposed tank shall be spherical, all welded construction and supported on a single pedestal. The tank shall be 150 feet in height, 40 feet in diameter with a normal operating range of 130 – 145 feet. The interior coating system shall be ANSI/NSF Standard 61 approved or equivalent. The tank will be equipped with a cathodic protection system, and includes a tank level control system with telemetry.
Chemical Feed	A positive displacement chemical feed pump, rated at 24 gpd @ 110 psi to apply a chlorine solution for Well No. 1. Chlorine is 12.5% NaOCL, ANSI/NSF Standard 60 approved and will be applied at a rate of 1.0 mg/l of actual chlorine.
Water Supply Well	Well No. 3, a 200 foot deep well with 170 feet of 8-inch casing and 30 feet of 8-inch, 10 slot screen. The well will be equipped with a 20 Hp submersible pump and motor rated 200 gpm @ 225 feet TDH, set at 160 feet below land surface.
Treatment Facilities	A 5 million gpd water treatment plant located at the north end of Second Avenue. The facility will include 6 low service pumps, 2 rapid mix basins, 4 flocculation/sedimentation basins, 8 dual media filters, 3 million gallon water storage reservoir and 6 high service pumps. Also included are chemical feed pumps and related appurtenances for the addition of alum, fluoride, phosphate and chlorine.

General Project Information – Complete all boxes below.

7. Design engineer's name, engineering firm, address, phone number, and email address:

Jeremy N. Nakashima, PE
Lockwood, Andrews & Newnam, Inc.
1 Oakbrook Terrace, Suite 207
Oakbrook Terrace, IL 60181
630-495-4123 / jnnakashima@lan-inc.com

8. Indicate who will provide project construction inspection:
☒Organization listed in Box 1.
☒Engineering firm listed in Box 7.
☐Other - name, address, and phone number listed below.

9. Is a basis of design attached?
☒YES ☐NO

If no, briefly explain why a basis of design is not needed. Submitted previously under separate cover.

10. Are sealed and signed engineering plans attached?
☒YES ☐NO

If no, briefly explain why engineering plans are not needed. Plans and specs submitted previously under separate cover.

11. Are sealed and signed construction specifications attached?
☒YES ☐NO

If specifications are not attached, they need to be on file at DEQ.

12. Were Recommended Standards for Water Works, Suggested Practice for Water Works, AWWA guidelines, and the requirements of Act 399 and its administrative rules followed?
☒YES ☐NO

If no, explain which deviations were made and why.

13. Are all coatings, chemical additives and construction materials ANSI/NSF or other adequate 3rd party approved?
☒YES ☐NO

If no, describe what coatings, additives or materials did not meet the applicable standard and why.

14. Are all water system facilities being installed in the public right-of-way or a dedicated utility easement? (For projects not located in the public right-of-way, utility easements must be shown on the plans.)
☐YES ☒NO

If no, explain how access will be obtained. Most work will be on City owned property, except forcemain.

15. Is the project construction activity within a wetland (as defined by Section 324.30301(d)) of Part 303, 1994 PA 451?
☐YES ☒NO

If yes, a wetland permit must be obtained.

16. Is the project construction activity within a 100-year floodplain (as defined by R 323.1311(e)) of Part 31, 1994 PA 451, administrative rules?
☐YES ☒NO

If yes, a flood plain permit must be obtained.

17. Is the project construction activity within 500 feet of a lake, reservoir, or stream?
☒YES ☐NO

If yes, a Soil and Erosion Control Permit must be obtained or indicate if the owner listed in box 2 of this application is an Authorized Public Agency (Section 10 of Part 91, 1994 PA 451) ☐ Owner is APA.

18. Will the proposed construction activity be part of a project involving the disturbance of five (5) or more acres of land?
☐YES ☒NO
If yes, is this activity regulated by the National Pollutant Discharge Elimination System storm water regulations?
☐YES: NPDES Authorization to discharge storm water from construction activities must be obtained.

☐NO: Describe why activity is not regulated:
Please call 517-241-8993 with questions regarding the applicability of the storm water regulations.

19. Is the project in or adjacent to a site of suspected or known soil or groundwater contamination?
☐YES ☒NO

If yes, attach a copy of a plan acceptable to the DEQ for handling contaminated soils and/or groundwater disturbed during construction. Contact the local DEQ district office for listings of Michigan sites of environmental contamination.

20. IF YOU ARE A CUSTOMER/WHOLESALE/BULK PURCHASER, COMPLETE THE FOLLOWING

1) Name and WSSN of source water supply system (seller) _____

2) Does the water service contract require water producer/seller to review and approve customer/wholesale/bulk purchaser water system construction plans?
☐YES ☐NO

If yes to #2, the producer/seller approval letter must be attached when submitted to DEQ.

21. **Owner's Certification** The owner of the proposed facilities or the owner's authorized representative shall complete the owner's certification. It is anticipated that the owner will either be a governmental agency (city, village, township, county, etc.) or a private owner (individual, company, association, etc.) of a Type I public water supply.

OWNER'S CERTIFICATION

I, BRENT F. WRIGHT (print) (name), acting as the WATER PLANT SUPERVISOR (print) (title/position) for CITY OF FLINT (print) (entity owning proposed facilities) certify that this project has been reviewed and approved as detailed by the Plans and Specifications submitted under this application, and is in compliance with the requirements of 1976 PA 399, as amended, and its administrative rules.

Signature* _____ Date 3-31-2014 Phone (810) 787-6537

*Original signature only, no photocopies will be accepted.

PROJECT BASIS OF DESIGN – FOR WATER MAIN PROJECTS

PROJECT NAME: _____

For this PROJECT the following information must be provided per Act 399 unless waived by the Department. For projects other than water main installation, or if additional space is needed, attach separate sheet(s) with detailed Basis of Design calculations.

A. A general map of the initial and ultimate service areas
☐ Included on engineering plans ☐ Attached separately

B. Number of service connections served by this permit application _____

C. Total number of service connections ultimately served by entire project _____

D. Residential Equivalent Units (REUs) served by this permit application _____

E. Total Residential Equivalent Units (REUs) ultimately served by entire project _____

F. Water flow rates for proposed project based on REUs listed in "D' and "E" above

1. Initial design average day flow (mgd) _____
2. Initial design maximum day flow (mgd) _____
3. Total design average day flow (mgd) _____
4. Total design maximum day flow (mgd) _____
5. Required fire flows: (1) _____ gpm for _____ hours

G. Actual flows and pressures of existing system at the connection point(s) (2)
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi

H. Estimated minimum flows and pressures within the proposed water main system (3) _____ gpm at _____ psi

(1) Every water system must decide what levels of fire fighting flows they wish to provide. Fire flow should be appropriate for the area (residential, commercial, industrial) being served by the project. Typical fire flow rates can be obtained from the water supply, local fire dept., ISO or AWWA. The water system must then be designed to be able to provide the required fire flows while maintaining at least 20 psi in all portions of the distribution system.

(2) Flows and pressures at the connection points must be given to determine if the existing water main(s) are able to deliver water to the new service area. These numbers can be obtained from a properly modeled and calibrated distribution system hydraulic analysis or hydrant flow tests performed in the field. If more than one connection is proposed, list as needed.

(3) List what the estimated minimum flows can be expected in the proposed water mains based on estimated water demands, head losses, elevation changes and other factors that may affect flows, such as dead end mains.

Flint WTP Improvements – Phase II, Segments I, II, and III
Responses to MDEQ Review Comments dated 4-3-2014

The MDEQ review comments dated 4-3-14 have been addressed as noted in the responses below. Revised drawings have also been prepared in conjunction with these responses and have been included in the attached revised drawing sets for Phase II, Segments I, II, and III.

DEQ
RESOURCE MANAGEMENT DIVISION
APR 08 2014
LANSING DISTRICT

Phase II – Segment 1 - Watermain Cut-in Plans

- **Mid-Pt Chlorination - update plans to depict the additional anti-siphon/ball valve as described in your response to our March 19, 2014 comments. Most likely to be added to Sheet C-508.**

  Response: The anti-siphon/ball valve is shown on revised Sheet C-104, dated 4-7-14.

- **Include a full-sized mid-point chlorination system schematic with the updated plans.**

  Response: The mid-point chlorination system schematic has been included in the Phase II, Segment I – Initial Watermain Cut-in drawings as Sheet C-509, dated 4-7-14.

- **It appears that make-up water and chlorine gas are not combined at the chlorine feeder (panel w. rotometer, vacc. monitor, auto. feed control valve, etc.) for production of liquid chlorine. Instead, this appears to take place at the ejector/check valve assembly on the plant supply line. Please confirm. If gas under vacuum is conveyed to the ejector at the plant supply line, the gas piping must be Schedule 80 seamless steel tubing. Please confirm. This can be included on the chlorination system schematic.**

  Response: The above description of the midpoint chlorination system is essentially correct. As shown on Sheet C-509, the mid-point chlorination system is a vacuum system. The vacuum regulators are mounted directly to the chlorine storage cylinders. Vacuum lines run from the regulators to the chlorinator control panels where feed rate is controlled. Vacuum lines are then connected from the control panel to ejectors, where water supply flowing through the ejectors creates the vacuum required to pull gas from the storage tanks. While the ejectors are not located in the control panel, it is common to have the ejectors remotely mounted from the control panels. A review of the 10 State Standards requirement for Schedule 80 seamless steel tubing appears to be for pressure gas feed systems, and not vacuum gas feed systems as proposed for Flint. As such, the recommended vacuum line material for a 500

ppd system is 5/8" O.D. flexible polyethylene plastic tubing (see attached information from Hydro Instruments).

Please provide 2 full-sized sets of Watermain Cut-in Plans that include the requested information and revisions.

Phase II - Segment 1 - WTP Rehabilitation Plans

- **LOX/LN Storage & Piping – update plans to depict revised sheets D2-102 and D2-601. The revisions were made to clarify the gas piping configuration.**

  Response: Revised drawings D2-101, D2-102, D2-301, D2-502, and D2-601 have been included in the updated plan set.

- **The existing LOX storage tank will provide approximately 16 days storage at max design rate at 12.0 MGD until the second tank is installed. The Act 399 permit will be issued with a condition that the MDEQ is provided a copy of the contract between the city and the LOX supplier that specifies the maximum delivery time. The LOX system shall be operated such that a minimum of 5 days storage is maintained in the LOX tank at all times.**

  Response: The City will provide MDEQ a copy of the contract between the City and their LOX supplier under separate cover. LOX can be supplied within 24 hours of when a purchase order is issued.

- **Mid – Point Chlorination (Chlorine room) - revise sheets C5-105 and C5-508 to show deletion of the chlorine gas scrubber system.**

  Response: Sheets C5-105, C5-508, and EP6-101, which are all specific to the chlorine scrubber work only, have been deleted in their entirety from the updated plan set.

- **Revise the ventilation intake duct detail (Sheet C5-508) to as described in your response.**

  Response: This intake duct detail is no longer applicable as it is for the chlorine scrubber system, which has been deleted. As noted in the previous MDEQ review comment responses, the City will extend the existing ventilation intake ductwork in the existing Chlorine Storage Room to finished floor level. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see Note 7 of revised drawing Sheet C-103.

- **Add panic hardware to chlorinator room door (east and west exits).**

  Response: The City will perform this work. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see Note 8 of revised drawing Sheet C-103.

- **The existing door between P.S. 4 and the chlorine gas storage room should be closed off such that the chlorine gas storage room and chlorinator room are only assessable from the outside. Although an improved door sweep is proposed, door sweeps are not failsafe in a catastrophic gas release and such an event could jeopardize the entire P.S. #4.**

  Response: The City will perform this work. This work has been added to the Phase II, Segment I – Initial Watermain Cut-in plan set, see notes on revised drawing Sheet C-103.

- **Raw Water Piping – the proposed 54X42 cross provides minimal vertical separation (approximately 6-inches). A pair concrete cradles installed on each side of the 54-inch concrete main will mitigate the force of the 42-inch main installed above at the crossing. A condition will be added to the Act 399 permit to field adjust the 42-inch main installation to maximize the vertical separation at the crossing.**

  Response: The Contractor is required to field verify the elevation of the existing 54" pipeline. The City or the City's representative onsite observing construction will coordinate with the Contractor to ensure that the clearance between the 42" and 54" pipelines is increased to the maximum extent practical.

Please provide 2 full-sized sets of WTP Rehabilitation Plans that include the requested information and revisions.

<u>Phase II – Segment 2 - Bray Road Sludge Lagoon</u>

Provide 2 full-sized sets of construction plans for proposed work at the Bray Road sludge lagoon. Separation between the concrete disposal area the lime sludge disposal area by metal sheet piling, as discussed in our meeting, needs to be depicted.

Response: 2 full sized sets of construction plans of proposed work at the Bray Road Sludge Lagoon are included for your review and file. The separation barrier between the concrete disposal area and the lime sludge disposal area will be accomplished by

establishing a clay barrier that extends to the bottom of the original lagoon bottom as shown in the detail on sheet C-501. The separation barrier will be constructed within the lime sludge lagoon away from the concrete disposal area as to provide complete separation as discussed.

Prepare final Bray Road Lime Sludge Management Plan. The plan also needs to include establishment of a level working surface in the west portion of the lagoon and removal of the island.

Response: A final version of the Bray Road Lime Sludge Management Plan is being included with this final submittal. A level working surface of 738.5' has been designated within the sludge lagoon after the pump station is operational. All debris or vegetation growth within the 742' elevation within the sludge lagoon is intended to be removed and cleared by the contractor.

The Act 399 permit will also include a condition requiring the sheet piling to be driven deep enough into native soil to maintain its structural integrity for removal of waste material on the exterior portion of the lagoon.

Response: Sheet piling is no longer being used as the separation barrier based on further discussion with the contractor and availability. A clay berm will be constructed for the full depth within the lime sludge lagoon using the original bottom of the sludge lagoon as a base using the proposed alignment proposed for the sheet piling.

Act 399 Permit Applications:

WTP Rehabilitation:

Part 6 (Facilities Description) needs to discuss the provisions for the stand-by generator. The description needs to be added in the Phase II – Segment III – Electrical Improvements (@WTP) – (i.e. transfer switch, universal generator connection)

Response: See attached revised Part 6 of the Act 399 Permit Application forms.

Bray Road (Flint WTP Phase II, Segment II – Lime Residual Disposal)

Please revise Part 6 (Facilities Description) since a berm-liner system will not be used to separate the lime sludge area from the concrete debris area. Eliminate "Berm/liner" from the statement: "Berm/liner or Sheet Piling improvements to separate concrete debris from lime sludge."

Response: See attached revised Part 6 of the Act 399 Permit Application forms.

Lockwood, Andrews & Newnam, Inc.

TRANSMITTAL

Filing Data Code 1-07

PLANNING

ENGINEERING

PROGRAM MANAGEMENT

Est. 1935

AUSTIN, TX
CHICAGO, IL
CLEARWATER, FL
COLLEGE STATION, TX
DALLAS, TX
FLINT, MI
FORT WORTH, TX
HOUSTON, TX
HUNTINGTON BEACH, CA
LAS VEGAS, NV
LOS ANGELES, CA
MIAMI, FL
MILPITAS, CA
PHOENIX, AZ
SACRAMENTO, CA
SAN ANTONIO, TX
SAN MARCOS, TX
WACO, TX

☐ UPS ☐ FEDEX
☐ DELIVERY SERVICE ☒ HAND DELIVER ☐ OVERNIGHT
☐ REGULAR MAIL ☐ PICK-UP ☐ OTHER Extranet(To PM)

To: Mr. Steve Busch, PE	Date: 4-8-14
	Project Number: 130-10701-001
Company: MDEQ	Routing:
Address: 525 WEST ALLEGAN STREET, Lansing, MI 48933	
Project: City of Flint Water Treatment Plant Improvements.	

We Are Sending You:		These Are Transmitted:
☐ Shop Drawings	☐ Reports	☐ As Requested
☐ Original Drawings	☐ Submittal Data	☒ For Your Use
☒ Prints	☐ Proposal	☒ For Review and Comment
☐ Specifications	☐ As Noted	☐ For Your Signature
☐	☐	☐
☐	☐	☐

Quantity	Description
2	22x34 Plans - Phase II, Segment 1 – Rehabilitation
2	22x34 Plans - Phase II, Segment 1 – Initial Watermain Cut-In
2	22x34 Plans - Phase II, Segment II – Lime Residual Disposal
2	Final Bray Road Lime sludge management Plan
1	Updated page 2 for permit applications
1	LAN Team Response to MDEQ Review comments

Remarks

These plans are being submitted for permit issuance as discussed.

DEQ
RESOURCE MANAGEMENT DIVISION
APR 08 2014
LANSING DISTRICT

Distribution	Prepared By
1- Daugherty Johnson 2- Brent Wright 3- File	Samir Matta, PE

1311 SOUTH LINDEN ROAD
SUITE B
FLINT, MI 48532
TEL 810.820.2682
FAX 810.820.2703
www.lan-inc.com

If enclosures are not as noted, kindly notify us at once.

B-018-11

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
April 3, 2014

Phase II – Segment 1 - Watermain Cut-in Plans

- Mid-Pt Chlorination - update plans to depict the additional anti-siphon/ball valve as described in your response to our March 19, 2014 comments. Most likely to be added to Sheet C-508.

- Include a full-sized mid-point chlorination system schematic with the updated plans.

- It appears that make-up water and chlorine gas are not combined at the chlorine feeder (panel w. rotometer, vacc. monitor, auto.-feed control valve, etc.) for production of liquid chlorine. Instead, this appears to take place at the ejector/check valve assembly on the plant supply line. Please confirm. If gas under vacuum is conveyed to the ejector at the plant supply line, the gas piping must be Schedule 80 seamless steel tubing. Please confirm. This can be included on the chlorination system schematic.

Please provide 2 full-sized sets of Watermain Cut-in Plans that include the requested information and revisions.

Phase II - Segment 1 - WTP Rehabilitation Plans

- LOX/LN Storage & Piping – update plans to depict revised sheets D2-102 and D2-601. The revisions were made to clarify the gas piping configuration.

- The existing LOX storage tank will provide approximately 16 days storage at max design rate at 12.0 MGD until the second tank is installed. The Act 399 permit will be issued with a condition that the MDEQ is provided a copy of the contract between the city and the LOX supplier that specifies the maximum delivery time. The LOX system shall be operated such that a minimum of 5 days

Act 399 Permit Applications:

WTP Rehabilitation:

Part 6 (Facilities Description) needs to discuss the provisions for the stand-by generator. The description needs to be added in the Phase II – Segment III – Electrical Improvements (@WTP) – (i.e. transfer switch, universal generator connection)

Bray Road (Flint WTP Phase II, Segment II – Lime Residual Disposal)

Please revise Part 6 (Facilities Description) since a berm-liner system will not be used to separate the lime sludge area from the concrete debris area. Eliminate "Berm/liner" from the statement: "Berm/liner or Sheet Piling improvements to separate concrete debris from lime sludge."

storage is maintained in the LOX tank at all times.

- Mid – Point Chlorination (Chlorine room) - revise sheets C5-105 and C5-508 to show deletion of the chlorine gas scrubber system.

- Revise the ventilation intake duct detail (Sheet C5-508) to as described in your response.

- Add panic hardware to chlorinator room door (east and west exits).

- The existing door between P.S. 4 and the chlorine gas storage room should be closed off such that the chlorine gas storage room and chlorinator room are only assessable from the outside. Although an improved door sweep is proposed, door sweeps are not failsafe in a catastrophic gas release and such an event could jeopardize the entire P.S. #4.

- Raw Water Piping – the proposed 54X42 cross provides minimal vertical separation (approximately 6-inches). A pair concrete cradles installed on each side of the 54-inch concrete main will mitigate the force of the 42-inch main installed above at the crossing. A condition will be added to the Act 399 permit to field adjust the 42-inch main installation to maximize the vertical separation at the crossing.

Please provide 2 full-sized sets of WTP Rehabilitation Plans that include the requested information and revisions.

Phase II – Segment 2 - Bray Road Sludge Lagoon

Provide 2 full-sized sets of construction plans for proposed work at the Bray Road sludge lagoon. Separation between the concrete disposal area the lime sludge disposal area by metal sheet piling, as discussed in our meeting, needs to be depicted.

Prepare final Bray Road Lime Sludge Management Plan. The plan also needs to include establishment of a level working surface in the west portion of the lagoon and removal of the island.

The Act 399 permit will also include a condition requiring the sheet piling to be driven deep enough into native soil to maintain its structural integrity for removal of waste material on the exterior portion of the lagoon.

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
March 19 , 2014

Segment 1 - Cut –in Piping

The detail shows air-release manholes with corp. stops? How will the air release operation be executed? Means to drain the manhole?

Written response needed.....

Segment 1 – WTP Rehab

1. Raw Water Piping – Maintain back-up supply from Gen Co. during interim operation at C.S. #2. Sheet C5-102

   54X42 cross (Sheet C5-501 & C5-101) only 6-inches – Support?

   Air-release manhole – same as Cut-in piping

   Current yard piping diagram?

Written response needed on the first 3 items. Yard piping diagram will be a work in progress.

2. Mid-Point CL2 - Basis of design provided

   - Scale – use existing or proposed? If poposed - type, capacity
   - Scrubber?
   - Room air-exchange rate ?
   - Pipe penetrations – discuss protective seal
   - Floor drains – discuss
   - Door sweep - discuss
   - Scrubber piping – lower intake

8 1 516 6793

- Check valve/anti-siphon at influent channel - include in final

3. High Service Pump

   Will mechanical ball valve operate like a check valve in event of unexpected pump shut-down?

   TDH of current pump and proposed pump?
   Conformance of proposed pump TDH with system head curve?

   Written response needed.....

4. LOX/LN Storage

   Piping configuration clarified
   The LN calculation (71 ppd) is not clear. Is there a % concentration or transfer efficiency?

5. Electrical improvements

   Are operation of the pumps being split with the MCC or are multiple MCCs being provided?

   Written response needed.....

Flint WTP Improvements
Phase II
Segments I-III
MDEQ Comments
February 27, 2014

2 FKNS
– ACCESS
– MONUMENTS O.R. INC
TO CONNECT TO CORP
TO ACCESS AIR
FILLING FILLING

Segment 1 - Cut –in Piping

✓ The detail shows air-release manholes with corp. stops? How will the air release operation be executed? Means to drain the manhole?
↳ PUMP EM DOWN

Segment 1 – WTP Rehab

✓ 1. Raw Water Piping – Maintain back-up supply from Gen Co. during interim operation at C.S. #2. Sheet C5-102 → NOT GOING JUST PRIOR TO K.R. AVAILABILITY

✓ 54X42 cross (Sheet C5-501 & C5-101) only 6-inches – Support?
↳ Field adjust the steel WM – MAXIMIZE the vert sep.

✓ Air-release manhole – same as Cut-in piping
↳ SAME DESIGN

Current yard piping diagram? – WORK IN PROGRESS SAME AP. CONCEPT

2. Mid-Point CL2 - Basis of design needed

- Application rate (both mid-pt & post for CT)
- CL2 gas max dosage LBs/Day
- Scale – type, capacity ✓ 4 NEW SCALETRON IND.
- Rotometer (lbs/day)
- Vacc reg, injector, educator (size)
- Scrubber capacity – NOT BEING INSTALLED
- Room air-exchange rate 1/3.3 MIN
- Pipe penetrations – Sheet C-103 – linkseal – gas resistant? – WILL INSPECT & SEAL
- Floor drains – to be plugged
- Door sweep – NEW BETTER SEALING SWEEPS TO BE PROVIDED
- Safety features – obs window, fan, lights, switches, panic bar
- Scrubber piping – lower intake → WILL EXTEND TO FLOOR W. 90° BEND
- Check valve/anti-siphon at influent channel – YES

hydraulic actuator
will close on system failure/shut-down

3. High Service Pump

Will mechanical ball valve operate like a check valve in event of unexpected pump shut-down?

185 will match w. smaller pump

TDH of current pump and proposed pump?
Conformance of proposed pump TDH with system head curve?

4. LOX/LN Storage

LOX & LN piping clarification – Sheet D2-102 & D2-601
BOD for storage
Ozone was designed at 4.0 mg/l max dose @ 36 MGD (Sec. 3.5 WTP BOD)

Ozone max dose at 18.0 MGD is 650 Lbs/day

How many GPD does this equate to?

5. Electrical improvements

Are operation of the pumps being split with the MCC or are multiple MCCs being provided?

One switchgear - dual feed
Two breakers - Kirkley

Flint WTP Improvements – Phase II, Segments I, II and III

Responses to MDEQ Review Comments dated 3/19/2014

Segment I – Initial Watermain Cut-in

1. Detail 2, Sheet C-504, "Air Release & Access Manhole," shows a 2" corp stop for air release. These are intended to be manual air release valves for exhausting air upon initial filling of the pipeline or after maintenance has been performed and refilling the pipeline. The manhole structure will be checked periodically and pumped out with a portable sump pump as part of the normal plant maintenance program.

Segment 1 – Rehabilitation

1. Raw Water Piping
   a. Maintain back up supply from Genesee County during interim operation at C.S. #2. Installation of the 42" raw water piping has been delayed until the KWA project is closer to being ready to supply water to the City. This will allow the City to maintain the backup supply from Genesee County during interim operation.
   b. The crossing of the new 42" steel pipe over the existing 54" concrete pipe is shown in plan on drawing sheet C5-101, with Detail 5, Sheet C5-501 showing how the 42-inch line will be supported. As shown on Detail 5, Sheet C5-501, the new 42-inch line will have concrete pipe cradles constructed on either side of the existing 54" pipe, maintaining a minimum clearance of 12" on either side of the 54" pipe. Pipe loads from the 42" line will then be transferred to the pipe cradles and into the soil, and not the 54" pipe. The 6" clearance between the two pipes will be backfilled with CLSM material as it will be impossible to compact typical granular bedding material under the 42" pipe.
   c. Detail 2, Sheet C5-505, "Air Release & Access Manhole," shows a 2" corp stop for air release. These are intended to be manual air release valves for exhausting air upon initial filling of the pipeline or after maintenance has been performed and refilling the pipeline. The manhole structure will be checked periodically and pumped out with a portable sump pump as part of the normal plant maintenance program.
   d. See attached color coded yard piping diagram.

2. Midpoint Chlorination
   a. Four (4) new scales will be provided for monitoring chlorine usage from ton containers. Scales shall be as manufactured by Scaletron Industries Ltd. with a load range of 0 to 4000 lbs.
   b. The City has not been able to determine that the chlorine scrubber is a requirement of any applicable code. At this time, the City will not be installing the chlorine scrubber shown on the design drawings and will rely on the existing ventilation system to exhaust air from the Chlorine Storage Room.
   c. The existing ventilation in the Chlorine Storage Room was tested to have a capacity of 18.3 air changes per hour, or 0.305 air changes per minute. Therefore, one room volume air

change would take approximately 3.3 minutes with the current ventilation system. See attached test results. Due to the size of the existing Chlorine Storage Room, a ventilation system of 1 air change per minute is not practical. While the existing ventilation system capacity is less than 1 air change per minute, it appears to be in compliance with 10 State Standards as lesser rates may be considered in cases where 1 air change per minute is not appropriate due to the size of the room.

d. WTP staff will identify and inspect all proposed and existing piping and conduit wall penetrations in the Chlorine Storage Room and seal as necessary to prevent gas leakage into other parts of Pump Station No. 4.

e. Existing floor drains in the Chlorine Storage Room were for condensate from the old chlorine evaporator system. These drains will no longer be used and will be plugged by WTP staff.

f. WTP staff will attach new door sweeps with better seals at existing doors as required.

g. WTP staff will extend existing ventilation intake ductwork to finished floor level with 90-degree bends.

h. Per Addendum No. 1, an Anti-siphon / Back Pressure Valve and additional ball valve shall be added just prior to the trough wall penetration. The anti-siphon / back pressure valve shall be PVC and designed for use with chlorine systems. The valve shall be a LMI #35856, Walchem E90422, or engineer approved equivalent. The valve shall be installed between the two ball valves to allow for isolation during servicing. The valve shall be located above the high water level in the trough. The Contractor shall install a 1" drain line from the relief port to the finished floor elevation of the pipe gallery.

Door sweeps not fail SAFE

would like to Read Cl_2 & usage

3. High Service Pump
   a. The new 16" pump control ball valve for HSP #1 replaces the existing pump control ball valve in kind and will operate in the same manner as the existing valve. The valve will act like a check valve upon emergency shutdown of the pump through the use of a hydraulic cylinder actuator that will automatically close the valve. The cylinder actuator uses hydraulic water system pressure to supply the energy required to close the valve.
   b. The existing HSP #1 is rated for 25 MGD at 185' TDH. The proposed replacement HSP #1 is rated for 15 MGD at 185' TDH, matching the head condition of the existing pump.
   c. Results from the City's hydraulic model were used to develop system curves for max day and average day, which were used to confirm pump selection. The proposed HSP #1 will operate on a VFD which can be adjusted during operation to meet various duty points depending on demand.

4. LOX/LIN Storage
   a. Nitrogen usage is calculated based on 2.5 % of the oxygen usage:

      2,833 ppd O_2 x 0.025 = 71 ppd N_2

5. Electrical Improvements
   a. The operation of the pumps is contained within a single switchgear at Pump Station No. 4. However, there will be a dual feed coming into the main plant switchgear that will supply redundant power to the plant, including Pump Station No. 4. There will also be two breakers

at the main plant switchgear that feed two different breakers at Pump Station No. 4. Therefore, any one point of failure will not take the system down.

DEQ
RESOURCE MANAGEMENT DIVISION
APR 08 2014
LANSING DISTRICT

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TO OWMA

Proposed Bray Road Lime Sludge Management Plan

1. Introduction

The City of Flint plans to utilize their existing WTP to provide water on a continuous basis. The city plans to treat water from the Flint River until construction of the proposed KWA supply system is complete and the WTP can then be used to treat water from Lake Huron. Until then, The City of Flint will be utilizing the Bray Road Disposal site to pump lime sludge for interim storage with decant water being pumped into the City of Flint sanitary sewer system. The Flint River and consequently the Bray Road facility will be utilized during the KWA Supply System era for emergencies or to supplement water supply demands beyond current max day provided by KWA.

2. Proposed Lime Sludge Management Plan

LAN has been working with the City to evaluate, design and implement a lime residuals disposal plan to handle softening sludge for the interim period and long term operation of using the Flint River as a water source. The most feasible option is the use of Bray Road lagoon which was constructed in 1958. The site has been used intermittently since then during select test runs by the City. However, a concern by the MDEQ about unauthorized discharges into the neighboring stream and disposal of street sweeping, concrete and asphalt chunks has made this site off limits for the time being. Our team is working with City staff to develop a preliminary work plan and schedule that will address the concerns of the MDEQ and allow the use of the site for continued discharges of lime sludge in the interim basis and in the long run when emergencies and supplemental water supply require the use of lime softening at the water treatment plant.

EXISTING SYSTEM

The most common sludge dewatering method is use of lagoons to settle the lime sludge and decant the water. The lime sludge from the water treatment clarifiers is transferred by pipe to a dewatering lagoon, e.g. at the Bray road site. The pipe network for the discharge line into the Bray Road site consists of an 8 " pipe with multiple discharge feeders with valves that distributes the flow of the lime sludge into the dewatering lagoon. This facility has one large dewatering lagoon and one small lagoon for decant water. The two are separated by a dike and a concrete structure with an adjustable stop log system that controls the flows between the two lagoons. The large dewatering lagoon is capable of decanting the water on top of the sludge (supernatant) to the adjacent small lagoon for discharge to the nearby Cornwell Drain via an outlet tower. See Figure 1 - Existing Site Layout. Figure 2 – Decant Lagoon Blow Up.

The site was constructed in the late 1950s and was used on a permanent basis until the City entered into a contract to obtain treated water from the City of Detroit, at which time; the site was used occasionally for test runs as a redundant system. During this period, the City of Flint did not control fully site activities and some unauthorized discharges of illegal debris got placed within the site that has compromised the use of the site. As a result, The MDEQ has, on multiple occasions, requested that the City secure the site and insures that these activities are suspended while addressing the illegal disposal of street sweeping, concrete and asphalt debris within the site. See Figure 3.

PROPOSED SYSTEM

The proposed upgrades associated with the Softening Residuals Disposal have been categorized into Phase II – Segment II and are to be completed as soon as practical so that the WTP can be utilized to treat water from the Flint River in the spring of 2014. However, the use of the Bray Road lagoon for other disposal activities will require that this issue be addressed independently to certain extent as to isolate the problem areas while working with MDEQ to permit its use for lime sludge disposal.

In order to analyze the issues, define the possibility of using the site and address MDEQ concerns, the LAN Team has performed additional survey, geotechnical and environmental testing at the site in order to assess the condition of the lime sludge in the basin and to verify the capacity of the lagoon system. Based on the preliminary findings of this evaluation, proposed improvements will be designed to accommodate the use of the facility in the interim basis (during the use of the Flint river) while addressing some of the MDEQ concerns about the site and any unauthorized discharges into the nearby stream. Permitting for site use will be incorporated as part of the overall design improvements at the WTP and submitted to the MDEQ for their pre-permit review and comments. A final package will be submitted to the MDEQ at the 100% design stage for permit issuance and approval of work plan.

The intended Work plan encompasses the following action items:

1. Evaluate the existing conditions in comparison to the original site design and its intended functionality in order to evaluate required design changes. Figures 1 & 2 highlight the original design and select key elements while Figure 3 shows the changes that may affect proper operation of the system.
2. Site survey of the project site has been completed. Collected data confirms the plan that the site has the required capacity to handle the continuous full time operation of the plant during the next 30 to 36 months until the KWA system is constructed and connection is made at which time, lime softening will not be required. Figure 4 highlights the current

site features and proposed elevation for the required volume and anticipated 2 feet free board.

3. In order to address MDEQ concerns about discharges to the Cornwell Drain, the outlet tower will be capped to terminate any discharges to the stream while lime softening is in use at the WTP.
4. A separation barrier will be constructed to isolate the disposal area from the lime sludge discharge bay as shown in Figure 4.
5. A decant structure and submersible pump station will be constructed in the SE corner of the upper lagoon bay to treat and dispose of flows into the City's sanitary system. This system will be fully operational while the plant is treating river water and lime softening is required. A new storm treatment outlet structure may be reestablished with the approval of MDEQ after the KWA connection is online and lime softening is no longer in use.
6. In order to assess the potential impact of the disposal site on the ground water, two new monitoring wells were installed along the west side of the site in order to analyze the characteristics of the flow entering the site while using the existing monitoring wells to check whether these characteristics have worsened or not. Based on the results of the well data collected, it does not seem that the debris area is a cause for contamination to the site; However, The City will have to develop a more definitive environmental work plan to further evaluate and insure that the debris will not cause any detrimental effect on the groundwater system.

PROPOSED MANAGEMENT PLAN

Drying and selling lime sludge for agricultural lime is a desirable solution to the disposal problem, since the money made by the sale offsets the disposal cost paid by the water treatment plant: if the lime sludge were not sold as a product, no value for the material could be recovered. However, The City of Flint has not had the time to research this option and find a suitable consumer(s) for such a transaction. But this option will be pursued and the plan will be modified for approval by the MDEQ when such option becomes viable.

Lime sludge could be disposed of in municipal solid waste (MSW) landfills. However, it is Safe to assume that MSW landfills would prefer stockpiled lime sludge to be somewhat dry, because landfills need to minimize the amount of leachate they generate. Furthermore, if lime sludge were sent to a MSW landfill, the producer of the sludge may have to pay for the costs of drying, loading, and transporting the sludge, plus tipping fees.

Since the sludge may need to be retained in the lagoon for an average 10 -12 months before it is excavated from the dewatering lagoon with a backhoe and isolated to be dried in the sun during the summer in a month or two depending on air temperature, sun exposure, and humidity. Therefore The City of Flint is proposing the following approach to their lime sludge management plan:

1. The City is committed to removing all new lime sludge to be generated during the operation of the plant using Flint River water in addition to 10% of the lime sludge already in place at the site.
2. The equivalent of 10% of existing lime sludge and all future accumulations will be disposed of site either at the landfill or using approved land application sites.
3. Existing lime sludge on site will be manipulated and stored in two semi isolated bays along the north side of the lagoon in order to allow the City to start removing it from site for disposal at the landfill until land application sites are determined and approved by MDEQ.
4. The four available orifices, on site, will be utilized to discharge lime sludge into the lagoon system based on a quarterly or semi-annual rotating schedule as to allow for proper distribution of the lime sludge within the lagoon.
5. No flows will be permitted into the decant lagoon until the pump station is fully operational. However, the plan is to maintain the level working surface within the sludge lagoon at 738.5' while the pump station and decant system is operational.

3. Implementation Schedule

The majority of the work associated with the operation of the WTP will need to be accomplished and completed by April 15, 2014 so the plant can be operational by April 17, 2014. All work associated with the Bray road site may not be complete but the following activities will be completed in order to allow for the successful operation of the Plant with MDEQ approval. The activities to be completed immediately are as follows:

1. Suitable Barrier of clay berm will be constructed to isolate the disposal area from the dewatering lagoon and will be completed as agreed to with MDEQ.
2. Outlet Tower will be bulk headed out of the decant lagoon as to insure no outflow to the stream nearby (Cornwell Drain).
3. New orifice will be installed near the SE corner of the site to replace the two damaged that will be abandoned.
4. Stop logs will be in place to isolate the dewatering lagoon from the decant lagoon until the pump station is operational.
5. Existing lime sludge will be manipulated along the edges as to excavate and store dry lime sludge in the upper two semi isolated bays for regular removal and disposal at the landfill until land application options are available for permitted use.

The City is committed to provide the appropriate improvements for the proper use of the site as a lime sludge disposal facility while addressing the issues associated with the unauthorized disposal areas so the site can be closed suitably and allow it to function as initially intended.

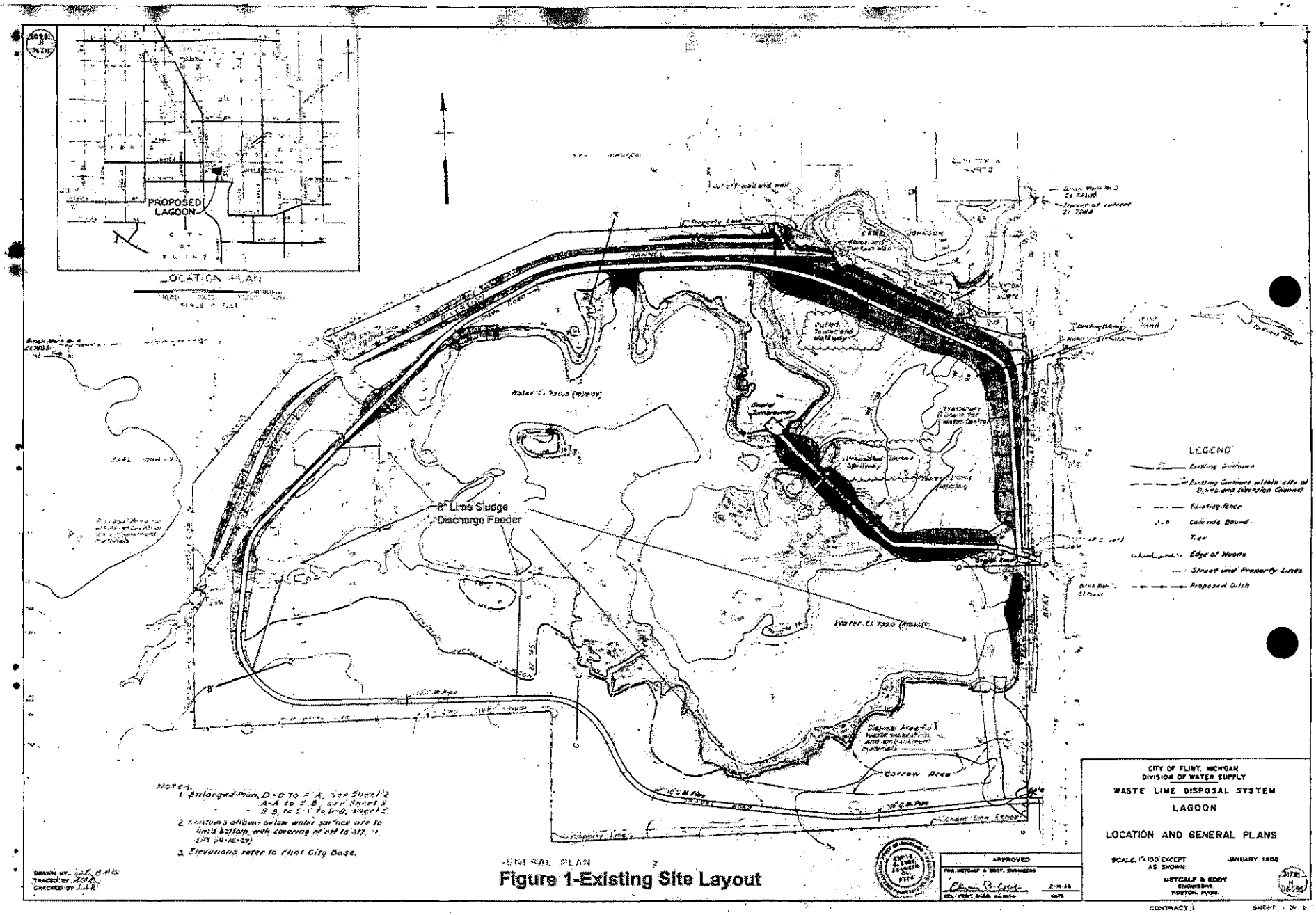


Figure 1-Existing Site Layout

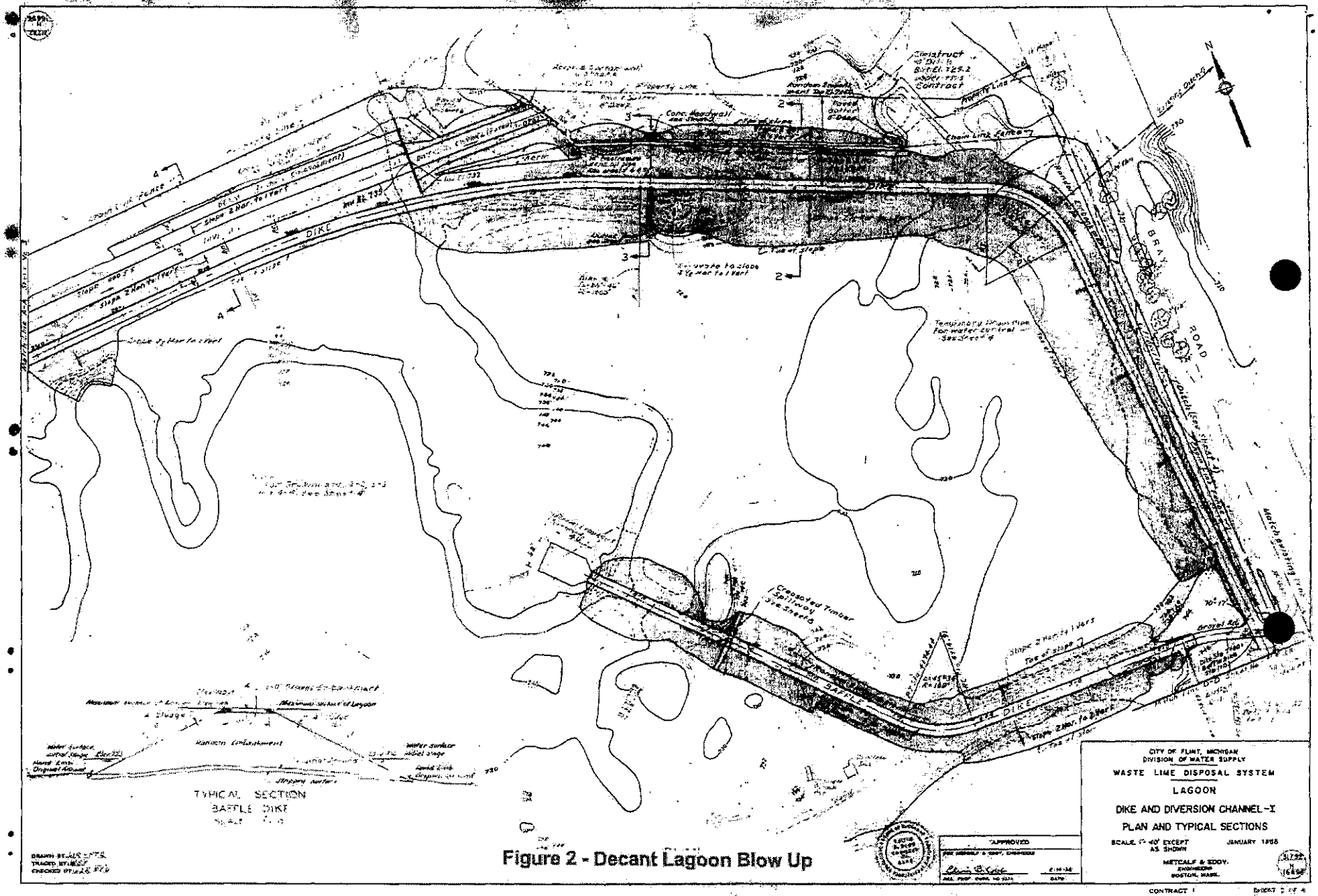


Figure 2 - Decant Lagoon Blow Up

CONTRACT 1 SHEET 2 OF 4

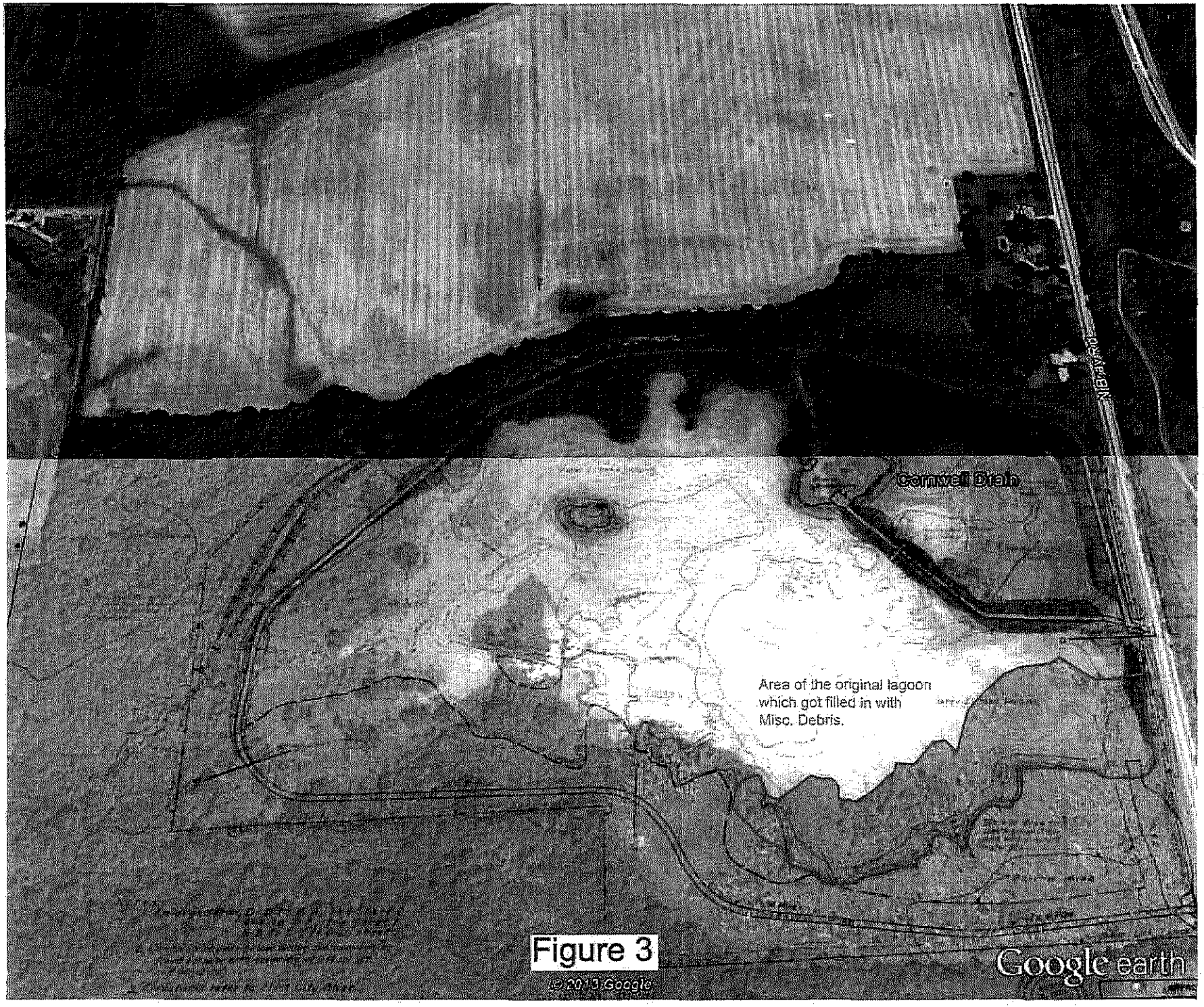

Cornwell Drain
Area of the original lagoon which got filled in with Misc. Debris.
© 2013 Google
Google earth

Figure 3

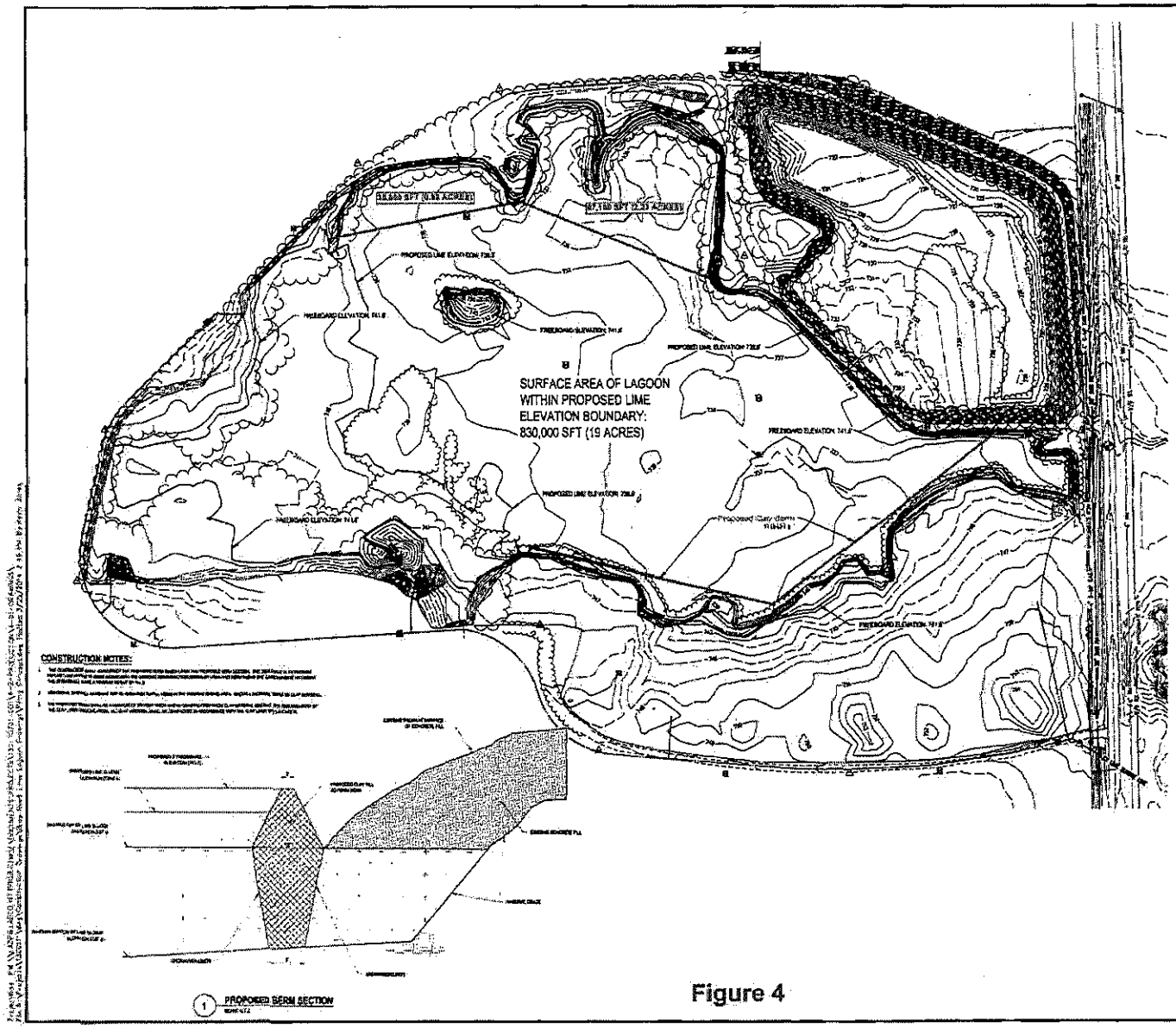


Figure 4

Flint WTP
Phase II, Segment II
Lime Residual Disposal
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
1311 South Linden Road, Suite 6
Flint, MI 48532
Tel 810-820-2642 Fax 810-820-2701

ROWE PROFESSIONAL SERVICES COMPANY

KEY PLAN

REVISIONS

NO.	DESCRIPTION	BY

FILE LOG

Project No. 130-10701-001
Date: February 28, 2014

Prysby, Mike (DEQ)

From:	Matta, Samir <SFMatta@lan-inc.com>
Sent:	Wednesday, March 26, 2014 2:22 PM
To:	Prysby, Mike (DEQ); Busch, Stephen (DEQ); Arduin, Jim (DEQ)
Cc:	Daugherty Johnson; Brent Wright (bwright@cityofflint.com)
Subject:	Bray Road Alternative Separation Concepts.
Attachments:	Piling Concept 3-24-14 (2).pdf - Adobe Acrobat.pdf; MC-3500 Chamber from ADS StormTech System.pdf

Hi All,

As requested, the following two concepts are being discussed with the City and ultimately with the contractor to see which one is more in line with the project budget and can be accomplished in a timely matter. The attached concept shows sheet piling being proposed which will be terminated at the designated height needed to achieve a 2' freeboard along the alignment highlighted in RED.

The other concept which we discussed on the phone will entail using a light weight storm chamber (see attachment) fastened to a 4x8 plywood sheeting, attached together, with a geotextile fabric along the back side to follow the same alignment as the sheet piling option. It will be placed directly on the existing lime sludge in front of the disposal area for separation.

Please review, let me know if you have any questions and we can further discuss on Monday.

Thanks.

Samir F. Matta, PE
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
2121 University Park Dr, Suite 100 • Okemos, MI 48864-6901
T 517.203.5437 **D** 517.203.5437 **C** 517.819.2367
www.lan-inc.com • SFMatta@lan-inc.com

CONFIDENTIALITY AND PRIVILEGE NOTICE: This email communication, including any and all attachments, (collectively, this "Communication") is intended solely for the person(s) to whom it is addressed. This Communication may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this Communication is strictly prohibited. If you have received this Communication in error, please contact the sender immediately. If this Communication was received in error, you are directed to immediately delete and/or destroy all copies.

Flint WTP Improvements
Bray Road Lime Sludge Lagoon
MDEQ Comments
March 21, 2014

1. The placement of the proposed liner and berm fails to establish physical separation between the lime sludge collection area and concrete fill area. For complete separation of these areas, the berm needs to be constructed down to native soil.

   As proposed, this appears to constitute the first step towards a "cap-in-place" of the existing materials. If waste is left in place within the berm, the city will be required to construct the berm to meet Part 115 cap requirements. In addition, long term groundwater monitoring, financial assurance, closure and post closure plans will be required.

2. Please provide a residuals management plan for the lime sludge collection area. In additional to removal of new lime sludge produced, the plan must also include the gradual removal of existing lime sludge.

3. The working depth of the lime sludge collection area does not appear to meet 10-States Standard's minimum depth of 5 feet. The available volume appears to be 60,000 cubic yards based on 2.6 feet of working depth. Please confirm this. What is the surface area of the lagoon? Please provide a basis of design that includes the amount of lime sludge produced at average day demand and the available days of storage at this production rate. These parameters will need to be used towards developing the residuals management plan. Finally, an acceptable residuals management plan is needed for us to consider a deviation from the 10-State Standards guidelines.

4. An effluent sampling point needs to be provided for decant water.

— Constr sch

— Disposal opts

— EQU on Monitoring Acc

WQ eval. → Dem. opt.
COZR. control

or

— Identify OPS PLAN
Dec staffing
staffs

Total Hardness 297 mg/l use 300 mg/l as $CaCO_3$ 9/13/13 LAN Report

Goal: 100 mg/l as $CaCO_3$

200 mg/l removed

10 stator .7 Acres/1 MGAL/100 mg/l removed

5 ft:

.7A * 10 MGD * 200 mg/l removed / 100 = 14A

Based on 5 ft depth

we have 2.6 ft depth — 19 A

SA = 830,000 ft^2 = 19 A

Rem 150 mg/l

.7A × 10 MGD × 150/100 =

LAN Report

@ 14 MGD

@ 12% solids → 73,924 gpd = 366 yd^3/day

@ 25% → 183 yd^3/day

25% @ 10 mgd → 131 yd^3/day

12 mgd → 157 yd^3/day

66000 yd^3 / 131 yd^3/day = 458 days @ 10 mgd

382 days @ 12 mgd

1.25 yd^3 / yr

3 months = 50,000 yd^3 @ 10 MGD — 3% — no dewatering

455 yd^3

@ 10 mgd 66 000 yd^3 / 55 yd^3/day = 1091 DAYS, 3 yrs

@ 12 mgd 66 000 yd^3 / 66 yd^3/day = 909 DAYS 2.5 yrs

BASIS OF DESIGN
BRAY ROAD LIME SLUDGE DECANT WATER TREATMENT SYSTEM
CITY OF FLINT

1. GENERAL DATA

The City of Flint (City) proposes to use the existing lime sludge storage lagoon facility at Bray Road for the next 2.5 years on a continuous basis while the Karegnondi Water Authority (KWA) water system is being constructed. After which, the facility will only be used should the Flint WTP have to treat Flint River water on an emergency basis. In order to maximize storage volume of the facility, the City proposes to construct a decant tower structure, pump station and forcemain to transport the decanted water from the lagoon to a nearby sanitary sewer for final disposal. A CO_2 feed system is also proposed to neutralize the high pH decant waste stream prior to pumping to the sanitary sewer.

The existing lime sludge storage lagoon facility at Bray Road does not have multiple cells; therefore, the sludge will be continuously wetted and will only consolidate to approximately 25% solids. The lime sludge and decant waste stream flows are summarized in the table below:

Lime Sludge Quantities Summary

	WTP Flow [MGD]	Sludge Produced (3% Solids) [gpd]	Sludge Stored (25% Solids) [cy/day]	Decant Waste to Sewer [gpd]	Decant Waste to Sewer [gpm]
Average Day	10 (DMGD)	92,000	55 (66 yd^3/DAY)	80,700	56
Current Max Day	18	165,000	98	145,200	100
Prop. Max Day	24	220,000	131	193,600	135

2. CO_2 FEED SYSTEM

a. Process Description

A gaseous carbon dioxide feed system will be installed on the Bray Road site near the decant pump station. The system will include a liquid storage tank, vaporizer, vapor heater, pressure regulator, pH control panel and a gas diffuser. Liquid CO_2 will be stored in a 6-ton tank and regulated through a vaporizer. The gaseous CO_2 will be sent through diffuser piping and released into the decant tower through two (2) 7" diameter disk ceramic diffusers. A pH probe will be located in the decant tower to monitor pH downstream of the CO_2 injection point. The pH probe will transmit the pH reading to the pH control panel, which will regulate the CO_2 feed rate for set point control of the pH in the decant water waste stream.

b. Design Criteria

- Max CO_2 feed – 200 mg/L
- Max decant flow rate – 140 gpm

- CO_2 feed system capacity @ Max Day (140 gpm)

$$\frac{140gpm}{694.4\frac{gpm}{MGD}} * 200ppm\ CO_2 * \frac{8.34lb}{gal} = 336\ lb/day$$

- CO_2 feed system capacity @ Average Day (60 gpm)

$$\frac{60gpm}{694.4\frac{gpm}{MGD}} * 200ppm\ CO_2 * \frac{8.34lb}{gal} = 144\ lb/day$$

- CO_2 storage for minimum 30 days at Average Day per 10 States Standards

$$144\frac{lb}{day} * 30\ days = 4{,}320\ lbs = 2.16\ tons$$

c. Equipment

- One (1) 6 ton capacity Liquid Carbon Dioxide storage tank system complete with refrigeration unit (6 ton is minimum for CO_2 delivery by tanker truck)
- One (1) 12 kW electric vaporizer
- One (1) vapor heater
- One (1) First stage CO_2 pressure regulator
- One (1) Carbon Dioxide pH control panel
- One (1) Carbon Dioxide gas diffuser assembly
- One (1) pH Transducer
- Two (2) 7" Diameter Ceramic Disk-type diffusers

3. DECANT TOWER

a. Process Description

The decant tower is a 6'x6' precast manhole with three (3) 12"W x 36"H staggered openings that will provide 9' of total operating depth for decanting. Each opening has an interior wall-mounted inverted slide gate with a manual operator and an external stoplog channel to allow maintenance on the slide gate when necessary. An under-flow baffle wall will be installed to promote CO_2 transfer into the decant waste stream and prevent short circuiting. A pH probe will be installed just below the invert of the 8" gravity pipe to the decant pump station.

b. Design Criteria

- Average day flow rate = 60 gpm
- Peak day flow rate = 140 gpm

- Minimum detention time = 20 min

$$Min\ Detention\ Volume\ Required = 20\ min * 140gpm * \frac{0.1337ft^3}{gal} = 374.3\ ft^3$$

- Minimum liquid level above diffuser = 10' per manufacturer

c. Equipment

- One (1) 6'x6'x25' precast manhole
  - Top of structure elevation = 744.00'
  - Top of baffle wall elevation = 742.00'
  - Maximum lagoon operating level elevation = 739.60'
  - Slide gate 1 invert elevation= 736.60'
  - Slide gate 2 invert elevation = 733.60'
  - Slide gate 3 invert elevation = 730.60'
  - 8" gravity line invert elevation = 730.33'
  - Lagoon bottom elevation = 730.00'
  - Bottom of baffle wall elevation = 722.00'
  - Diffuser centerline elevation = 720.25'
  - Bottom of decant tower elevation = 719.00'

- Detention Time:

@ Max Day $\frac{\left[(730.33-719.00)*6*6*\frac{7.48\ gal}{CF}\right]}{140\ gpm} = 21.8\ min$

@ Average Day $\frac{\left[(730.33-719.00)*6*6*\frac{7.48\ gal}{CF}\right]}{60\ gpm} = 50.8\ min$

- Minimum Operating Depth Over Diffusers: 730.33' - 720.25' = 10.08'
- Three (3) 12"W x36"H inverted slide gates, 304SS
- Three (3) 20"W Stoplogs and channels, 304SS
- One (1) 6'W x 20'H Baffle Wall, FRP
- 8" Diameter Gravity line to Decant P.S., DIP or PVC

4. DECANT PUMP STATION DESIGN AND FORCEMAIN

a. Process Description

The decant pump station will be a 6' diameter precast concrete manhole. It will be fed through an 8" gravity line from the decant tower. Two (2) 140-gpm submersible solids handling pumps will be installed with quick discharge connections and guide rails for lifting and lowering the pumps for maintenance. The pumps will be controlled by a float switch assembly consisting of four (4) switches: pumps off; pump 1 on; pump 2 on; high water alarm. The pump

discharge piping will connect to a 4" diameter forcemain that will transport the waste stream to a nearby sanitary sewer.

b. Design Criteria

- Max Day flow rate, Qmax = 140 gpm
- Average Day flow rate, Qave = 60 gpm
- Maximum pump starts per hour = 10

$$Cycle\ time\ (\theta) = \frac{60\ min}{10\ cycles} = 6\ min$$

$$Minimum\ sump\ volume = \frac{Q_{pump} * \theta}{4} = \frac{140 * 6}{4} = 210\ gal$$

- Minimum forcemain velocity of 2 ft/s

c. Equipment

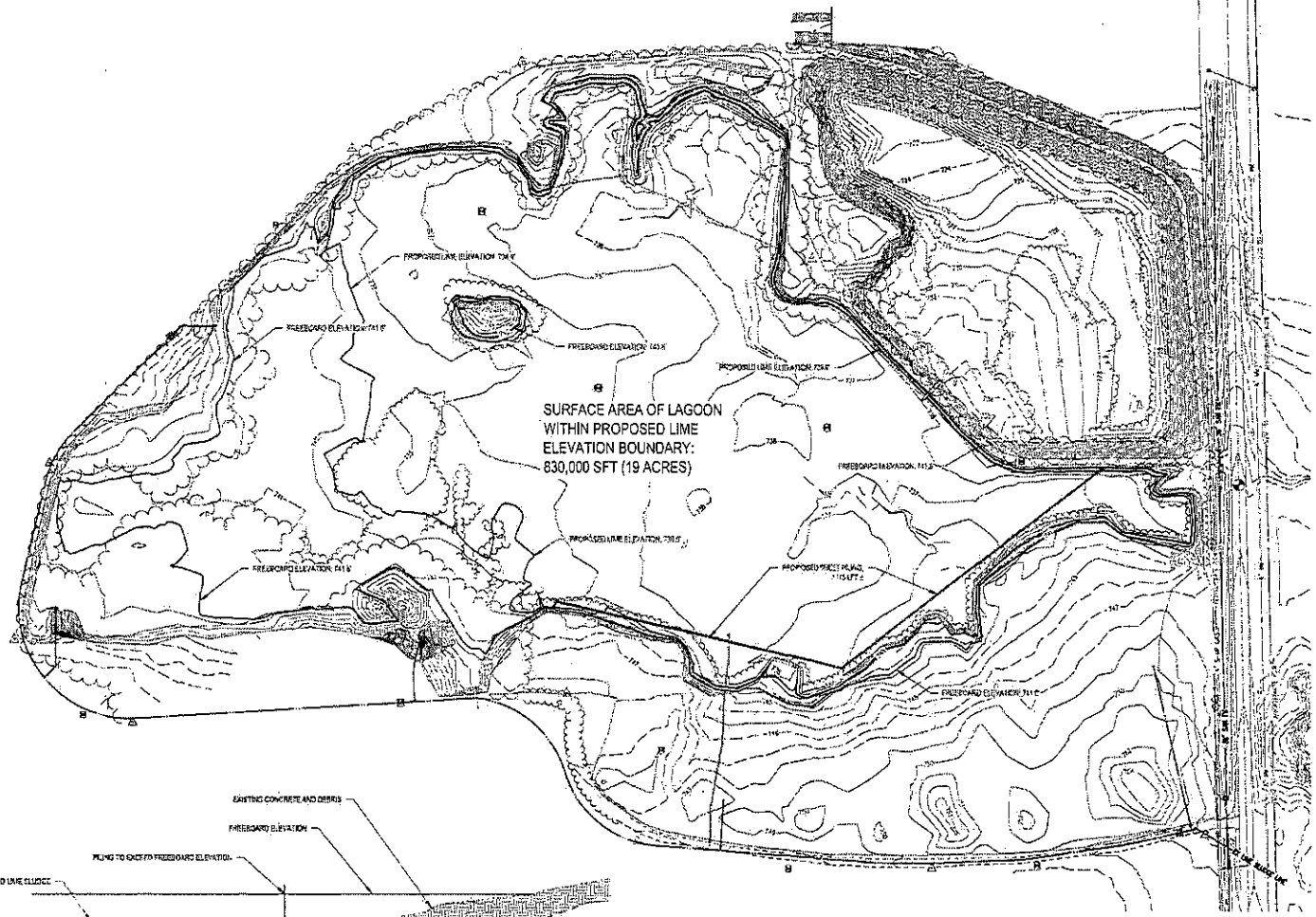
- One (1) 6'*Diameter* x 18'H precast manhole
  - Top of structure elevation = 744.00'
  - High Water Alarm elevation = 731.25'
  - Gravity line invert elevation = 730.25'
  - Pump 2 On elevation = 729.75'
  - Pump 1 On elevation = 728.75'
  - Pumps Off elevation = 727.50'
  - Bottom of pump station elevation = 726.00'

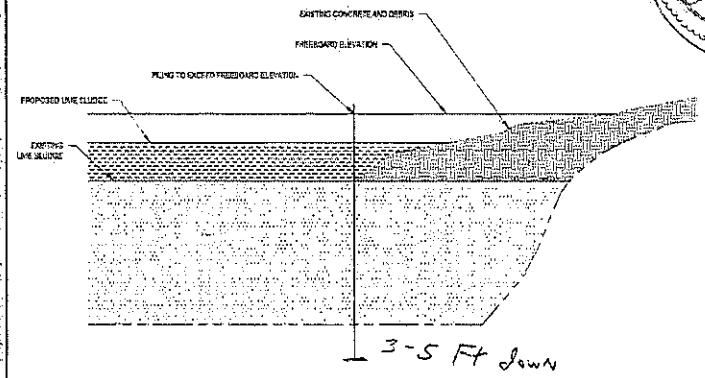
$$Wetwell\ volume = \frac{\pi D^2}{4} = \frac{\pi 6^2}{4} = 28.27\ \frac{ft^2}{ft} * 7.48 \frac{gal}{ft^3} = 211.5 \frac{gal}{ft}$$

$$Pump\ Run\ Time = \frac{(728.75' - 727.50') * 211.5 \frac{gal}{ft}}{(140\ gpm - 60\ gpm)} = 3.3\ min$$

$$Fill\ Time = \frac{(728.75' - 727.50') * 211.5 \frac{gal}{ft}}{(60\ gpm)} = 4.4\ min$$

- Two (2) 140-gpm pumps
- One (1) 4-float switch assembly
- 4" Diameter Forcemain, DIP or PVC
  - Forcemain Velocity @ Qmax = $\frac{\frac{140\ gal}{min} * \frac{1\ min}{60\ s} * \frac{1\ CF}{7.48\ gal}}{\pi(\frac{2}{12})^2} = 3.6\ fps$





Flint WTP
Phase II, Segment II
Lime Residual Disposal
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LAN & AECOM COMPANY
1311 South Linden Road, Suite B
Flint, MI 48532
Tel: 810-620-2600 Fax: 810-620-2633

ROWE PROFESSIONAL SERVICES COMPANY
The Rowe Building
540 S. Saginaw St., Ste. 200
P.O. Box 1546
Flint, MI 48501
O: (810) 341-7500
F: (810) 341-7501
www.rowepsc.com

KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE

FILE LOG

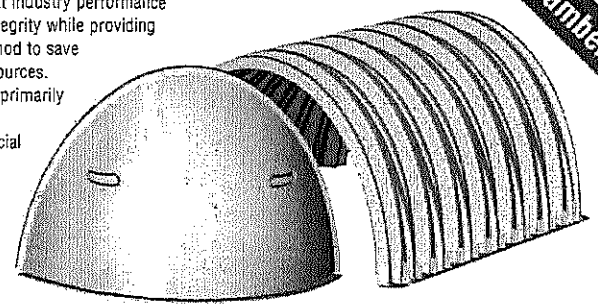
Project	
Drawn	
Date	
Check	

Project No. 130-10701-001
Date: February 28, 2014

StormTech MC-3500 Chamber

MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



StormTech MC-3500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	90" (2286 mm) x 77" (1956 mm) x 45" (1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	178.9 ft³ (5.06 m³)
Weight	134 lbs (60.8 kg)

* This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below chambers, 9" (229 mm) of stone between chambers/end caps and 40% stone porosity.

StormTech MC-3500 End Cap (not to scale)

Nominal End Cap Specifications

Size (L x W x H)	26.5" (673 mm) x 71" (1803 mm) x 45.1" (1145 mm)
End Cap Storage	15.6 ft³ (0.44 m³)
Min. Installed Storage*	46.9 ft³ (1.32 m³)
Weight	43 lbs (19.5 kg)

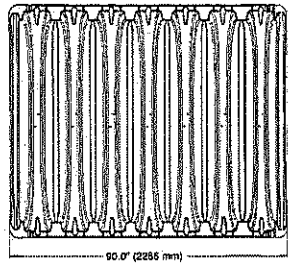
* This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below, 6" (152 mm) of stone perimeter, 9" (229 mm) of stone between chambers/end caps and 40% stone porosity.

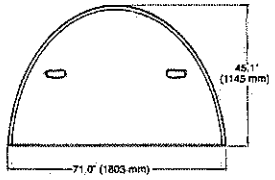
Shipping

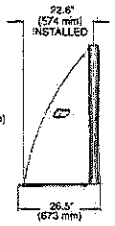
15 chambers/pallet

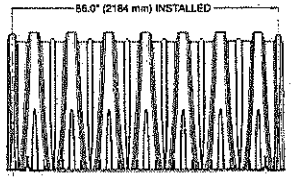
16 end caps/pallet

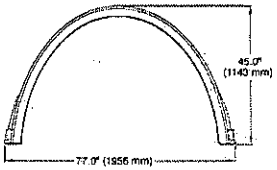
7 pallets/truck











2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT APPLICATION FOR WATER SUPPLY SYSTEMS

(CONSTRUCTION - ALTERATION - ADDITION OR IMPROVEMENT) AS DESCRIBED HEREIN

Required under the Authority of 1976 PA 399, as amended

ENTERED

This application becomes an Act 399 Permit only when signed and issued by authorized Michigan Department of Environmental Quality (DEQ) Staff. See Instructions below for completion of this application.

1. Municipality or Organization, Address and WSSN that will own or control the water facilities to be constructed. This permit is to be issued to:

City of Flint
4500 N. Dort Highway
Flint, MI 48505

WSSN: 02310

2. Owner's Contact Person (provide name for questions):

Contact: Brent Wright
Title: Water Plant Supervisor
Phone: 810.787.6537

Permit Stamp Area (DEQ use only)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 151055 JUL 14 2015

EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

3. Project Name (Provide phase number if project is segmented):

Flint WTP Phase II, Segment 3 Filter Media Replacement

4. Project Location (City, Village, Township):
Flint, MI

5. County (location of project):
Genesee

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR OF THE DEPARTMENT OF ENVIRONMENT QUALITY

cc: DEQ RESOURCE MANAGEMENT DIVISION JUN 30 2015 LANSING DISTRICT

Issued by: Michael Prysby

Reviewed by: Michael Prysby

☐ **If this box is marked see attached special conditions.**

Instructions: Complete items 1 through 5 above and 6 through 21 on the following pages of this application. Print or type all information except for signatures. Mail completed application, plans and specifications, and any attachments to the DEQ District Office having jurisdiction in the area of the proposed construction.

Please Note:

a. This **PERMIT** only authorizes the construction, alteration, addition or improvement of the water system described herein and is issued solely under the authority of 1976 PA 399, as amended.
b. The issuance of this **PERMIT** does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other DEQ permits, or approvals from other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the date of issuance in accordance with R 325.11306, 1976 PA 399, administrative rules, unless construction has been initiated prior to expiration.
d. Noncompliance with the conditions of this permit and the requirements of the Act constitutes a violation of the Act.
e. Applicant must give notice to public utilities in accordance with 1974 PA 53, (MISS DIG), being Section 460.701 to 460.718 of the Michigan Compiled Laws, and comply with each of the requirements of that Act.
f. All earth changing activities must be conducted in accordance with the requirements of the Soil Erosion and Sedimentation Control Act, Part 91, 1994 PA 451, as amended.
g. All construction activity impacting wetlands must be conducted in accordance with the Wetland Protection Act, Part 303, 1994 PA 451, as amended.
h. Intentionally providing false information in this application constitutes fraud which is punishable by fine and/or imprisonment.
i. Where applicable for water withdrawals, the issuance of this permit indicates compliance with the requirements of Part 327 of Act 451, Great Lakes Preservation Act.

6. **Facilities Description** – In the space below provide a detailed description of the proposed project. Applications without adequate facilities descriptions **will be returned.** SEE EXAMPLES BELOW. Use additional sheets if needed.

Replace media of 12 dual media filters, new media to be 12" sand and 18" Granular Activated Carbon. Relocate chlorine feed point to the weir chamber, immediately downstream of the filters. Chlorine to be fed into a pipe leaving bay 1 and outletting into bay 2 of the weir chamber.

Project also included addition of a water tight hatch, retrofitted into existing access port in the roof of the weir chamber which is in the office level floor. A chlorine gas detector will be installed with the monitor panel viewable at the hatch. Two additional closed ports will be installed into the weir chamber walls to allow for hook up of exhausting equipment in case chlorine vapor ever needs to be expelled to enter the chamber.

EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES	
Water Mains	500 feet of 8-inch water main in First Street from Main Street north to State Street. **OR** 250 feet of 12-inch water main in Clark Road from an existing 8-inch main in Third Avenue north to a hydrant.
Booster Stations	A booster station located at the southwest corner of Third Avenue and Main Street, and equipped with two, 15 Hp pumps each rated 150 gpm @ 200 feet TDH. Station includes backup power and all other equipment as required for proper operation.
Elevated Storage Tank	A 300,000 gallon elevated storage tank located in City Park. The proposed tank shall be spherical, all welded construction and supported on a single pedestal. The tank shall be 150 feet in height, 40 feet in diameter with a normal operating range of 130 – 145 feet. The interior coating system shall be ANSI/NSF Standard 61 approved or equivalent. The tank will be equipped with a cathodic protection system, and includes a tank level control system with telemetry.
Chemical Feed	A positive displacement chemical feed pump, rated at 24 gpd @ 110 psi to apply a chlorine solution for Well No. 1. Chlorine is 12.5% NaOCL, ANSI/NSF Standard 60 approved and will be applied at a rate of 1.0 mg/l of actual chlorine.
Water Supply Well	Well No. 3, a 200 foot deep well with 170 feet of 8-inch casing and 30 feet of 8-inch, 10 slot screen. The well will be equipped with a 20 Hp submersible pump and motor rated 200 gpm @ 225 feet TDH, set at 160 feet below land surface.
Treatment Facilities	A 5 million gpd water treatment plant located at the north end of Second Avenue. The facility will include 6 low service pumps, 2 rapid mix basins, 4 flocculation/sedimentation basins, 8 dual media filters, 3 million gallon water storage reservoir and 6 high service pumps. Also included are chemical feed pumps and related appurtenances for the addition of alum, fluoride, phosphate and chlorine.

General Project Information – Complete all boxes below.

7. Design engineer's name, engineering firm, address, phone number, and email address:

Jeff Hansen, PE
Lockwood, Andrews and Newnam, Inc.
1311 South Linden Rd, Suite B
Flint, MI 48532

8. Indicate who will provide project construction inspection:
- ☐ Organization listed in Box 1.
- ☒ Engineering firm listed in Box 7.
- ☐ Other - name, address, and phone number listed below.

9. Is a basis of design attached?
☒ YES ☐ NO

If no, briefly explain why a basis of design is not needed.

10. Are sealed and signed engineering plans attached?
☒ YES ☐ NO

If no, briefly explain why engineering plans are not needed.

11. Are sealed and signed construction specifications attached?
☒ YES ☐ NO

If specifications are not attached, they need to be on file at DEQ.

12. Were Recommended Standards for Water Works, Suggested Practice for Water Works, AWWA guidelines, and the requirements of Act 399 and its administrative rules followed?
☒ YES ☐ NO

If no, explain which deviations were made and why.

13. Are all coatings, chemical additives and construction materials ANSI/NSF or other adequate 3rd party approved?
☒ YES ☐ NO

If no, describe what coatings, additives or materials did not meet the applicable standard and why.

14. Are all water system facilities being installed in the public right-of-way or a dedicated utility easement? (For projects not located in the public right-of-way, utility easements must be shown on the plans.)
☒ YES ☐ NO

If no, explain how access will be obtained.

15. Is the project construction activity within a wetland (as defined by Section 324.30301(d)) of Part 303, 1994 PA 451?
☐ YES ☒ NO

If yes, a wetland permit must be obtained.

16. Is the project construction activity within a 100-year floodplain (as defined by R 323.1311(e)) of Part 31, 1994 PA 451, administrative rules?
☐ YES ☒ NO

If yes, a flood plain permit must be obtained.

17. Is the project construction activity within 500 feet of a lake, reservoir, or stream?
☐ YES ☒ NO

If yes, a Soil and Erosion Control Permit must be obtained or indicate if the owner listed in box 2 of this application is an Authorized Public Agency (Section 10 of Part 91, 1994 PA 451) ☐ Owner is APA.

18. Will the proposed construction activity be part of a project involving the disturbance of five (5) or more acres of land?
☐YES ☒NO
If yes, is this activity regulated by the National Pollutant Discharge Elimination System storm water regulations?
☐YES: NPDES Authorization to discharge storm water from construction activities must be obtained.

☒NO: Describe why activity is not regulated:
Please call 517-241-8993 with questions regarding the applicability of the storm water regulations.

19. Is the project in or adjacent to a site of suspected or known soil or groundwater contamination?
☐YES ☒NO

If yes, attach a copy of a plan acceptable to the DEQ for handling contaminated soils and/or groundwater disturbed during construction. Contact the local DEQ district office for listings of Michigan sites of environmental contamination.

20. IF YOU ARE A CUSTOMER/WHOLESALE/BULK PURCHASER, COMPLETE THE FOLLOWING

1) Name and WSSN of source water supply system (seller) _____

2) Does the water service contract require water producer/seller to review and approve customer/wholesale/bulk purchaser water system construction plans?
☐YES ☐NO

If yes to #2, the producer/seller approval letter must be attached when submitted to DEQ.

21. **Owner's Certification** The owner of the proposed facilities or the owner's authorized representative shall complete the owner's certification. It is anticipated that the owner will either be a governmental agency (city, village, township, county, etc.) or a private owner (individual, company, association, etc.) of a Type I public water supply.

OWNER'S CERTIFICATION

I, BRENT F. WRIGHT (print) (name), acting as the SUPERVISOR (print) (title/position) for CITY OF FLINT WATER PLANT (print) (entity owning proposed facilities) certify that this project has been reviewed and approved as detailed by the Plans and Specifications submitted under this application, and is in compliance with the requirements of 1976 PA 399, as amended, and its administrative rules.

Signature* _____ Date 6/30/15 Phone (810)787-6537

*Original signature only, no photocopies will be accepted.

PROJECT BASIS OF DESIGN – FOR WATER MAIN PROJECTS

PROJECT NAME: Flint WTP Phase II, Segment 3 Filter Media Replacement

For this PROJECT the following information must be provided per Act 399 unless waived by the Department. For projects other than water main installation, or if additional space is needed, attach separate sheet(s) with detailed Basis of Design calculations.

A. A general map of the initial and ultimate service areas
☒ Included on engineering plans ☐ Attached separately

B. Number of service connections served by this permit application see basis of design

C. Total number of service connections ultimately served by entire project _____

D. Residential Equivalent Units (REUs) served by this permit application _____

E. Total Residential Equivalent Units (REUs) ultimately served by entire project _____

F. Water flow rates for proposed project based on REUs listed in "D' and "E" above

1. Initial design average day flow (mgd) 18.3
2. Initial design maximum day flow (mgd) 25.4
3. Total design average day flow (mgd) 24.0
4. Total design maximum day flow (mgd) 30.0
5. Required fire flows: (1) _____ gpm for _____ hours

G. Actual flows and pressures of existing system at the connection point(s) (2)
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi

H. Estimated minimum flows and pressures within the proposed water main system (3) _____ gpm at _____ psi

(1) Every water system must decide what levels of fire fighting flows they wish to provide. Fire flow should be appropriate for the area (residential, commercial, industrial) being served by the project. Typical fire flow rates can be obtained from the water supply, local fire dept., ISO or AWWA. The water system must then be designed to be able to provide the required fire flows while maintaining at least 20 psi in all portions of the distribution system.

(2) Flows and pressures at the connection points must be given to determine if the existing water main(s) are able to deliver water to the new service area. These numbers can be obtained from a properly modeled and calibrated distribution system hydraulic analysis or hydrant flow tests performed in the field. If more than one connection is proposed, list as needed.

(3) List what the estimated minimum flows can be expected in the proposed water mains based on estimated water demands, head losses, elevation changes and other factors that may affect flows, such as dead end mains.

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

CITY OF FLINT WATER TREATMENT PLANT

PHASE II, SEGMENT 3 – FILTER MEDIA REPLACEMENT

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

DIVISION 1	GENERAL REQUIREMENTS
DIVISION 2	SITE WORK
SECTION 02540	CHEMICAL PIPING
SECTION 02550	CHEMICAL PIPING VALVES
SECTION 02560	PIPE TESTING
DIVISION 3	CONCRETE
DIVISION 5	METALS
SECTION 05550	BOLTS, ANCHOR BOLTS AND EXPANSION ANCHORS
DIVISION 9	FINISHES
SECTION 09928	PROTECTIVE COATING SYSTEMS
DIVISION 11	EQUIPMENT
DIVISION 13	SPECIAL CONSTRUCTION
DIVISION 15	MECHANICAL
DIVISION 16	ELECTRICAL

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 151055 JUL 4 201

EXAMINED AND APPROVED FOR COMPLIANCE
WITH ACT 399, P.A. 1976

SECTION 02540
CHEMICAL PIPING

PART 1 - GENERAL

1.01 Summary
This section governs the material, pipe, fittings, connections, butt fusion and general construction practices for all chemical piping.

1.02 References

A. AWWA C110-08 Ductile Iron and Gray Iron Fittings

B. AWWA C906-07 – Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 63 In., for Water Distribution and Transmission.

C. AWWA C207-07 – Steel Pipe Flanges for Waterworks Service – Sizes 4 In. Through 144 In.

D. ASTM D-1784 – Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

E. ASTM D-2837 – Standard Test method for Obtaining Hydrostatic Design basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products

F. ASTM D-2846 - Chlorinated Poly (Vinyl Chloride) (PVC) Plastic Hot and Cold Water Distribution Systems

G. ASTM D-3261-03 – Butt Heat Fusion for Polyethylene Plastic Pipe and Fittings

H. ASTM D-3350 – Polyethylene Plastics Pipe and Fittings Materials

I. ASTM F-439 – Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80

J. ASTM F-441 – Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80

K. ASTM F-2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

1.03 Related Work

A. Section 02550 – Chemical Piping Valves

B. Section 02560 – Pipe Testing

1.04 Pipe Packaging, Handling and Storage

A. The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact and without physical damage. The transportation carrier shall use appropriate method and intermittent checks to ensure the pipe is properly supported, stacked and restrained during transport such that the pipe is not nicked, gouged or physically damaged.

B. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The handling of the pipe shall be done in such a

manner that it is not damaged by dragging over sharp objects or cut by chokers or lifting equipment.

C. Sections of pipe having been discovered with cuts or gouges in excess of 5 percent of the wall thickness of the pipe shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt-fusion joining method.

D. Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable-type chokers must be avoided. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections. Care must be exercised to avoid cutting or gouging the pipe.

PART 2 - PRODUCTS

2.01 Manufacturers – the list of manufacturers below does not imply pre-approval of any product. All products must meet the requirements of this specification and be approved by the Engineer.

A. HDPE and CPVC Pipe

1. IPEX Inc,
2. Harvel Plastics Inc.
3. Charlotte Pipe and Foundry / Cresline Plastic Pipe Company
4. Spears Manufacturing
5. Harrison Plastics Corp.
6. Asahi / America

B. HDPE Dual Containment Pipe

1. Asahi / America

2.02 Materials

A. Pipe and Fittings

1. Chemical resistance data shall be provided for all plastic piping.
2. High Density Polyethylene (HDPE) – Single wall
   a. All polyethylene pipe and fittings shall be in accordance with AWWA C906-07 from material having Standard PE code designation of PE 4710 and intended for use in the transportation of chlorinated water with a chlorine concentration of up to 2,000 ppm.
   b. All HDPE pipe shall be black with UV stabilizer. Submit product data.
   c. At the time of product submittal for approval, the supplier shall have enclosed an Affidavit of Compliance certifying that the pipe products furnished by him meet with all above standard requirements. Furthermore, polyethylene compounds shall be tested and certified as suitable for use with chlorinated water, in concentrations as listed, by an independent accredited testing agency.
   d. The pipe and fitting manufacturer shall also supply certification that samples of this product have undergone stress regression testing, evaluation, and validation in accordance with ASTM D-2837 and PPI TR-3.

e. Pipe and fittings shall be produced by the same manufacturer from identical materials meeting the requirements of this specification.

f. Single wall HDPE Pipe and fittings shall be of 160 psi minimum pressure class, size and SDR as shown on the plans. If SDR is not shown stated on the plans, the minimum pipe thickness shall be SDR 11.

g. Flanged connections, where shown, shall be supplied with 316 stainless steel lap joint flanges meeting AWWA C207D specifications, and joined with 5/8" diameter 316 stainless steel bolts, washers and nylon inserted locking nuts of the specified size. The stainless steel bolts shall have adequate thread length to assure proper joint seal.

h. Dual Containment HDPE Piping and Fittings

i) Asahi Chem Prolok

a) PE 100-PC resin

b) HDPE material as per ASTM 3350

ii) Size and wall thickness ratings as shown on the plans. If thickness is not shown on the plans, pipe shall have the following minimum wall thicknesses: containment pipe - SDR 13.5, and carrier pipe - SDR 11.

iii) All pipe and fittings rated for minimum pressure of 150 psi at 68 degrees F.

iv) Manufacturer's data shall be submitted for dual containment pipe that adequately demonstrates that the pipe is suited for horizontal directional drill installation.

v) Pipe Centralizers

a) Full round centralizers thermally bonded to carrier pipe.

b) Spacing shall be per Plastic Piping Institute standards.

c) Molded or machined from HDPE pipe grade resins or sheet.

d) At least 2 openings per centralizer to permit fluid flow.

e) Centralizers shall uniformly maintain position of carrier pipe within the containment pipe.

f) OD of the centralizer shall meet the ID of the containment pipe.

g) End termination fittings shall be used where shown on the plans to provide transition to single wall pipe.

3. CPVC

a. All CPVC pipe shall be manufactured from a Type IV, Grade 1 Chlorinated Polyvinyl Cchloride (CPVC) compound with a minimum Cell Classification of 23447 per ASTM D1784.

b. CPVC pipe shall conform to the requirements of ASTM F-441 chlorinated polyvinyl chloride plastic pipe, Schedule as shown on the plans. The pipe shall be manufactured in strict compliance to ASTM F441, consistently meeting the Quality Assurance test requirements of this standard with regard to material, workmanship, burst pressure, flattening, and extrusion quality. The pipe shall be produced in the USA using domestic materials, by an ISO 9001 certified manufacturer, and shall be stored indoors after production, at the manufacturing site, until shipped from factory. This pipe shall carry the National Sanitation Foundation (NSF) seal of approval for

potable water applications. The pipe shall have a Flame Spread rating < 25 and a Smoke Development rating < 50 when tested and listed for Surface Burning Characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

c. Fittings shall conform to the requirements as outlined in ASTM F-439 for Schedule 80 socket type fittings.

4. Gaskets

a. All flanged joints, except as otherwise specified, shall be made with rubber gaskets, full face. They shall conform to Appendix A of AWWA C110-08.

PART 3 - EXECUTION

3.01 Installation

A. Installation practices, including support spacing, butt fusion and solvent welding, shall be in compliance with the manufacturer's printed recommendations.

B. HDPE piping manufacturer shall provide written butt fusion procedure and requirements.

C. Butt fusion heating requirements for dual containment piping shall be based on the thicker of the two pipes.

D. The contractor shall install a sufficient number of unions for ease of disassembly as recommended by the manufacturer's printed recommendations.

E. Curving HDPE pipe shall not exceed minimum manufacturer's recommendations. In general, bending radius shall not be less than 40 times the pipe OD.

F. Dual wall piping manufacturer's representative shall provide up to 1 day on-site training for water treatment plant staff.

3.02 Testing

A. CPVC and/or single wall HDPE pipe shall be tested as per the requirements of Section 02560 Pipe Testing.

B. HDPE Dual Containment Pipe - Test as per ASTM F 2164 and Section 02560 Pipe Testing.

3.03 Joining

A. All CPVC socket type connections shall be jointed with CPVC solvent, having a minimum viscosity of 2000 cps; as Type 80-c cement. Submit manufacturer's data for approval.

B. Except where flange connections are specifically shown, HDPE pipe and fittings shall be butt fusion joined in accordance with the manufacturer's recommended procedure. Threaded or socket type connections will not be accepted. The pipe and fitting manufacturer shall provide fusion training services for field construction and inspection personnel.

C. Only an agent of the manufacturer of dual containment pipe or operator properly trained for dual containment pipe thermal welding shall perform the welding.

*** END OF SECTION ***

SECTION 02550
CHEMICAL PIPING VALVES

PART 1 - GENERAL

1.01 Work Included

A. Chemical piping valves and accessories for buried, exposed, submerged and other types of piping, except where included in other Sections.

B. Coordination: Review installation procedures under other Sections and coordinate with the Work which is related to this Section, including buried piping installation, exposed piping installation, plumbing, etc.

1.02 Related Work

A. Section 02540 – Chemical Piping

1.03 References (latest editions)

A. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

B. ASTM A48 - Gray Iron Castings.

C. ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

D. ASTM D2464 - Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

E. ASTM D2467 - Socket-type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

F. ASTM F437 - Threaded Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.

G. ASTM F439 - Socket-type Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.

1.04 Quality Assurance/Quality Control – Manufacturer's Qualifications

A. Valves and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least five (5) years.

B. Insofar as possible, all valves of the same specific type shall be the product of one (1) manufacturer.

1.05 Submittals

Submit shop drawings and product data as per the requirements below:

A. Valve Manufacturer Submittals: Submit for review detailed drawings, data and descriptive literature on all valves and appurtenances, including:

1. Dimensions.
2. Size.
3. Materials of construction.
4. Weight.
5. Protective coating.

B. Manufacturer's Certifications: Submit manufacturer's certificates of compliance with ANSI, AWWA and other Standards listed herein.

C. Manufacturer's Service Report:

1. Certify that valves are properly installed except as noted.
2. Recommend corrective action for any deficiencies noted.

D. Submit a detailed operation and maintenance manual for all valves and appurtenances provided under this Section, including the following information:

1. Product name and number.
2. Name, address and telephone number of manufacturer and local distributor.
3. Instruction bulletins for operation, maintenance and recalibration.
4. Complete parts and recommended spare parts lists.

1.06 Valve Delivery, Handling and Storage

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

C. Valves and appurtenances which are cracked, chipped distorted or otherwise damaged or dropped will not be acceptable.

D. Store all valves and appurtenances off the ground in enclosed shelter.

PART 2 - PRODUCTS

2.01 General

A. Valves shall be installed as shown on the Contract Drawings and as otherwise necessary to provide a safe, convenient, flexible and economical control of all piping systems and their related equipment.

B. Valves 4" and larger equipped with flanged joints shall be in conformity with the current ANSI B16.1, "Cast Iron Pipe Flanges and Flanged Fittings", Class 250 drilling.

C. Valves and unions or flanges shall be provided at each individual connection to each piece of equipment to permit complete servicing or removal of each item and drainage of pipe systems. Valves shall be provided for all branch lines; unless otherwise indicated or specified, all valves less than 4" shall be provided with threaded connections.

D. Dual contained valves provided by the piping manufacturer shall be supplied pre-assembled and tested to 150% of the maximum operating pressure. Actuators, stem extensions and accessories shall be part of the preassembled package.

2.02 Ball Valves, 4" and smaller

A. Manufacturers:

1. Asahi or approved alternative

B. Materials:

1. CPVC Type IV, Cell Classification 23447HDPE
2. O-Rings: EPDM or FKM
3. All valves shall have polypropylene handle.

C. Rated Working Pressure:

1. 150 psi at 68° F.

PART 3 - EXECUTION

3.01 Installation

A. Install valves and specialties in accordance with manufacturer's recommendations and instructions to permit intended performance.

B. Extreme care shall be used in the handling, storage and installation of equipment to prevent damage or distortion of the equipment and to ensure proper performance.

3.02 Testing

A. All valves shall be given hydrostatic shop pressure test in accordance with applicable AWWA standard specified. The valves shall be tested, first by applying the hydrostatic pressure with the valve open, and then with the valve closed. The valves shall be tight and secure under the test pressure.

B. Valves and specialties shall be tested in place by the Contractor, and any defects in valves, specialties or connections shall be correct to the satisfaction of the Engineer.

3.03 Identification of Valves

A. Each shutoff or control valve installed inside the plant, valve vault, out building or other accessible area (except those provided as a component of a specific equipment item) shall be provided with a 1-1/2" minimum diameter heavy brass tag.

B. Each tag shall have a unique identifying alpha-numeric code identifying the valve type and service, as approved by the Engineer.

END OF SECTION

SECTION 02560
PIPE TESTING

PART 1 - GENERAL

1.01 Section Includes

A. Testing of all piping, as specified.

B. Pipelines to be Tested:

1. Chemical Feed piping

2. All other new piping not specifically listed above.

1.02 Related Sections

A. Section 02540 – Chemical Piping

B. Section 02550 – Chemical Piping Valves

1.03 Quality Assurance

All equipment, devices, and tools required for testing of piping systems shall be provided by Contractor and shall be of first class construction designed to perform the required service.

1.04 Submittals

Contractor shall submit for review his test procedures for each pipeline to be tested. Provide list of equipment and materials to be used during each test, including size, capacity, manufacturer, model numbers, and all necessary appurtenances.

PART 2 - PRODUCTS

2.01 Testing Equipment

A. All testing equipment, including meter or measuring facilities shall be furnished by Contractor, and shall be subject to the Owner's approval.

B. Contractor shall pay for all water necessary to complete testing.

PART 3 - EXECUTION

3.01 General

A. Test all piping as specified herein except as otherwise authorized by the Engineer.

B. Notify the Engineer 48 hours in advance of testing.

C. Provide all testing apparatus, including pumps, hoses, gages and fittings.

D. Pipelines shall hold the specified test pressure for a period of one (1) hour unless noted otherwise.

E. Repair and retest pipelines which fail to hold specified test pressure or which exceed the allowable leakage rate.

F. Conduct all tests in the presence of the Engineer unless otherwise approved.

G. Contractor shall perform all specified testing.

3.02 Pressure and Leakage Tests Procedures

A. Exposed Piping, Interior Piping, and HDPE Pipe

1. Ensure that all supports, restraints, and pipe protection features are securely in place.

2. Section to be tested shall be slowly filled with water to allow for escape of entrapped air. Install corporation stops as necessary for removal of air.

3. Test only 1 pipeline section at a time.

4. Apply test pressure of 150 psi for two (2) hours and observe pressure gage. Carefully check for leaks while test pressure is being maintained.

a. Examine exposed pipe, joints, fittings and valves. Stop visible leakage or replace the defective pipe, fitting or valve.

b. Pump water into the line with the test pump to maintain the specified test pressure for a one-hour period.

c. All repair, replacement, and retesting required because of failure to meet test requirements shall be made by Contractor.

5. Allowable Leakage Rates: No leakage permitted.

6. Leakage Test shall be repeated following corrective work until a satisfactory test is achieved.

B. HDPE Dual Containment Pipe

1. Carrier Pipe: Hydrostatic test as per Part 3.02 (C) above.

2. Containment Pipe

a. Air test at 10 psi over 10 minutes with no allowable pressure drop.

b. Perform air test with carrier pipe full of water and pressurized to at least 20 psi to avoid collapse.

3.03 Cleaning

All piping shall be thoroughly cleaned and flushed in a manner approved by Engineer prior t being placed into service.

END OF SECTION

SECTION 05550
BOLTS, ANCHOR BOLTS AND EXPANSION ANCHORS

PART 1 - GENERAL

1.1 SUBMITTALS

Submit the following information for review. Do not begin fabrication until after submittals have been reviewed.

A. Manufacturer's Product Data. Manufacturer's product data shall contain sufficient information to evaluate conformance to specifications and produce suitability for intended use. Submit test reports from accredited independent testing laboratories where specified. Submit manufacturer's product data for the following products:

1. Expansion Anchors. Certified pullout and shear capacities shall be included in the submittal.

2. Standard cast products.

1.2 SUBSTITUTIONS

Substitution of rolled sections, details or products is not permitted without prior written approval. If items shown or specified are not readily obtainable, permission to substitute for the specified item may be requested by the Contractor. Substitutions may be allowed on items of equal or superior properties which conform to design criteria.

1.3 CODE REQUIREMENTS

Design of steel fabrications shall conform to the requirements of AISC Specifications for Structural Steel for Building, Allowable Stress Design (Current Edition).

1.4 INSPECTION AND TESTING

The materials and workmanship covered in this specification may be inspected by the Owner, the Engineer or the Owner's designated testing laboratory. The testing laboratory will be employed and paid by the Owner as specified in Section 01380, Quality Control. Inspection may be performed in the mill, shop or field as deemed necessary. Inspection in no way relieves the Contractor from his responsibility to furnish satisfactory materials. The right to reject material at any time before final acceptance is reserved, if material and workmanship do not conform to drawings and specifications.

1.5 DELIVERY AND STORAGE

Schedule material delivery so that items may be erected promptly after arrival. If materials must be stored at the project site, they shall be stored aboveground on platforms, skids or other supports. Material stored at the site shall be kept free of dirt, mud, grease or oil. Protect stored material from corrosion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bolts, Studs, Nuts and Washers.

1. General

a. Bolt heads shall be marked with manufacturer, ASTM material designation/grade, and country where manufactured. Markings shall be raised or depressed.

b. At joint harnesses and restrained harnesses connected to flanges, the tie bolts and studs, flange bolts and nuts shall be in conformity with the current ASTM A193, Grade B7 and ASTM A194.

c. For pipe joints, bolt strength shall be adequate to provide compression needed for water tightness of the gasket material used.

2. Buried Conditions

a. Corrosion Resistant Steel (CRS) CRS anchor bolts, flange bolts, and studs shall be "Cor-Ten" type steel and shall conform to ASTM A325 Type 3 weathering steel with minimum tensile strength of 105 ksi. Type 3 bolts shall be marked A325. Nuts shall be in conformance with ASTM A563 Grade C3.

b. At buried mechanical joints, bolts and nuts shall be in conformance with all of AWWA C111 dimensions and requirements. Bolts and nuts shall be tension tested for a minimum ultimate tensile stress of 65 ksi using testing procedures corresponding to ASTM A307 requirements, and shall be proof load tested based on 45 ksi stress to AWWA C111 standards.

3. Exposed or Submerged Conditions.

a. Stainless Steel. Type 316 conforming to ASTM A193 Grade B8M, Class 2 with ASTM A194 Grade 8M stainless steel nuts and washers.

4. Other as Specified

a. Carbon Steel. Conform to ASTM A325, with suitable nuts and washers, as noted on the drawings. Washers bearing on metal shall be cast steel. Where type is not noted on the drawings, provide ASTM A325. Use carbon steel bolts where indicated on the drawings.

b. Stainless Steel. Where specified or indicated on the drawings as "stainless steel," "SS" or "stn. steel.", Bolts shall be Type 304 conforming to ASTM A193 Grade B8M, Class 2 or 2B with ASTM A194 Grade 8 stainless steel nuts and washers or meet 3 (a) above.

B. Anchor Bolts.

1. Carbon steel anchor bolts shall be galvanized threaded rods conforming to ASTM A307, except where shown or specified otherwise, with suitable heavy hex nuts and oversize washers. Anchor bolts and nuts shall be tapped or chased after galvanizing. Use carbon steel anchor bolts except where noted otherwise on the drawings.

2. Stainless steel anchor bolts shall be Type 304 conforming to ASTM A193 Grade B8. Use stainless steel anchor bolts where shown on the drawings as "stainless steel," "stn. steel" or "SS." Provide stainless steel anchor bolts with suitable stainless steel nuts and oversize washers.

3. Provide anchor bolts for all equipment and machinery when anchor bolts are not furnished by the manufacturer. Anchor bolt type, size, length, projection, etc., shall conform to the requirements of the equipment and machinery manufacturer.

4. Provide templates to accurately position the anchor bolts in the forms.

C. Concrete Expansion Anchors.

1. Provide drilled-in concrete expansion anchors, which are externally threaded edge type expansion bolt anchors complete with washers and nuts. The anchors shall conform to Federal Specification FF S 325, Group II, Type 4, Class 1 concrete expansion anchors.

2. Carbon Steel Expansion Anchors. Not allowed.

3. Stainless Steel Expansion Anchors. Provide stainless steel expansion anchors conforming to AISI Type 316.

4. The expansion anchors shall have minimum ultimate capacity when tested in accordance with ASTM E 488 in 4,000 psi concrete as follows:

Stainless Steel:

Bolt Size	1"	3/4"	5/8"	1/2"
Minimum Shear Strength*	28,000#	18,000#	12,500#	8,340#
Minimum Pullout Strength	27,000#	14,500#	11,000#	8,000#
Minimum Embedment	6"	4-3/4"	4"	3-1/2"

*Shear plane through the anchor bolt shank.

5. Expansion anchors shall be installed in accordance with the manufacturer's recommendations.

6. A list of standard materials used in the manufacturer of the anchor components, including designated material specification (AISI, ASTM, etc.), as well as pullout and shear values attained from tests performed by a certified independent testing laboratory in accordance with ASTM E 488, shall be submitted to the Engineer for review. The submittal shall also include the manufacturer's installation instructions.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Prior to installation, inspect surfaces to which miscellaneous metal items will be attached. If the condition of the surface is such that it will adversely affect installation, do not proceed with installation until corrective measures have been taken.

B. Verify that aluminum surfaces that will be in contact with concrete or steel have been coated as specified

3.2 INSTALLATION

A. Accurately set work to established lines and elevations and securely fasten in accordance with approved shop drawings and provisions of this section.

B. The Contractor shall be fully responsible for furnishing and installing any temporary braces, ties or shoring necessary to hold secure and safe all items under the action of wind and erection loads imposed thereon until construction is completed.

C. Prior to placement of concrete, set concrete inserts (e.g. anchor bolts) in proper location and provide necessary anchorages or restraints to prevent movement of inserts during concrete placement.

D. For stainless steel bolting, apply anti-sieze compound liberally to bolt threads and face of nuts to prevent galling.

E. Follow manufacturer's installation instructions for concrete expansion anchors.

3.3 ERECTION OF STEEL ITEMS

Erection of steel items must conform to AISC specification, Structural Steel for Buildings. Field-fabricated bolt holes, when required, shall be drilled; or as an alternate, they may be flame-cut undersize and reamed to correct size.

END OF SECTION

SECTION 09928
PROTECTIVE COATING SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. All labor, materials, equipment, transportation, supervision, tools, and services necessary for the surface preparation and field painting of exposed steel surfaces; including structural steel, equipment, piping, conduits, and all appurtenances and miscellaneous items

B. All mechanical equipment shipped without a finish coat shall be field painted prior to installation.

1.2 RELATED WORK

A. Work under this Section is also subject to the requirements specified in Divisions 0 and 1 of these Contract Documents:

B. Section 01330: Submittal Procedures.

C. Section 05120: Structural Steel

D. Section 05500: Metal Fabrications

E. Section 05510: Miscellaneous Metals

F. Section 05550: Bolts, Anchor Bolts, Expansion Anchors, and Concrete Inserts

1.3 REFERENCES

A. American National Standards Institute / American Society for Testing and Materials, ANSI / ASTM

1. ANSI / ASTM D16: Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. Ferrous Metal Standard: SSPC – Society of Protective Coatings

C. Cast and Ductile Iron Standard: NAPF 500.

D. Recommended Standards For Water Works by Great Lakes Upper Mississippi River Board of State Public Health And Environment Managers.

E. Recommended Standards For Wastewater Facilities by Great Lakes Upper Mississippi River Board of State Public Health And Environment Managers.

F. International Concrete Repair Institute (ICRI)

1.4 DEFINITIONS

A. Conform to ANSI / ASTM D16 for interpretation of terms used in this Section.

Quality Assurance

B. Product Manufacturer: Company specializing in manufacturing quality paint and finish products intended for use in water/wastewater treatment plants with three (3) years of experience.

C. Applicator: Company specializing in water/wastewater treatment plant painting and finishing with three (3) years of experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

B. All coatings in the following categories shall meet the USEPA Federal Clean Air Act ruling, which becomes effective on September 11, 1999. All coatings specified in the technical specification sections shall be revised accordingly to meet these requirements. The main categories targeted for Volatile Organic Compound levels are as outlined below:

1.	Form Release Agents	(450 g/L)
2.	Primers / Undercoatings	(350 g/L)
3.	Bituminous Coatings / Mastics	(500 g/L)

1.6 SUBMITTALS

A. Submit in accordance with Section 01330

B. Product Data

1. Provide product data on finishing products.

2. Submit manufacturer's application instructions.

3. Submit samples in 1" x 2" size illustrating range of colors and textures available for each surface finishing product scheduled for selection.

C. Shop drawings shall include a listing of all items which the Contractor intends to paint, the paint materials designated for use on those specific items, color charts, and blank spaces to allow the Owner to insert their color selections for each item.

The color selections may be adjusted by the Owner and Engineer after a specific manufacturer of paint has been chosen by the Contractor, and the shop drawings have been reviewed by the Engineer. The Owner reserves the right to specify colors other than those stated in this Section, or as shown on the Drawings. It shall be the Contractor's responsibility to have the final color selections authorized by the Owner prior to ordering any paint materials.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and protect products in accordance with Section 01600.

B. Deliver products to site in sealed original labeled containers; inspect to verify acceptance.

C. Container labeling to include manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and / or reducing.

D. Store paint materials at a minimum ambient temperature of 45o F and a maximum of 90o F, in a well ventilated area, unless manufacturer's instructions have different requirements.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL REQUIREMENTS

A. All paint shall be applied in accordance with the applicable manufacturer's printed data sheet and container label outlining recommended minimum and maximum surface and air temperatures required for application. Paint

shall not be applied to wet or damp surfaces and shall not be applied in rain, snow, fog or mist, or when the relative humidity exceeds 85%.

B. No paint shall be applied when it is expected that the relative humidity will exceed 85% and/or the air temperature will drop below recommended levels within 12 hours after paint application. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, painting shall be delayed until certain that the surfaces are dry. Painting should be completed well in advance of the probable time of day when condensation will occur in order to permit the film an appropriate drying time prior to the formation of moisture on the surface.

C. Provide minimum lighting level of 15 foot-candles on surfaces to be finished.

1.9 EXTRA STOCK

A. Provide 1-gallon container, or small kit, of each type of paint color to owner.

B. Label each container with color, and room location, in addition to the manufacturer's label.

C. Containers shall be tightly sealed.

1.10 ITEMS TO BE PAINTED

A. General List: These lists are intended to provide an overview of work and there may be minor or specific exceptions noted on the Drawings or Specified in Appendix A – Itemized Painting Schedule.

1. All unit process equipment and their accessories. Equipment directly connected to color coded pipe shall be painted the same color as the pipe, or as specified in Appendix A – Itemized Painting Schedule.

2. All exposed piping, and appurtenances with associated hardware; including steel, ductile iron pipe, cast iron pipe, plastic, etc.

3. All exposed electrical conduits, brackets, etc. Properly prime galvanized surfaces as specified. Outdoor electrical apparatus and enclosures shall be coated in the same color as adjacent surfaces.

4. New building construction, including interior and exterior concrete masonry walls, all metal doors and frames, all drywall, and exposed wood.

5. All metal equipment and appurtenances not otherwise covered in the previous sections (except aluminum, chrome-plated and stainless items) shall be painted. Submerged items shall be painted black, unless otherwise indicated.

6. All aluminum, stainless steel, and other metal surfaces in contact with dissimilar metals shall be painted at the points of contact according to Appendix B to prevent contact between dissimilar metals. Aluminum in contact with concrete shall be coated per Appendix B to prevent direct metal contact to concrete.

7. All structural steel.

B. Excluded Items: Unless otherwise shown on the Drawings, or specified in other sections, the following is a general list of those surfaces not to be painted on-site or by the manufacturer.

1. Fiberglass Items.

2. Aluminum items, unless otherwise specified.

3. Stainless steel, unless otherwise specified.

4. Chrome Plating.

5. Pre-painted items.

6. Galvanized surfaces, excluding electrical conduits, unless otherwise specified.

C. Itemized Painting Schedule: In addition to the General List of items to be painted above, Appendix A - Itemized Painting Schedule at the end of this Section lists specific items to be painted as part of the Work. This schedule is not intended to be all inclusive, but is proved to indicate major equipment or other items of importance that are to be painted. The schedule does not relieve the Contractor's responsibility to provide a comprehensive list of items to be painted as part of the shop drawing submittal(s).

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Paint: Interior and Exterior

1. Tnemec Company

2. AkzoNobel (International Paint, LLC Devoe Coatings)

3. Approved Alternative

2.2 MATERIALS

A. Coatings: Ready mixed, except field-catalyzed coatings.

1. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coatings.

2. Good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified or commercial quality.

C. Provide best grade of various types of coatings scheduled as regularly manufactured by acceptable paint manufacturer. Products not displaying manufacturer's identification as "standard, best grade product," are not acceptable.

2.3 FINISH SCHEDULE

A. This schedule is not intended to include mention of every item requiring field painting, but is intended as a guide to finishing various surfaces throughout the project.

1. The Finish Schedule in Appendix B at the end of this Section is based, in general, on the products of Tnemec Company and AkzoNobel, and is the basis for standard of quality. The standard "or equal" clause shall apply.

2. Product substitutions shall be subject to the requirements of Section 01600. Each such request shall include the name of the specified material for which a substitute is being requested; the name of the proposed substitute material; and a complete description of the proposed substitute including performance and test data and any other information necessary for an evaluation.

3. The burden of proof of the merit of the proposed substitute is upon the Contractor. The decision of the Engineer/Owner regarding approval or disapproval of the proposed substitution shall be final.

4. Where products are proposed other than those specified by name and number in the Finish Schedule, provide submittal as required including product data sheets and performance criteria along with a new painting schedule in the same format included in this Section.

B. Undercoats:

1. Provide undercoat / primer paint produced by the same manufacturer as the finish coat.

2. Insofar as practicable, use undercoat / primer and finish coat material as part of a unified system of paint finish.

C. Provide all paint and materials supplied by one manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces base conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to the commencement of work.

1. Report all conditions that may adversely affect quality of the finished work prior to commencement of work.

2. Do not commence until such defects have been corrected.

C. Correct defects and deficiencies in surfaces, which may adversely affect work on this Section.

D. Beginning of installation means acceptance of existing surfaces and / or base.

3.2 PREPARATION OF SURFACES

A. Correct minor defects and clean surfaces which impact the work of this section.

B. Impervious Surfaces:

1. Remove mildew by power washing / scrubbing with a solution of trisodium phosphate (TSP) or bleach.

2. Rinse with clean water and allow surfaces to dry.

C. Preparation of Metal Surfaces

1. SSPC-SP1 SOLVENT CLEANING: The removal of dirt, oil, grease and foreign matter with solvents or commercial cleaners using various methods of cleaning such as wiping, dipping, steam cleaning or vapor degreasing. The removal of oil and grease by solvent cleaning is included in all other SSPC Surface Preparation Specifications.

2. SSPC-SP2 HAND TOOL CLEANING: The removal of loose rust and mill scale, or old paint by hand wire brushing, hand scraping, hand chipping or hand sanding.

3. SSPC-SP3 POWER TOOL CLEANING: The removal of loose rust and mill scale by mechanical means such as power sanders, wire brushes, chipping hammers, abrasive grinding wheels or needle guns.

4. SSPC-SP4 FLAME CLEANING: The dehydration of the surface by rapidly heating with a high temperature, high-velocity oxyacetylene flame followed by wire brushing and hand scraping to remove loose rust and mill scale.

5. SSPC-SP5 WHITE METAL BLAST CLEANING: The complete removal of all visible rust, mill scale, paint and foreign matter by compressed air nozzle blasting, centrifugal wheels or other specified method, leaving an overall, uniformly gray-white metallic appearance.

6. SSPC-SP6 COMMERCIAL BLAST CLEANING: The removal of at least sixty-six percent of all visible rust, mill scale, paint and other foreign matter from each square inch of surface by compressed air nozzle blasting, centrifugal wheels or other specified methods.

7. SSPC-SP7 BRUSH-OFF BLAST CLEANING: The removal of loose rust, mill scale, paint and foreign matter from the surface by compressed air nozzle blasting, centrifugal wheels or other specified methods.

8. SSPC-SP8 PICKLING: The complete removal of all rust, mill scale and foreign matter by chemical reaction or electrolysis in acid solutions. The degree of cleanliness is similar to SSPC-SP5 White Metal Blast Cleaning.

9. SSPC-SP9 WEATHERING AND CLEANING: This is a method of preparing unpainted metal surfaces for coating by weathering metals to remove all or part of mill scale followed by blast cleaning.

10. SSPC-SPC10 NEAR-WHITE METAL BLAST CLEANING: The removal of ninety-five percent of all visible rust, mill scale, paint and other foreign materials from each square inch of surface by compressed air nozzle blasting, centrifugal wheels or other specified reason.

11. On galvanized surfaces, prepare in accordance with the methods outlined in ASTM D 6386-99 Standard Practice for Preparation of Zinc (Hot Dipped Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

12. On stainless steel surfaces, prepare by solvent cleaning prior to using any one of the methods in SSPC-SP1. Only solvents or cleaning solutions containing less than two hundred (200) ppm of halogens shall be used to prevent stress corrosion cracking. Abrasive blast cleaning procedures outlined by Steel Structures Painting Council for carbon steel may also be used for stainless steel. Only very hard silica sand or other abrasive material should be used for a fast cutting action and to obtain a sharp angular profile.

D. Shop Primed Steel Surfaces

1. The paint systems shown in appendix B are to be used for equipment and piping delivered to the site even though they may already be shop primed. A shop prime coat shall not be substituted for the surface preparation of prime coats required on-site by the paint systems listed in that Section.

2. Sand or scrape to remove loose primer and rust.

3. Feather edges to form a smooth transition to tight existing paint.

4. Shop Prime Coat: Apply per Finish Schedule in Appendix B at the end of this Section in accordance to the requirements for prime coating.

E. Concrete and Masonry Surfaces

1. All concrete and masonry surfaces to be painted or sealed shall be clean, dry and free of dirt, oils, dust, grease, wax, flaking or loose paint, efflorescence and other deleterious materials. All cracks, chips and other defects in plain concrete and masonry surfaces shall be filled prior to coating or sealing.

2. New concrete or masonry should not be coated for at least twenty-eight (28) days to permit the concrete or mortar to cure and dry out.

3. Prepare concrete or masonry surfaces to be coated in accordance with SSPC SP-13. Surface profile shall be accordance with ICRI CSP standards as recommended by the manufacture based on coating system and the intended environment. The surface of concrete or masonry to be coated should be examined for defects such as fins, protrusions, bulges and mortar spatter. These defects should be corrected by grinding or scraping. Remove non-degraded release agents, oil, wax, and grease by scraping off heavy deposits and solvent cleaning with a hot trisodium phosphate solution. Allow time to dry thoroughly before coating.

F. Cast and Ductile Iron Piping

1. Preparation per NAPF 500 requirements, latest edition.

G. Wood surfaces

1. Wood shall be clean and dry. Remove surface deposits of sap or pitch by scraping and wiping clean with mineral spirits or VM&P naphtha. Seal knots and pitch pockets with shellac reduced with equal parts of shellac thinner (denatured alcohol) before priming. Sand rough areas with the grain, starting with medium grit sandpaper and finishing with fine grit. Remove sanding dust. After prime coast is dry, fill cracks and holes with putty or spackling compound. When filler is hard, sand flush with the surface using fine grit sandpaper. Sand lightly between coats with fine grit, open-coated sandpaper.

H. PVC Pipe

1. All surfaces to be uniformly and thoroughly scarified using a medium grit sandpaper. Any dust or other contaminates remaining after sanding shall be removed with dry, oil free compressed air or by vacuum after cleaning.

I. Gypsum Drywall Construction

1. Sand joint compound with fine-grit, open-coated sandpaper to provide a smooth flat surface. Avoid heavy sanding of the adjacent wallboard surfaces, which will raise the nap of the paper covering. Remove dust from the surface by wiping with clean rags or other means. If additional joint finishing is required to provide a smooth surface, the same joint compound or ready-mixed spackling compound shall be used. Putty, patching pencils, caulking, or masking tape shall not be applied to the drywall surfaces to be painted. Lightly scuff-sand tape joints after priming to remove raised paper nap. Take care not to sand through the prime coat and remove dust by wiping with clean rags.

3.3 PROTECTION

A. Protect elements surrounding work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.

3.4 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. All painting shall be done in the best manner by skilled workmen and in accordance with the SSPC Good Painting Practices PA1 and the manufacturer's application recommendations. The Contractor shall follow OSH requirements. Extreme care shall be taken around volatile materials, which could pose a fire or explosion hazard. Precautions shall be taken to avoid workmen from inhaling toxic or dangerous vapors or paint particles. Containers for use shall be opened in the presence of the Engineer immediately before use.

C. Paint shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Where necessary, packaged paint other than cement-emulsion filler may be thinned immediately prior to application in accordance with the manufacturer's directions if authorized by the Engineer, but not in excess of one pint of thinner per gallon of paint.

D. Surfaces that have been cleaned or pretreated shall be given a first coat of paint as soon as practical after surface preparation, prior to any deterioration of the prepared surfaces.

E. Each coat shall be applied at the rate and to the film thickness specified in Appendix B. One (1) gallon of paint as originally furnished must not cover a greater area than when applied by spray gun than when applied by brush unthinned.

F. All paint shall be thoroughly and smoothly applied or brushed out to a uniform film without runs or sags. Each coat of finish shall be allowed to completely cure and dry hard before application of the succeeding coat. First coats for specific metal surfaces shall be applied by brush, if required by the Engineer. When the trim has been shop primed, any subsequent coats may be applied by brush, roller, or spray. Other surfaces may be coated by brush, roller, or spray, except for filler coats. Sand lightly between coats if required to achieved specific finish.

G. Apply each coat of paint in contrasting color than the preceding coat unless otherwise approved by the Engineer.

H. Metal surfaces adjacent to other surfaces receiving water-based paints shall be primed and/or touched-up prior to the application of the water-based paints. The first coat on plaster shall include touching-up or application of primer-sealer as necessary to produce a uniform color and gloss. Application of styrene-butadiene filler shall be in accordance with the manufacturer's instructions. Surface voids, pores, and cracks shall be filled, and the completed dry film shall be free from pinholes or other imperfections. Surface irregularities need not be completely filled. The coasting material shall not be applied over caulking compound.

I. Paint on metal, masonry, plaster, or concrete areas of considerable size (except floors) may be sprayed by skilled workmen only. Respirators shall be worn by those in proximity of spray painting. The nozzle shall be held perpendicular to the surface being painted and the coat applied uniformity, thoroughly wetted, and properly bonded to the surface. Immediately after spraying, remove all surplus paint and smooth out all runs and sags by brushing out. Adjacent surfaces shall be protected from drips, spatter, and over spray.

3.5 PAINTING EQUIPMENT

A. Brushes shall be new and be the size and type best suited for the particular work. Brushes shall be kept clean and stored properly when not in use. If rollers are used for applying enamel, they shall have a short nap, as required by the manufacturer.

B. Spraying equipment shall be subject to the Engineer's authorization. Compressors shall be motor-driven, oil and water free, and shall be set in locations designated by the Engineer and connected and used without interfering with the work of other trades. The paint spray container shall have an efficient agitator for materials requiring this. All flexible hose, nozzles, and equipment shall be thoroughly cleaned after each day's work and maintained in first-class working conditions.

3.6 FINISHING MECHANICAL EQUIPMENT AND PIPING

A. Finish paint shop primed equipment to color selected.

B. Prime and paint insulted and exposed pipes, hangers, brackets, collars, and supports except where items are prefinished.

C. Replace identification markings on mechanical equipment when painted accidentally.

D. Pipe Color Code

1. All new, exposed, interior, and submerged piping shall be painted. Plastic pipe shall be painted only in order to indicate its use according to the Pipe Color Code, and only that portion which is exposed and not submerged shall be painted. Plastic pipe which is used for purposes other than those mentioned in the Pipe Color Code shall not be painted. In general, the only application for asphalt dipped pipe shall be buried installations. Pipe colors shall be according to the following schedule. The direction of flow of the contents of the pipe shall be stenciled on the piping. Permanently attached plastic markers may be used in lieu of the stenciling. Shop drawings shall indicate stencil or plastic marker method.

2. Water: Color banding and identification of piping (flow arrows, naming, numbering) in accordance with following schedule and the Recommended Standards for Water Works, published by the Great Lakes – Upper Mississippi River Board State Public Health and Environment Managers, latest edition.

a.	Raw water line	Olive
b.	Settled or Clarified water	Aqua
c.	Potable Water	Blue
d.	Alum or Primary Coagulant	Orange
e.	Ammonia	White
f.	Carbon Slurry	Black
g.	Caustic	Yellow w/ green band
h.	Chlorine	Yellow
i.	Fluoride	Light blue w/ red band
j.	Lime Slurry	Light Green
k.	Ozone	Yellow w/ orange band
l.	Phosphates	Light green w / red band
m.	Potassium Permanganate	Violet
n.	Soda Ash	Light green w/ orange band
o.	Sulfuric Acid	Yellow w/ red band
p.	Sulfur Dioxide	Light green w/ yellow band
q.	Backwash Waste	Light brown
r.	Sludge	Dark brown
s.	Sewage (wastewater) line	Gray
t.	Compressed Air line	Green
u.	Gas	Red
v.	Polymers or Coagulant Aids	Orange w/ green band

The contents and direction of flow shall be stenciled on the piping in a contrasting color.

3. Wastewater: Color banding and identification of piping (flow arrows, naming, numbering) in accordance with following schedule and the Recommended Standards for Wastewater Facilities, published by the Great Lakes – Upper Mississippi River Board State Public Health and Environment Managers, latest edition.

a.	Raw Sludge line	Brown w/black bands
b.	Sludge Recirc. Suction line	Brown w/yellow bands

c.	Sludge Draw off line	Brown w/orange bands
d.	Sludge Recirc. Discharge line	Brown
e.	Non-potable water line	Blue w/black bands
f.	Potable Water line	Blue
g.	Sewage (wastewater) line	Gray
h.	Chlorine Line	Yellow
i.	Sulfur Dioxide	Yellow w/red bands
j.	Compressed Air line	Green
k.	Water lines for heating digesters	Blue w/6" band @ 30" spacing
l.	Plumbing drains and vents	Black

The contents and direction of flow shall be stenciled on the piping in a contrasting color.

4. Pipe Lettering Size

Pipe O.D. (inches)	Letter Height (inches)
3/4 to 1-3/4	1/2
1-1/2 to 2	3/4
2-1/2 to 6	1-1/4
8 to 10	2-1/2
Over 10	3-1/2

3.7 CLEANING

A. As work proceeds, promptly remove paint where spilled, splashed or spattered.

B. During progress of work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Collect cotton waste, cloths, and materials that constitute a fire hazard; place in closed metal containers and remove daily from site.

D. Upon completion of work, leave premises neat and clean, to the satisfaction of Engineer.

APPENDIX A - ITEMIZED PAINTED SCHEDULE

A. New Items to be Painted	Color
N/A	

B. Existing Items to Be Painted	Color
N/A	

END OF APPENDIX A

APPENDIX B – FINISHED PAINTED SCHEDULE

Surface	Surface Preparation	Primer	Inter-mediate	Finish
Steel-Structural Tanks, Pipes, Equipment Exterior, Non-Immersion	SSPC-SP6	TP2 or IPP1	TI2 or IPI1	TF1 or IPF1
Steel-Structural Tanks, Pipes, Equipment Interior, Non-Immersed	SSPC-SP6	TP2 or IPP1	TI2 or IPI1	TF4 or IPF2
Steel-Structural Tanks, Pipes, Equipment Interior, Non-Immersed (2nd Option)	SSPC-SP6	IPP2	N/A	IPF2
Steel-Structural Tanks, Pipes, Equipment Immersion, Potable Water	SSPC-SP10	TP2 or IPP3	TI5 or N/A (IP)	TF8 or IPF3
Steel-Structural Tanks, Pipes, Equipment Immersion, Non-Potable Water	SSPC-SP10	TP2 or IPP2	TI2 or N/A (IP)	TF4 or IPF2
Steel-Structural Tanks, Pipes, Equipment Below Grade	SSPC-SP10	TP2 or IPP4	N/A	TF5 or IPF4
Factory Primed Steel Exterior Exposed	N/A	N/A	TI4 or IPI3	TF1 or IPF1
Factory Primed Steel Interior Exposed	N/A	N/A	TI4 or IPI3	TF2 or IPF2
PVC Pipe Exterior Exposed	Scarify	TP1 or IPP1	N/A	TF1 or IPF1
PVC Pipe Interior Exposed	Scarify	TP1 or IPP1	N/A	TF1 or IPF2

APPENDIX B – FINISHED PAINTED SCHEDULE

Surface	Surface Preparation	Primer	Inter-mediate	Finish
Ductile Iron Pipe Exterior Exposed Non-Immersed	NAPF 500-03-03	TP2 or IPP1	TI2 or IPI3	TF1 or IPF1
Ductile Iron Pipe Interior Exposed Non-Immersed	NAPF 500-03-03	TP2 or IPP1	TI2 or N/A (IP)	TF4 or IPF2
Ductile Iron pipe Immersion Non-Potable Water	NAPF 500-03-03	TP2 or IPP1	TI2 or IPI1	TF4 or IPF2
Ductile Iron Pipe Immersion Potable Water	NAPF 500-03-03	TP2 or IPP5	TI5 or N/A (IP)	TF8 or IPF3
Ductile Iron Pipe Below Grade	NAPF 500-03-03	TP2 or IPP4	N/A	TF5 or IPF4
Galvanized Steel and Non-Ferrous Metals Exterior Exposed	ASTM D 6386- 99	TP1 or IPP1	N/A	TF1 or IPF1
Galvanized Steel and Non-Ferrous Metals Interior Exposed	ASTM D 6386- 99	TP1 or IPP1	N/A	TF2 or IPF2
Galvanized Steel and Non-Ferrous Metals Immersion, Potable Water	ASTM D 6386- 99	TP2 or IPP5	N/A	TF10 or IPF3
Galvanized Steel and Non-Ferrous Metals Immersion, Non-Potable Water	ASTM D 6386- 99	TP1 or IPP1	N/A	TF4 or IPF2
Galvanized Steel and Non-Ferrous Metals Chain Link Fence	ASTM D 6386- 99	TP1 or IPP1	N/A	TF1 or IPF1
Concrete Exterior Exposed	SSPC-SP 13	TP4 or IPP6	TI3 or IPI1	TF7 or IPF5

APPENDIX B – FINISHED PAINTED SCHEDULE

Surface	Surface Preparation	Primer	Inter-mediate	Finish
Concrete Exterior Exposed Below Grade	SSPC-SP 13	N/A	N/A	TF5 or IPF6
Concrete Immersion Non-Potable Water	SSPC-SP 13 ICRI-CSP 5	TP3 or IPP7	N/A or IPI1	TF4 or IPF2
Concrete Immersion Potable Water	SSPC-SP 13 ICRI-CSP5	TP3 or IPP6	N/A or IPI2	TF10 or IPF3
Concrete Immersion Brine Tank	SSPC-SP 13 ICRI-CSP 5	TP3 or IPP8	TI5 or N/A (IP)	TF12 or IPF7
Concrete Interior Exposed	SSPC-SP 13 ICRI-CSP 1-3	TP3 or IPP2 Patch as required	N/A	TF4 or IPF2
Concrete Secondary Containment Severe Conditions Interior Exposed	SSPC-SP 13 ICRI - CSP 5	TP3 or IPP6	TI6 or IPI4	TF9 or IPF8
Concrete Floors Non-Slip Clear Finish	SSPC-SP 13 ICRI-CSP 3	TP6	N/A	TF10
Concrete Masonry Exterior Exposed	Clean and Dry	TP4 or IPP9	TI3 or IPI1	TF7 or IPF1
Concrete Masonry Interior Exposed	Clean and Dry	TP5 or IPP9	TI2 or IPI1	TF4 or IPF2
Plaster and Wallboard Interior Exposed	Clean and Dry	TP4 or IPP10	N/A	TF3 or IPF9
Wood Interior and Exterior	Clean and Dry	TP4 or IPP11	N/A	TF3 or IPF10

APPENDIX B – FINISHED PAINTED SCHEDULE

Surface	Surface Preparation	Primer	Inter-mediate	Finish
Insulated Pipe Interior	Clean and Dry	TP4 or IPP6	TI7 or IPI5	TF6 or IPF11
Concrete: Severe Wastewater (H_2S) Environments	SSPC-SP 13 ICRI-CSP 5	TP3 or IPP8	TI8 or N/A (IP)	TF11 or IPF7
Steel: Severe Wastewater (H_2S) Environments	SSPC-SP 5, 3.0 mil minimum profiled	N/A	TF11 or N/A (IP)	TF11 or IPF7
Steel-Structural Tanks, Pipes, Equipment Exterior, Non-Immersion – ELEVATED WATER STORAGE TANKS – NEW CONSTRUCTION	SSPC-SP10	IPP12	IPI6	IPF1
Steel-Structural Tanks, Pipes, Equipment Exterior, Non-Immersion - ELEVATED WATER STORAGE TANKS – MAINTENANCE & REPAIR (Option 1 – polyurethane)	SSPC-SP7 Min: SSPC-SP2/SP3	IPP13 Spot Prime	IPI6	IPF1
Steel-Structural Tanks, Pipes, Equipment Exterior, Non-Immersion - ELEVATED WATER STORAGE TANKS – MAINTENANCE & REPAIR (Option 2 – acrylic)	Power Wash w/Devprep 88 (min 2000 psi)	IPP13 Spot Prime	IPI5	IPF11

E. Tnemec Prime (TP) Coat:

TP1	Series N69Hi-Build Epoxoline II, 2.0-3.0 mils dry
TP2	Series 1 Omnithane 2.5 – 3.5 mils
TP3	Series 218 MortarClad, min. 1/32"
TP4	Series 151 Elasto-Grip FC, 0.7 – 1.5 mils dry

TP5	Series 130 EnviroCrete, 60 - 80 sq. ft./gal spread rate for porous CMU, 85 to 115 sq. ft./gal. for dense CMU
TP6	Series 201 Epoxoprime

F. Tnemec Intermediate (TI) Coats:

TI1	Series N69 Hi-Build Epoxoline II, 2.0-3.0 mils dry
TI2	Series N69 Hi-Build Epoxoline II, 4.0-6.0 mils dry
TI3	Series 156 EnviroCrete, 4.0-8.0 mils dry
TI4	Series 27 Typoxy, 2.0-3.0 mils dry
TI5	Series 140 Pota-Pox, 4.0-6.0 mils dry
TI6	Series 237SC PowerTread 8.0-10.0 mils dry
TI7	Series 6 Tneme-Cryl, 2.0 – 3.0mils dry
TI8	Series 434 Perma-Shield H2S, 1/8" min. thickness

G. Tnemec Finish (TF) Coats:

TF1	Series 73 Endura-Shield, 2.0-3.0 mils dry
TF2	Series N69 Hi-Build Epoxoline, 2.0-3.0 mils dry
TF3	Series 113 HB Tneme-Tufcoat, 4.0 – 6.0
TF4	Series N69Hi-Build Epoxoline II, 4.0-6.0 mils dry
TF5	Series 46H-413 Hi-Build Tneme Tar, 14.0-20.0 mils dry
TF6	Series 6 Tneme-Cryl, 2.0-3.0 mils dry
TF7	Series 156 EnviroCrete, 4.0-8.0 mils dry
TF8	Series N140 Pota-Pox Plus, 4.0 to 6.0 mils dry
TF9	Series 282 Tneme-Glaze, 6.0 – 8.0
TF10	Series 294 Clear CRU 2.0–3.0 mils dry
TF11	Series 435 Perma-Glaze 15.0 – 2.0 mils

H. International Paint (IPP) Prime Coats:

IPP1	Devoe Devran 201H, 2.0-3.0 mils dry
IPP2	Devoe Devran 224HS, 4.0-6.0 mils dry or
	International Intergard 345, 4.0-6.0 mils dry
IPP3	Devoe Bar Rust 233H, 4.0-6.0 mils dry or
	International Interseal 670HS, 4.0-6.0 mils dry
IPP4	Devoe DevTar 5A-HS, 6.0-8.0 mils dry

IPP5	Devoe Bar Rust 233H, 2.0-3.0 mils dry (thinned) or
	International Interseal 670HS, 2.0-3.0 mils dry (thinned)
IPP6	Pre-Prime 167, 1.0-1.5 mils dry
IPP7	Devoe Devfil 145
IPP8	Enviroline 50 Moisture Tolerant Primer, 2.0-4.0 mils dry or
	Ceilcote 680M Primer, 2.0-4.0 mils dry
IPP9	Devoe Bloxfil 4000
IPP10	Devoe Tru-Glaze 4030, 2.0-3.0 mils dry
IPP11	Devoe Devflex 4020
IPP12	Devoe Cathacoat 302H, 2.5-4.0 mils dry or
	International Interzinc 22, 2.5-4.0 mils dry
IPP13	Devoe Bar Rust 231, Spot Prime or
	International Intergard 345, Spot Prime

I. International Paint Intermediate (IPI) Coats:

IPI1	Devoe Devran 224HS, 4.0-6.0 mils dry or
	International Intergard 345, 4.0-6.0 mils dry
IPI2	Devoe Bar Rust 233H, 4.0-6.0 mils dry or
	International Interseal 670HS, 4.0-6.0 mils dry
IPI3	Devoe Devran 201H, 2.0-3.0 mils dry
IPI4	Devoe Devchem 253, 5.0-6.0 mils dry
IPI5	Devoe Devflex 659, 2.0-3.0 mils dry
IPI6	Devoe Bar Rust 231, 4.0-6.0 mils dry or
	International Intergard 345, 4.0-6.0 mils dry

J. International Paint Finish (IPF) Coats:

IPF1	Devoe Devthane 379, 2.0-3.0 mils dry or
	International Interthane 990, 2.0-3.0 mils dry
IPF2	Devran 224HS, 4.0-6.0 mils dry or
	International Intergard 345, 4.0-6.0 mils dry
IPF3	Devoe Bar Rust 233H, 4.0-6.0 mils dry or
	International Interseal 670HS, 4.0-6.0 mils dry

IPF4	Devoe DevTar 5A-HS, 6.0-8.0 mils dry
IPF5	Devoe Devthane 378, 2.0-3.0 mils dry or
	International Interthane 870, 2.0-3.0 mils dry
IPF6	Interzone 954 or Devtar 247, 16.0-20.0 mils dry
IPF7	Enviroline 222, 20.0-100.0 mils dry or
	Ceilcote 663SG, 60.0-120.0 mils dry
IPF8	Devoe Devchem 258, 5.0-6.0 mils dry
IPF9	Devoe Tru-Glaze 4418, 2.0-3.0 mils dry
IPF10	Devoe Devflex 4216, 2.0-3.0 mils dry
IPF11	Devoe Devflex 659, 2.0-3.0 mils dry

END OF APPENDIX B

END OF SECTION

ultrasorb 400

CITY OF FLINT WTP
Filter Media Replacement
Basis of Design

					Notes
Max. Expected Flow Rate =	30.0 mgd =		20,833 gpm =	2,785 cft/min	7.92' current depth
Max. Day May 2014 - April 2015 =	25.4 mgd =		17,639 gpm =	2,358 cft/min	
Avg. Day May 2014 - April 2015 =	18.3 mgd =		12,708 gpm =	1,699 cft/min	
Design Flow Rate =	24.0 mgd =		16,667 gpm =	2,228 cft/min	
Min. Expected Flow Rate =	8.0 mgd =		5,556 gpm =	743 cft/min	
Area / Filter =	700 sft				
Number of Filters =	12				

mgd	30.0	24.0	8.0
Loading (gpm/sft) =	2.48	1.98	0.66

Top of Underdrain elev =	723.58			
Washwater Trough Weir elev =	730.67			
Operating Water Level =	734.00			
Top of Filter Basin / Floor elev =	736.00			
Filter BW Dimensional D =	7.08			
Existing Sand D =	12.00 inches =		1.00 ft	
Existing Anthracite D =	18.00 inches =		1.50 ft	
Proposed Sand D =	12.00 inches =		1.00 ft	
Proposed GAC D =	18.00 inches =		1.50 ft	
Proposed Water Depth =			7.92 ft	
Max Cold BW Flow rate / filter =	9800 gpm =		14.0 gpm/sft	
Max Warm BW Flow rate / filter =	14000 gpm =		20.0 gpm/sft	
Max Sand Expanded D =	14.2 inches =		1.18 ft =	18%
Max GAC Expanded D =	34.20 inches =		2.85 ft =	90%
Total BW Expanded D =	48.40 inches =		4.03 ft	
Proposed BW Freeboard =			3.05 ft	
Proposed # of Filters to Replace	12			
GAC Volume =	12,600 cft			
GAC apparent density =	33.7 lbs/cft			
GAC Total Weight =	424,620 lbs =		212.3 tons	

Remove

Install

current depth?

new depth
7.92
-2.50 ft
5.42 ft

See following pages for details

To match current BW flow rate
Use when water temp > 65 degrees
Occurs at cold temps

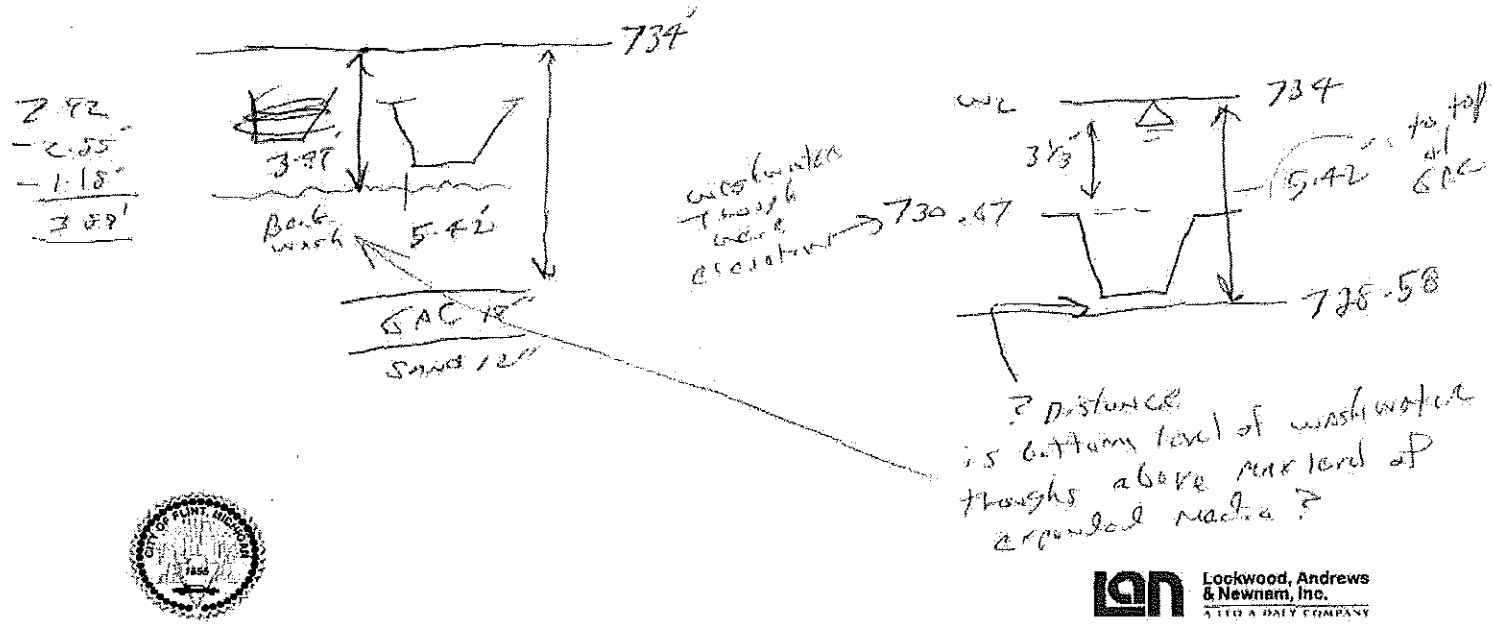
mgd	30.0	24.0	8.0
EBCT (min) =	4.5	5.7	17.0

Propose to relocate intermediate chlorine feed to inlet side of weir chamber following filtration
Intermediate CL2 feed point to remain in place as means to disinfect filters in the future, if needed

mgd	30.0	24.0	8.0
Contact time (min) =	55.0	68.8	206.3
CT =	99.0	123.8	371.4

Calculations attached separately

Required CT at 1.8 mg/l chlorine, less than 0.5 degrees C, and pH of 8.0 = 56 OK



Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

After conf. w. Mike & Brent

UNTP coverage

O/C

M. Gibbs — Utilities Administrator

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

Date: 05/20/15
By: JRH
Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	14.0
Water Temperature (F°)	32
Viscosity (centipoise)	1.79355
Dynamic Viscosity (# -sec/sf)	3.746E-05
Water Density (#/cf)	62.42
Mass Density (# -sec/ft^4)	1.940

COMMENTS

Uniformity Coeff a 6.4 high w the Filtrasorb Products & Effective Sizes

10-states

<1.65

.45 - .55

> 2.5

SITE LOCATION	10 States		10 States Interpreted		Filtrasorb 400		Filtrasorb 300		Alt	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65 ✓	2.30	1.40 ✓	2.30	1.90 ✗	2.30	2.10 ✗	2.30	1.50 ✓
Effective Size (mm)	0.400	0.550 ✓	0.40	0.800 ✗	0.40	0.650 ✗	0.40	0.800 ✗	0.40	0.650 ✗
d60% Size (mm)	0.920	0.908	0.920	1.120	0.920	1.235	0.920	1.680	0.920	0.975
d90% Size (mm)	1.607	1.269	1.607	1.403	1.607	1.899	1.607	2.762	1.607	1.279
Porosity	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50
Specific Gravity	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45
Media Density (#/cf)	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Reynolds Number	2.447	0.734	2.447	1.329	2.447	1.750	2.447	4.168	2.447	0.899
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Unhindered Settling Vel. (ft/sec)	20.68	6.20	20.68	11.23	20.68	14.79	20.68	35.22	20.68	7.59
Expansion Coefficient (n)	3.287	3.708	3.287	3.494	3.287	3.399	3.287	3.117	3.287	3.633
Bed Porosity Coefficient (k)	142.82	27.92	142.82	35.31	142.82	39.49	142.82	56.85	142.82	30.22
Porosity (expanded)	0.493	0.830	0.493	0.767	0.493	0.737	0.493	0.638	0.493	0.809
Bed Depth Expanded (in)	14.2	53.0	14.2	38.7	14.2	34.2	14.2	24.9	14.2	47.2
% Expanded Bed	18.4	194.4	18.4	115.0	18.4	90.1	18.4	38.1	18.4	162.0
d90gac/d10s Ratio	3.173		3.508		4.746		6.905		3.198	
Discussion/Notes										

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation

Filter Media Analysis 2015 1st Stage

Date: 05/20/15

By: JRH

Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	20.0
Water Temperature (F°)	80
Viscosity (centipoise)	0.86134
Dynamic Viscosity (# -sec/sf)	1.799E-05
Water Density (#/cf)	62.22
Mass Density (# -sec/ft^4)	1.927

COMMENTS

10-states

<1.65

.45-.55 mm

<2.50

SITE LOCATION	10 States		10 States Interpreted		Filtrasorb 400		Filtrasorb 300		Alt	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.40	2.30	1.90	2.30	2.10	2.30	1.50
Effective Size (mm)	0.400	0.550	0.400	0.800	0.400	0.650	0.400	0.800	0.400	0.650
d60% Size (mm)	0.920	0.908	0.920	1.120	0.920	1.235	0.920	1.680	0.920	0.975
d90% Size (mm)	1.607	1.269	1.607	1.403	1.607	1.899	1.607	2.762	1.607	1.279
Porosity	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50
Specific Gravity	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45
Media Density (#/cf)	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	6.00	13.38	7.16	13.38	12.54	13.38	4.66
Reynolds Number	9.640	2.905	9.640	5.259	9.640	6.928	9.640	16.499	9.640	3.557
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.828	1.000	1.000
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	6.00	13.38	7.16	13.38	10.39	13.38	4.66
Unhindered Settling Vel. (ft/sec)	81.46	24.55	81.46	44.44	81.46	58.54	81.46	139.42	81.46	30.06
Expansion Coefficient (n)	2.866	3.231	2.866	3.045	2.866	2.962	2.866	2.716	2.866	3.166
Bed Porosity Coefficient (k)	184.94	38.40	184.94	49.50	184.94	55.84	184.94	68.25	184.94	41.83
Porosity (expanded)	0.460	0.817	0.460	0.743	0.460	0.707	0.460	0.636	0.460	0.792
Bed Depth Expanded (in)	13.3	49.2	13.3	35.0	13.3	30.7	13.3	24.8	13.3	43.3
% Expanded Bed	11.2	173.5	11.2	94.3	11.2	70.7	11.2	37.5	11.2	140.5
d90gac/d10s Ratio	3.173		3.508		4.746		6.905		3.198	
Discussion/Notes										

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

CITY OF FLINT WTP

2-18 MGAL 2-14 MGAL

CT CALCS

TIME FROM FILTERS EFFLUENT TO 1ST TAP

Label	Location	Diameter in	Diameter ft	L ft	W ft	D ft	Bottom elev	Vol cft	Flow Rate mgd	Flow Rate cft/s	Baffle Factor	Time min	Velocity fps	Flow Rate mgd	Flow Rate cft/s	Time min	Flow Rate mgd	Flow Rate cft/s	Time min
A	Weir chamber, pre-baffle			26.75	13.08	15.5	709.00	5423	30.0	46.4	1.0	1.95	0.23	24.0	37.1	2.43	8.0	12.4	7.30
B	Weir chamber, post-baffle			26.75	8.5	10.0	709.00	2274	30.0	46.4	1.0	0.82	0.55	24.0	37.1	1.02	8.0	12.4	3.06
	Effluent pipe																		
C	wc - bldg face	48	4.00	16.00				201	30.0	46.4	1.0	0.07	3.69	24.0	37.1	0.09	8.0	12.4	0.27
D	bldg face - junct well	48	4.00	401.00				5039	30.0	46.4	1.0	1.81	3.69	24.0	37.1	2.26	8.0	12.4	6.79
	Res. 3																		
E	Junct well			12.00	18.00	15.0	704.00	3240	30.0	46.4	1.0	1.16	0.17	24.0	37.1	1.45	8.0	12.4	4.36
F	Clear well			140.00	177	10.0	709.00	247,800	30.0	46.4	0.5	44.49	0.05	24.0	37.1	55.61	8.0	12.4	166.83
G	Transfer chamber			7.00	55.25	15.0	704.00	5,801	30.0	46.4	1.0	2.08	0.06	24.0	37.1	2.60	8.0	12.4	7.81
H	Suction well			9.00	25.75	15.0	704.00	3,476	30.0	46.4	1.0	1.25	0.12	24.0	37.1	1.56	8.0	12.4	4.68
	Pump																		
I	Suction pipe	36	3.00	12.00				85	30.0	46.4	1.0	0.03	6.57	24.0	37.1	0.04	8.0	12.4	0.11
J	Discharge pipe	30	2.50	20.00				98	30.0	46.4	1.0	0.04	9.46	24.0	37.1	0.04	8.0	12.4	0.13
K	Dis. pipe (to bldg face)	42	3.50	34.00				327	30.0	46.4	1.0	0.12	4.82	24.0	37.1	0.15	8.0	12.4	0.44
	Finish main 1																		
L1	bldg face - 1st tee	42	3.50	208.00				2001	30.0	46.4	1.0	0.72	4.82	24.0	37.1	0.90	8.0	12.4	2.69
M1	tee - WTP tap	42	3.50	223.00				2146	30.0	46.4	1.0	0.77	4.82	24.0	37.1	0.96	8.0	12.4	2.89
N1	WTP tap - bldg face	12	1.00	19.00				15	30.0	46.4	1.0	0.005	59.10	24.0	37.1	0.01	8.0	12.4	0.02
	Subtotal											1.49				1.87			5.60
	Finish main 2																		
L2	bldg face - 1st tee	42	3.50	73.00				702	30.0	46.4	1.0	0.25	4.82	24.0	37.1	0.32	8.0	12.4	0.95
M2	tee - 1st split	42	3.50	277.00				2665	30.0	46.4	1.0	0.96	4.82	24.0	37.1	1.20	8.0	12.4	3.59
	Subtotal											1.21				1.51			4.53
								Total CT time	@ 36 mgd =			55.0		@ 24 mgd =		68.8	@ 12 mgd =		206.3

	2014								2015							
Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr		Min	Avg	Max
Cl2	5.0	4.7	3.9	3.3	3.1	2.5	2.0	1.8	1.8	2.1	2.4	2.0		1.8	2.9	5.0
pH	7.37	7.48	7.62	7.78	7.82	7.71	7.87	8.07	7.74	7.84	7.89	7.83		7.4	7.8	8.1
Flow (mgd)	30.0	24.0	8.0													
CT =	99.0	123.8	371.4													

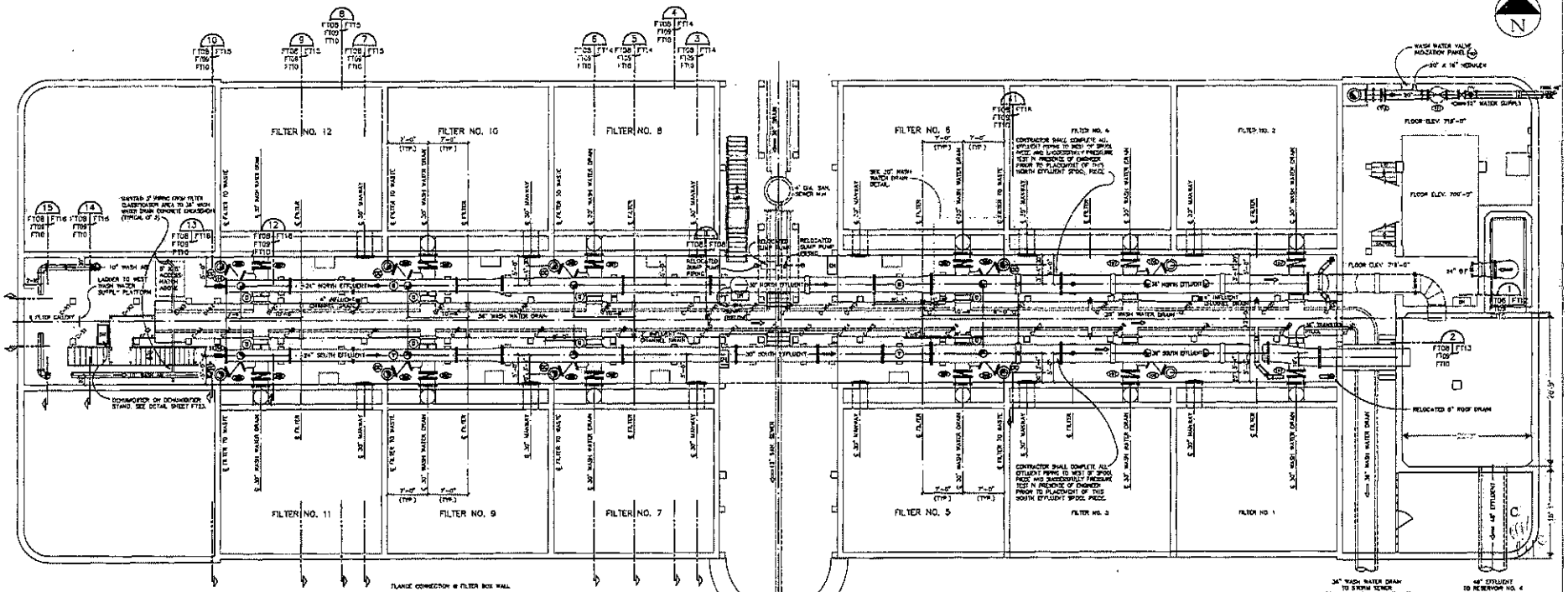
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Table C-1. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 0.5°C or Lower

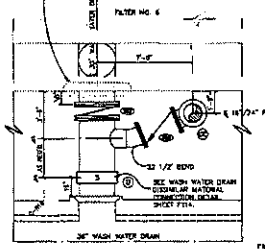
CHLORINE CONCENTRATION	pH<=6 Log Inactivation						pH=6.5 Log Inactivation						pH=7.0 Log Inactivation						pH=7.5 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	23	46	69	91	114	137	27	54	82	109	136	163	33	65	98	130	163	195	40	79	119	158	198	237
0.6	24	47	71	94	118	141	28	56	84	112	140	169	33	67	100	133	167	200	40	80	120	159	199	239
0.8	24	48	73	97	121	145	29	57	86	115	143	172	34	68	103	137	171	205	41	82	123	164	205	246
1	25	49	74	99	123	148	29	59	88	117	147	176	35	70	105	140	175	210	42	84	127	169	211	253
1.2	25	51	76	101	127	152	30	60	90	120	150	180	36	72	108	143	179	215	43	86	130	173	216	259
1.4	26	52	78	103	129	155	31	61	92	123	153	184	37	74	111	147	184	221	44	89	133	177	222	266
1.6	26	52	79	105	131	157	32	63	95	126	155	189	38	75	113	151	188	226	46	91	137	182	228	273
1.8	27	54	81	108	135	162	32	64	97	129	161	193	39	77	116	154	193	231	47	93	140	186	233	279
2	28	55	83	110	138	165	33	66	99	131	164	197	39	79	118	157	197	236	48	95	143	191	238	286
2.2	28	56	85	113	141	169	34	67	101	134	169	201	40	81	121	161	202	242	50	99	149	198	248	297
2.4	29	57	86	115	143	172	34	68	103	137	171	205	41	82	124	165	206	247	50	99	149	199	248	298
2.6	29	58	88	117	146	175	35	70	105	139	174	209	42	84	126	168	210	252	51	101	152	203	253	304
2.8	30	59	89	119	148	178	36	71	107	142	178	213	43	86	129	171	214	257	52	103	155	207	258	310
3	30	60	91	121	151	181	36	72	109	145	181	217	44	87	131	174	218	261	53	105	158	211	263	316

CHLORINE CONCENTRATION	pH=8.0 Log Inactivation						pH=8.5 Log Inactivation						pH=9.0 Log Inactivation					
(mg/L)	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	46	92	139	185	231	277	55	110	165	219	274	329	65	130	195	260	325	390
0.6	48	95	143	191	238	286	57	114	171	228	285	342	68	136	204	271	339	407
0.8	49	98	148	197	246	295	59	113	177	236	295	354	70	141	211	281	352	422
1	51	101	152	203	253	304	61	122	183	243	304	365	73	146	219	291	364	437
1.2	52	104	157	209	261	313	63	125	188	251	313	376	75	150	226	301	376	451
1.4	54	107	161	214	268	321	65	129	194	258	323	387	77	155	232	309	387	464
1.6	55	110	165	219	274	329	66	132	199	265	331	397	80	159	239	318	398	477
1.8	56	113	169	225	282	338	68	136	204	271	339	407	82	163	245	326	408	489
2	55	115	173	231	288	346	70	139	209	278	348	417	83	167	250	333	417	500
2.2	59	118	177	235	294	353	71	142	213	284	355	426	85	170	256	341	426	511
2.4	60	120	181	241	301	361	73	145	218	290	363	435	87	174	261	348	435	522
2.6	61	123	184	245	307	368	74	148	222	296	370	444	89	178	267	355	444	533
2.8	63	125	188	250	313	375	75	151	226	301	377	452	91	181	272	362	453	543
3	64	127	191	255	318	382	77	153	230	307	383	460	92	184	276	369	460	552

Source. AWWA, 1991.



FILTER GALLERY PIPING LEGEND			
ID	DESCRIPTION	EXISTING	NEW
F	WASH WATER SUPPLY - GALLERY SERVING FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	YES
G	REWASH FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	NO
H	EFFLUENT FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	YES
P	NORTH EFFLUENT	YES	YES
T	SOUTH EFFLUENT	YES	YES
U	WASH WATER DRAIN FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	YES
V	INFLUENT FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	YES
W	SURFACE WASH FILTERS NO. 5 - NO. 12, INCLUSIVE	YES	NO
X	PLANT WASH AND SURFACE WASH	YES	NO
AA	WASH AIR SUPPLY - GALLERY	YES	NO
BB	WASH AIR SUPPLY FILTERS NO. 5 - NO. 12, INCLUSIVE	NO	YES
CC	FILTER TO WASTE SERVING FILTERS NO. 5 - NO. 12, INCLUSIVE	NO	YES
DD	PROCESS WATER	NO	YES
EE	WASH WATER SUPPLY - WEST	NO	YES



30" WASH WATER DRAIN DETAIL

SCALE : 1/4" = 1'-0"

EXISTING CAST IRON WASH WATER DRAIN DISTANCE FROM FILTER BOX WALL TO FLANGE/FLANGE FACE	
FILTER NO.	DISTANCE "D"
5	8.3"±
6	10"±
7	8.1"±
8	8.5"±
9	8.5"±
10	6"±
11	8.75"±
12	8.5"±

FILTERS NO. 7, 9, & 11 SIMILAR.
FILTERS NO. 5, 8, 10, & 12 OPPOSITE HAND.

FILTER PLAN - EL. 720'-0"

SCALE : 1/4" = 1'-0"

GENERAL NOTE

ALL DRAWINGS ARE A REPRESENTATION OF ACTUAL CONDITIONS BASED ON 1992 CONSTRUCTION PLAN DRAWINGS. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, SIZES, AND LOCATIONS OF ALL RELEVANT ITEMS.

GENERAL NOTE NO. 1

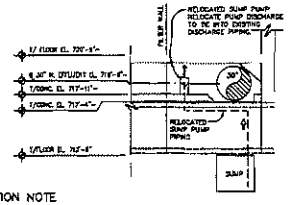
THIS NOTE APPLIES TO DRAWINGS FT01 THROUGH FT08

THE WORK ARE FOR ALL CONCRETE SURFACES THAT ARE REPAIRED, INFILLED OR PATCHED SHALL BE SMOOTH AND FLUSH WITH SURROUNDING CONCRETE SURFACES. IF NECESSARY THE CONTRACTOR SHALL GRIND THE NEW SURFACES TO BE FLUSH WITH THE ADJOINING SURFACES.

GENERAL CONSTRUCTION NOTE

NO MOUNTING OR FASTENING OF ANY TEMPORARY OR PERMANENT EQUIPMENT, SUPPORTS, OR DEVICES TO THE CONCRETE OF THE FILTER BOXES OR INFLUENT CHANNEL IS PERMITTED.

PIPE END CONFIGURATION LEGEND

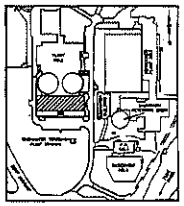


SECTION 1 FT08

SCALE : 1/4" = 1'-0"

NOTES :

1. FILTER MATERIALS NOT SHOWN FOR CLARITY.
2. SUPPORT MECHANISMS FOR VALVES, ACTUATORS, & PIPING NOT SHOWN FOR CLARITY. REFER TO 1/4 SCALE SECTIONS FOR SUPPORT LOCATIONS.
3. HANDRAIL NOT SHOWN FOR CLARITY. SEE NEW FILTER GALLERY SECTION FOR NEW HANDRAIL AT FLOOR ELEV. 719'- AT TOP OF 36" WASH WATER DRAIN CONCRETE CHANNEL.



KEY PLAN

THE DLZ TEAM

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

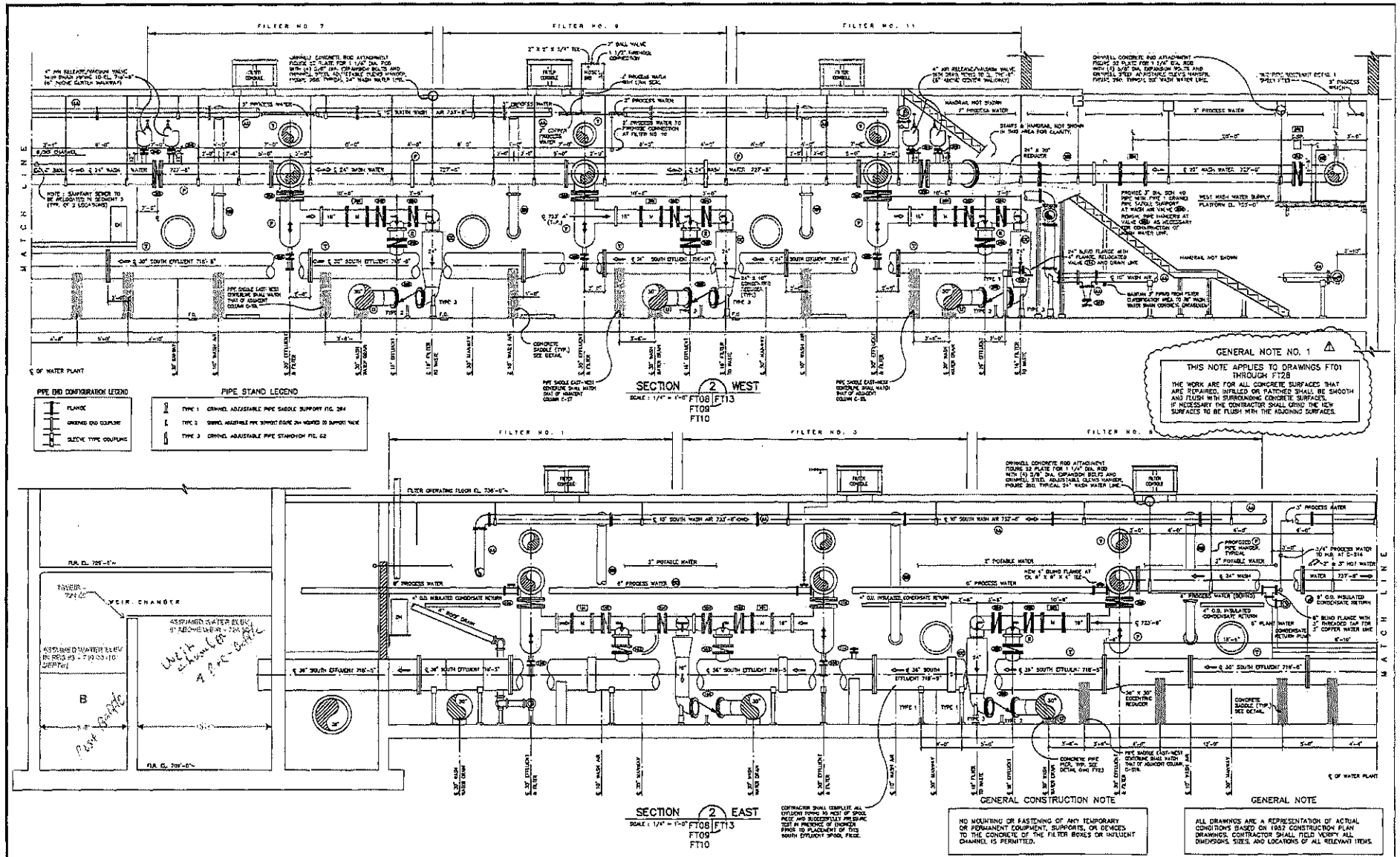
FILTER REHABILITATION
NEW FILTER PLAN - EL. 720'-0"

DRAWN	J.B.P.
CHK'D.	C.A.P.
APPV'D	C.A.P.
DATE	JUNE 2002
PROJECT NUMBER	7019-04

NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JD	10/03
2	AS-BUILT	DJV	8/05
3			
4			
5			

SHEET OF

DRAWING NUMBER FT08



THE DLZ TEAM

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

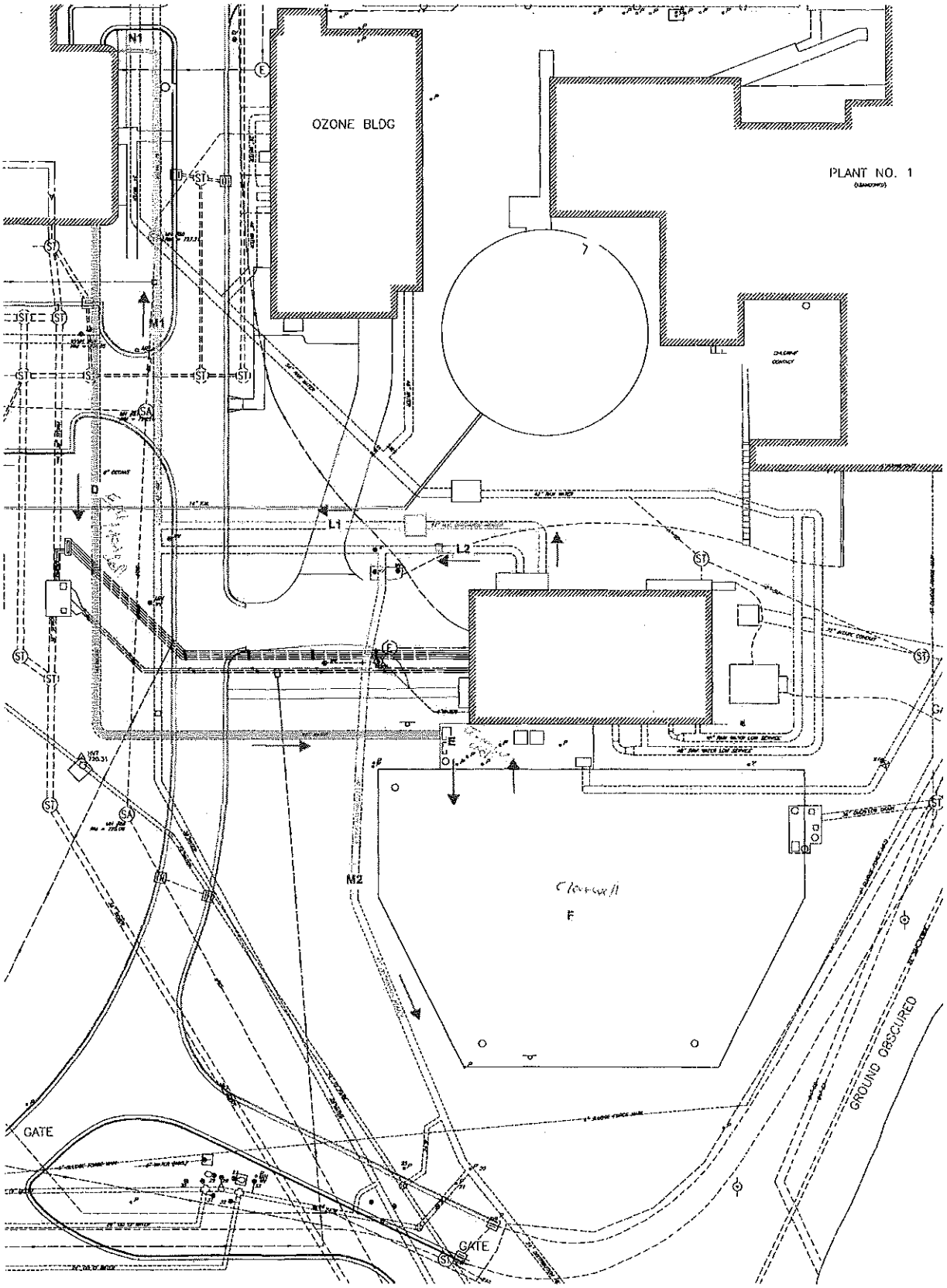
WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

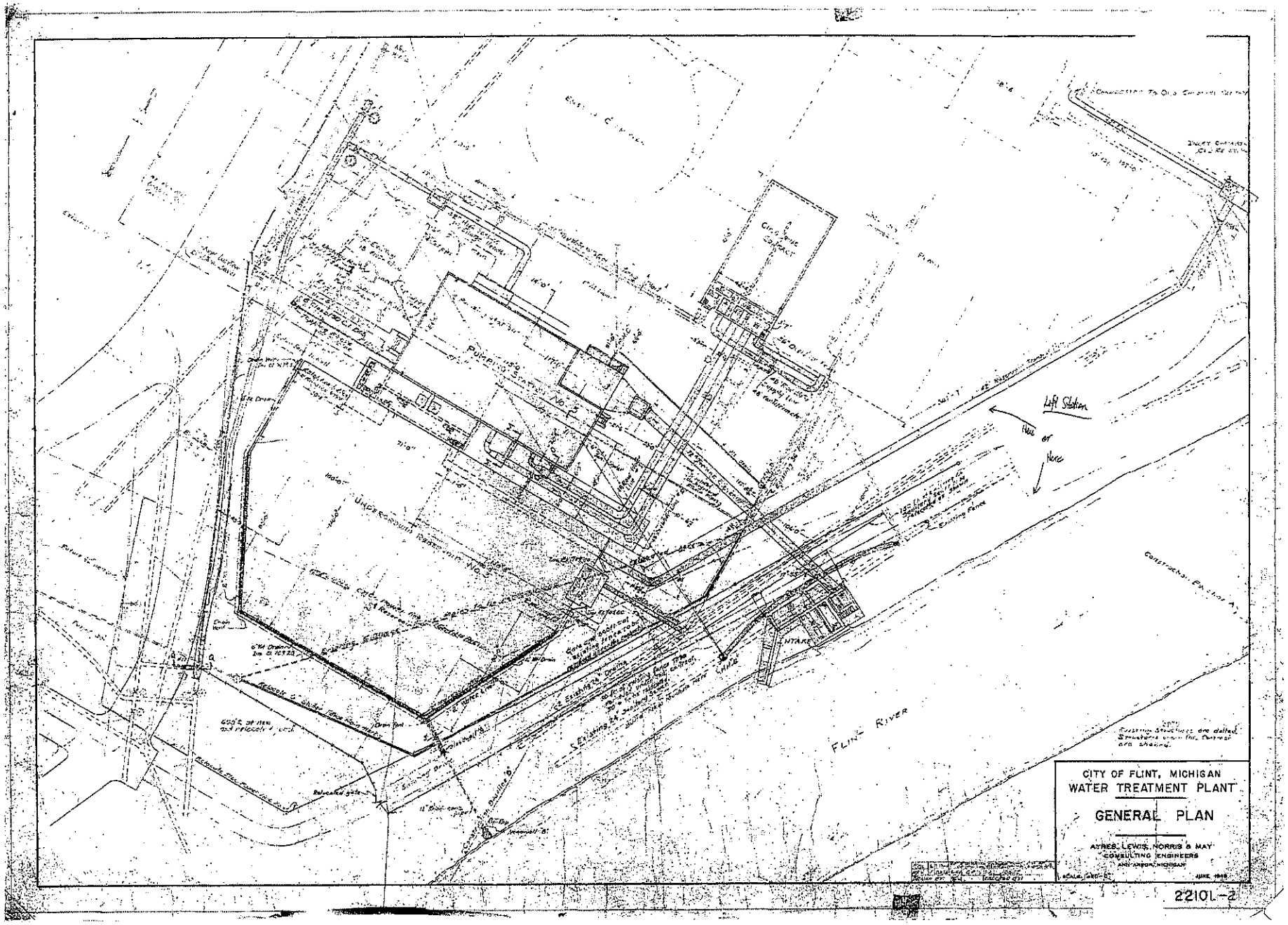
FILTER REHABILITATION
NEW FILTER GALLERY SECTIONS

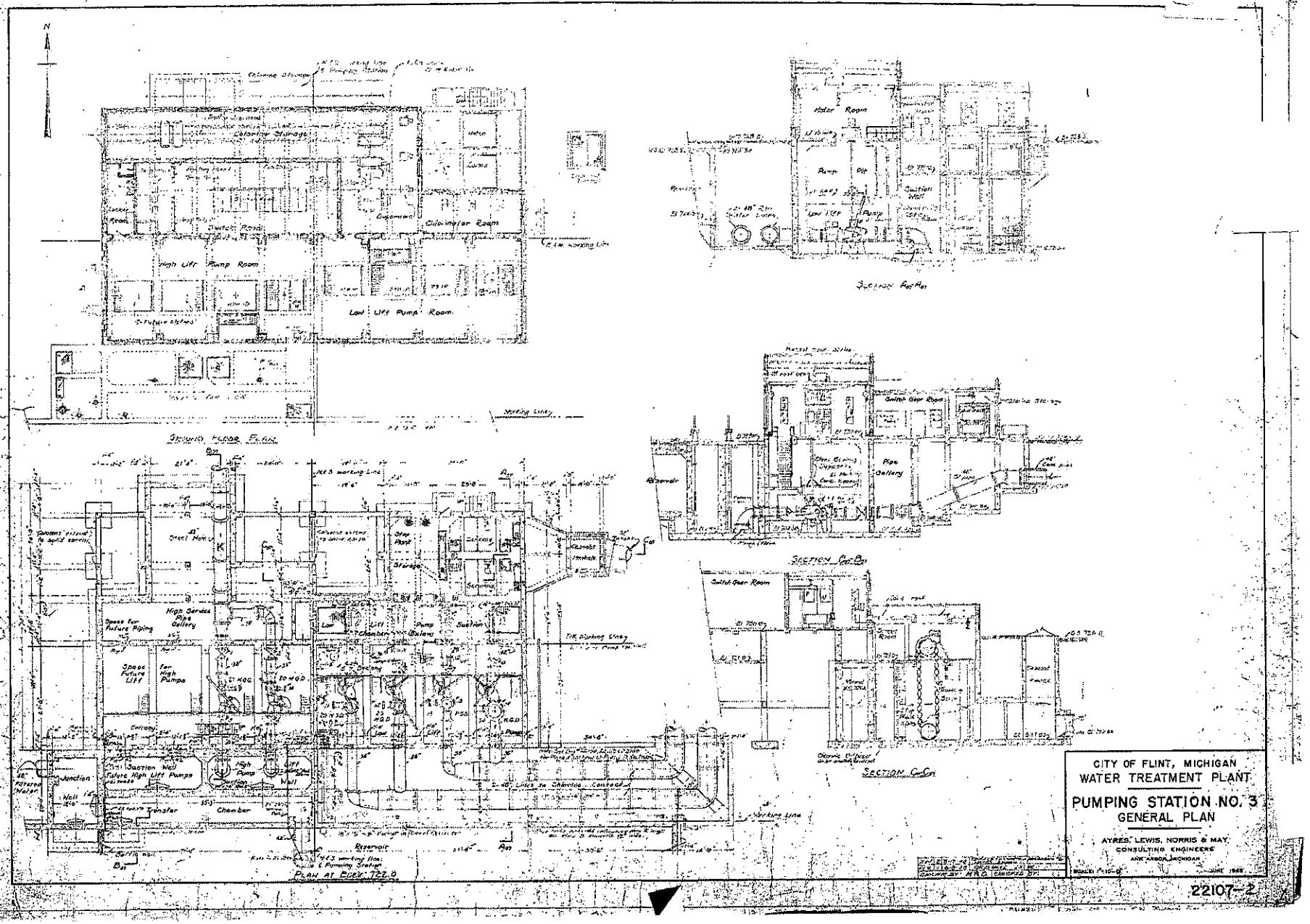
DRAWN	J.E.P.
CHK'D.	C.A.F.
APPRV'D	C.A.F.
DATE	JUNE 2002
PROJECT NUMBER	7019-04

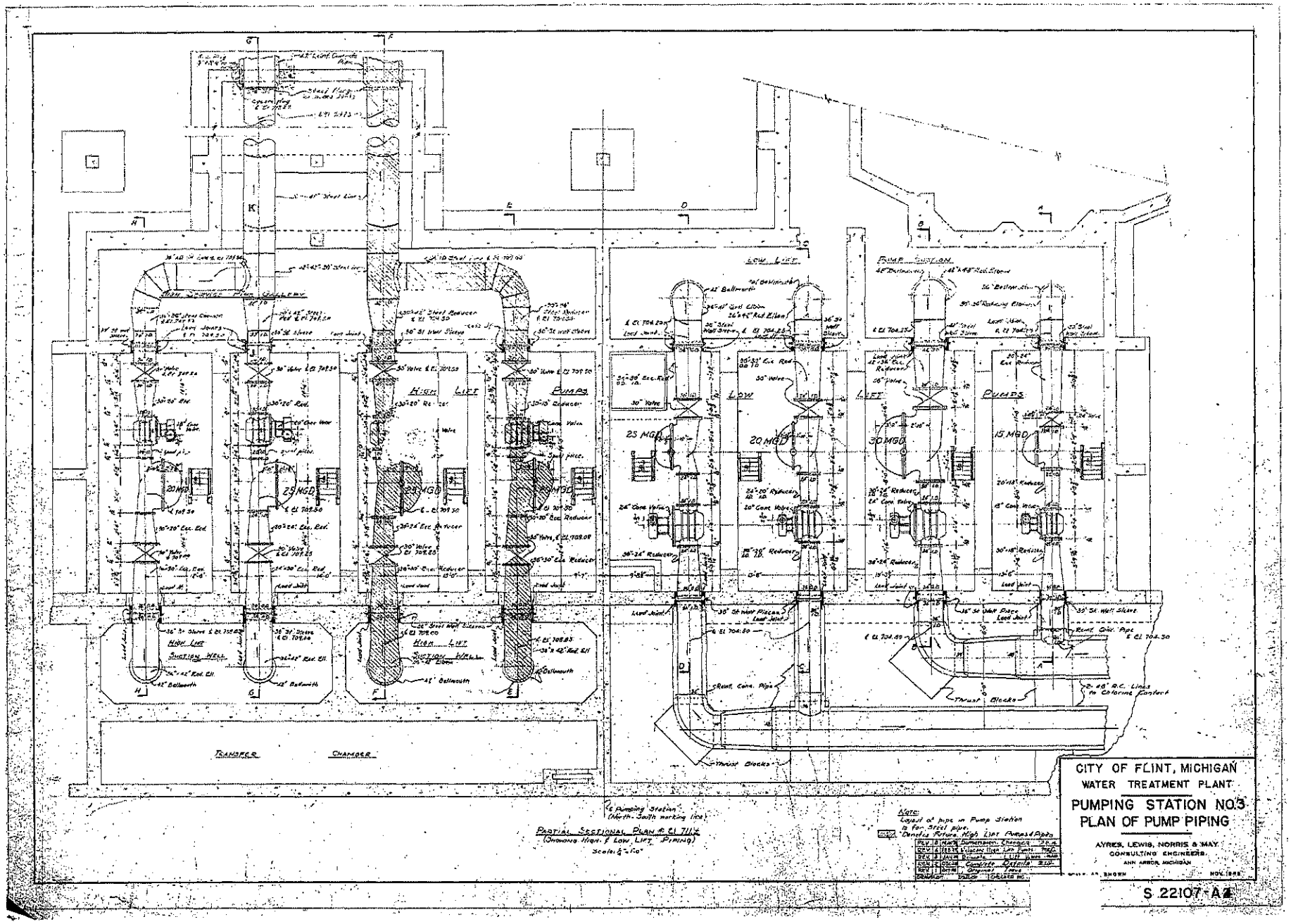
NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JO	10/03
2	AS-BUILT	DJM	8/05

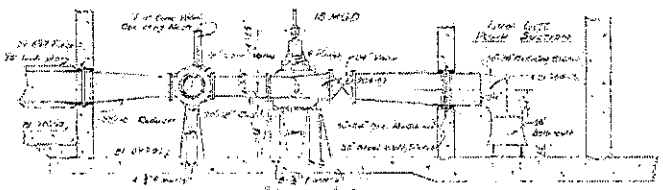
SHEET
OF
DRAWING NUMBER
FT13


OZONE BLDG
PLANT NO. 1
N1
M1
L1
L2
M2
F
GATE
GATE
GROUND OBSCURED

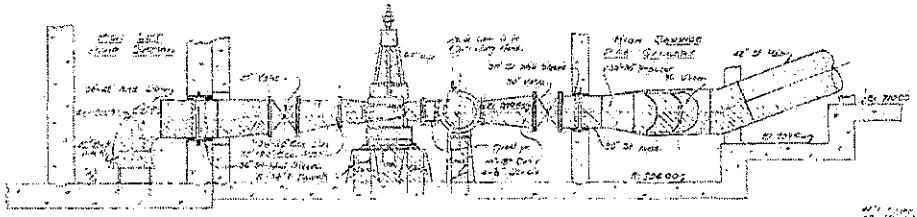

Lift Station
Here or Here
FLINT RIVER
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
GENERAL PLAN
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
2210L-2


Ground Floor Plan
Chlorine Storage
Chlorinator Room
High Lift Pump Room
Low Lift Pump Room
Water Room
Pump Pit
Suction Well
Suction Pit Plan
Switch Gear Room
Pipe Gallery
Reservoir
Section A-A
Section C-C
Plan at Elev. 722.0
Suction Well
Future High Lift Pumps
Chamber
Transfer
Junction
Well
Space for Future Piping
High Service Pipe Gallery
Space Future Lift
for High Pumps
Balcony
Low Lift Pump Chamber
Suction
Storage
Chlorine Injector
Working Line
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
PUMPING STATION NO. 3
GENERAL PLAN
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
JUNE 1949
22107-2

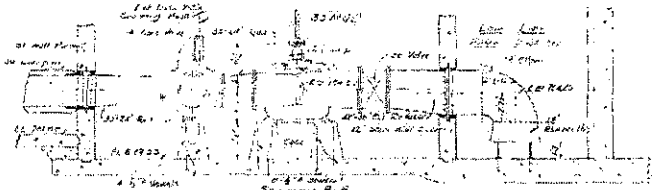

High Lift Pumps
Low Lift Pumps
Pump Suction
High Lift Suction Well
Transfer Chamber
25 MGD
20 MGD
30 MGD
15 MGD
Thrust Blocks
Pumping Station (North-South working line)
Partial Sectional Plan @ El 711.7
(Showing High & Low Lift Piping)
Scale: 1/2" = 1'-0"
Note: Layout of pipe in Pump Station is for Steel pipe.
Denotes Future High Lift Pumps & Pipe
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
PUMPING STATION NO. 3
PLAN OF PUMP PIPING
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
S 22107 - A2



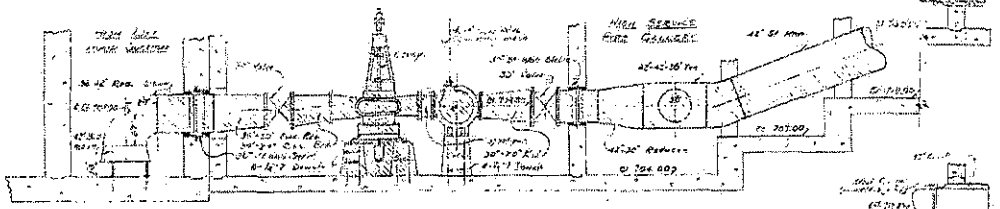
SECTION A-A



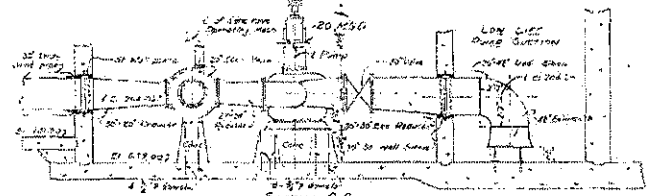
SECTION E-E
(SHOWING 25 MGD PUMP)
SCALE 1/4"=1'



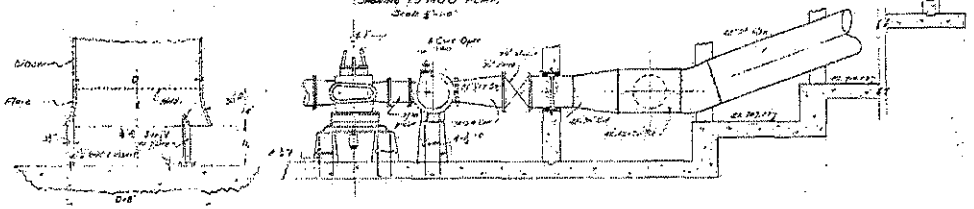
SECTION B-B



SECTION F-F
(SHOWING 25 MGD PUMP)
SCALE 1/4"=1'

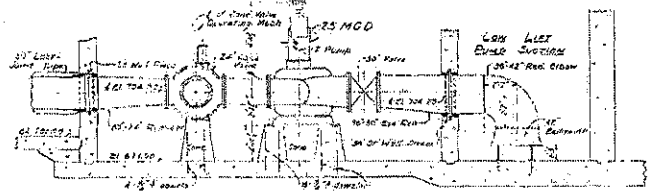


SECTION C-C
(SHOWING 20 MGD PUMP)



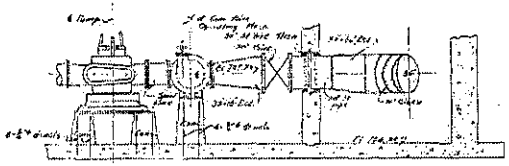
BELLMOUTH SUPPORT DETAILS
NO SCALE

SECTION G-G
(SHOWING 25 MGD PUMP DISCHARGE)
SCALE 1/4"=1'



SECTION D-D
(SHOWING 25 MGD PUMP)
SCALE 1/4"=1'

HIGH SUCTION	24"	22 1/2"	1/2"
25 MGD PUMP	27"	24"	1/2"
20 MGD PUMP	24"	20"	1/2"
LOW SUCTION			
25 MGD PUMP	36"	34"	1/2"
20 MGD PUMP	42"	36"	1/2"
25 MGD PUMP	48"	42"	1/2"
20 MGD PUMP	48"	42"	1/2"



SECTION H-H
(SHOWING 20 MGD PUMP DISCHARGE)
SCALE 1/4"=1'

NOTE:
1. [illegible] DENOTES FUTURE HIGH LIFT PUMPS & PIPES.
2. SUCTION PIPING FOR HIGH LIFT PUMPS IS AS SHOWN IN SECTIONS E-E & F-F.

REV	D	DWN	APP	DATE	DESCRIPTION
REV	4	RB	[illegible]	[illegible]	[illegible]
REV	3	[illegible]	[illegible]	[illegible]	[illegible]
REV	2	[illegible]	[illegible]	[illegible]	COMPLETE DETAILS
REV	1	[illegible]	[illegible]	[illegible]	ORIGINAL ISSUE

DRAWN BY [illegible] CHECKED BY [illegible]

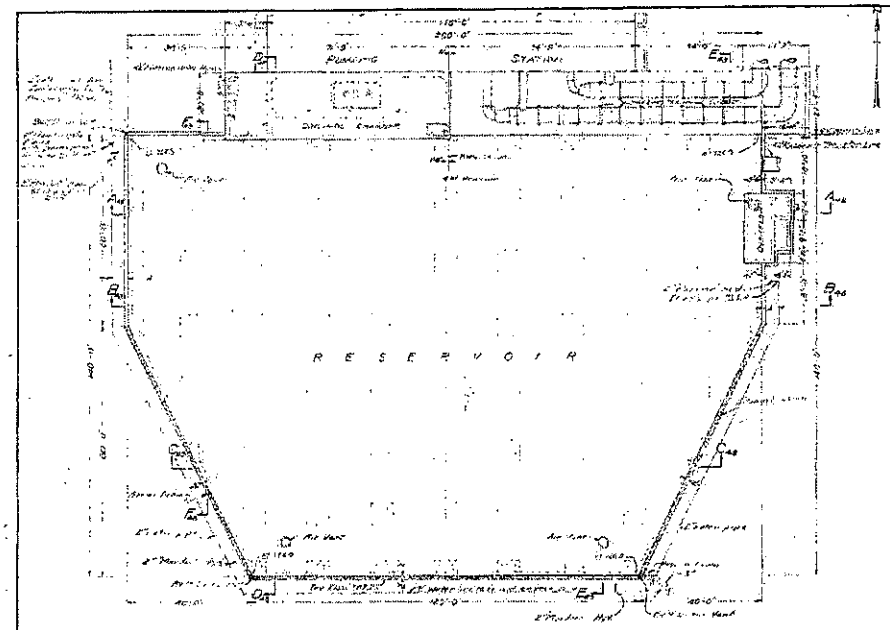
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT

PUMPING STATION NO.3
SECTIONS OF PUMP PIPING

AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

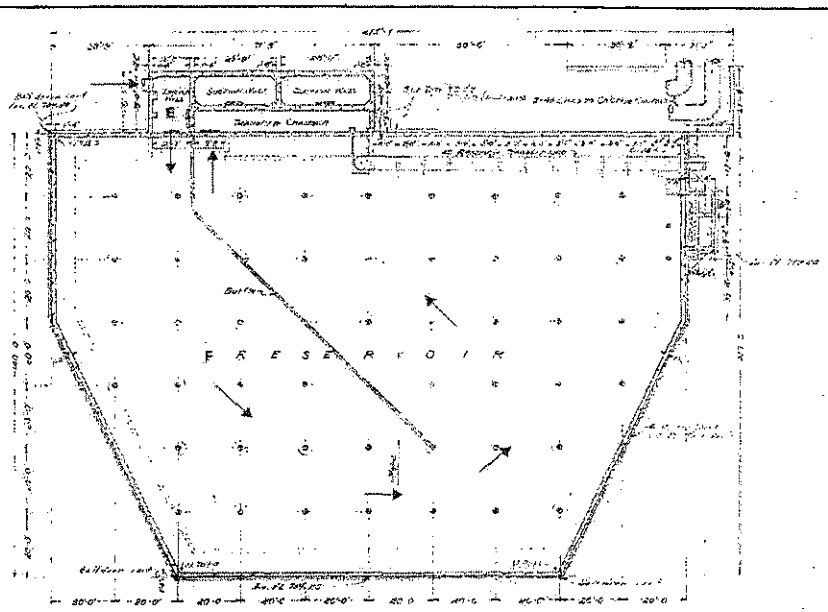
SCALE: AS SHOWN NOV. 1946

S 22107-B4

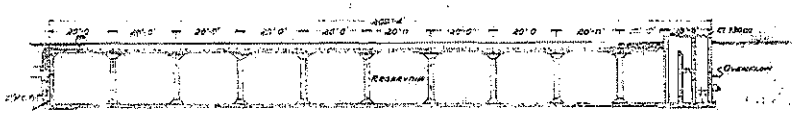


PLAN VIEW OF RESERVOIR

AVG W = [(200'x60') + ((200'+120')/2 x (80'))] / 140 = 177'

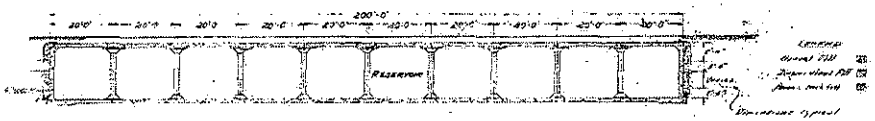


PLAN OF FLOOR-SLAB

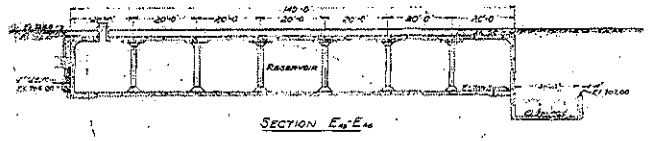


SECTION A_{46}-A_{46}

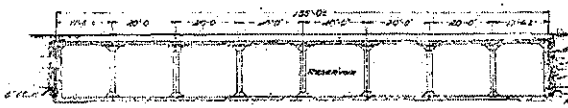
SECTION D_{46}-D_{46}



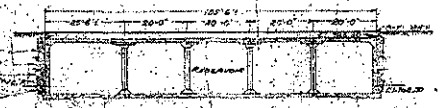
SECTION B_{46}-B_{46}



SECTION E_{46}-E_{46}



SECTION C_{46}-C_{46}



SECTION F_{46}-F_{46}

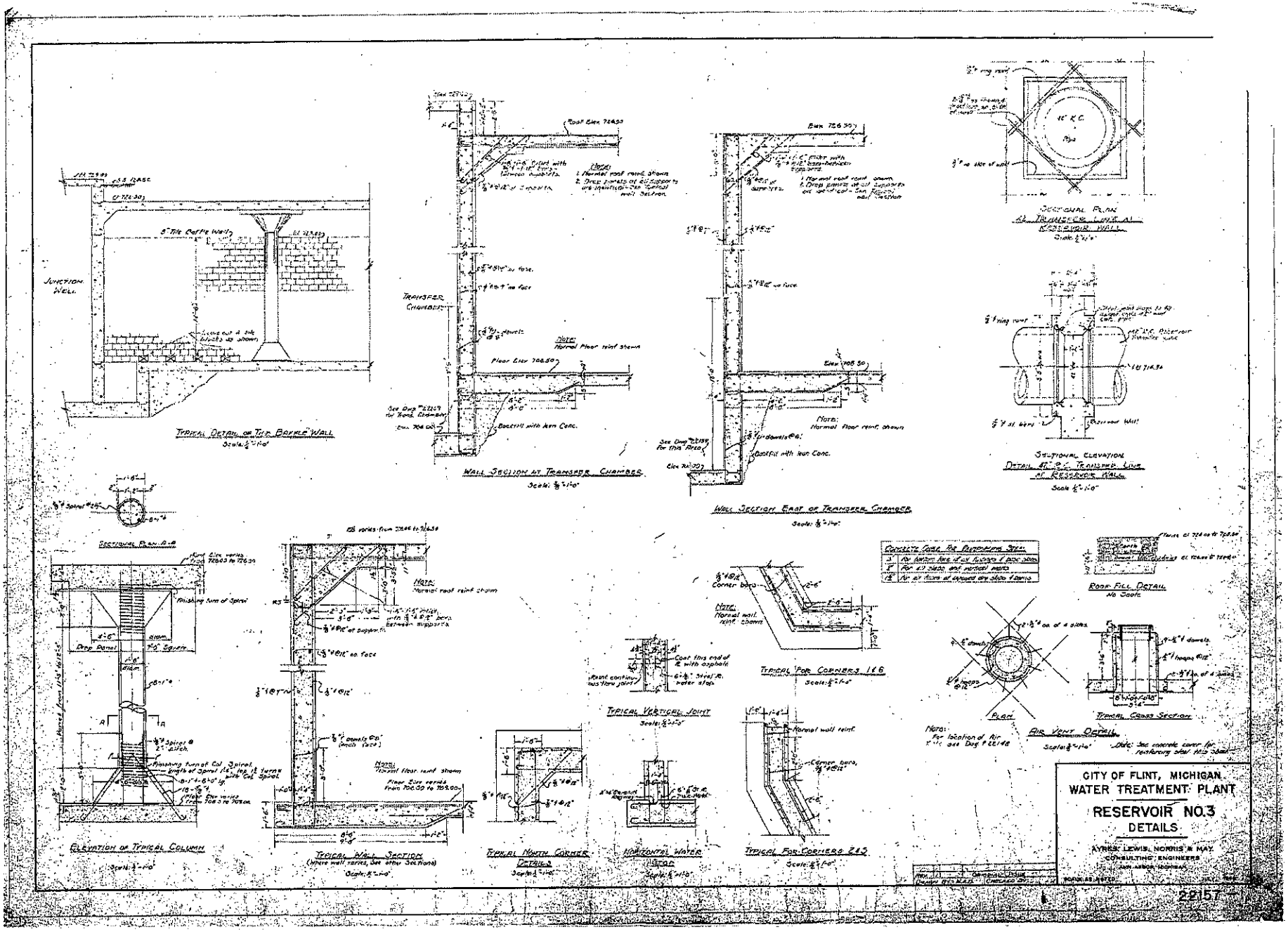
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT

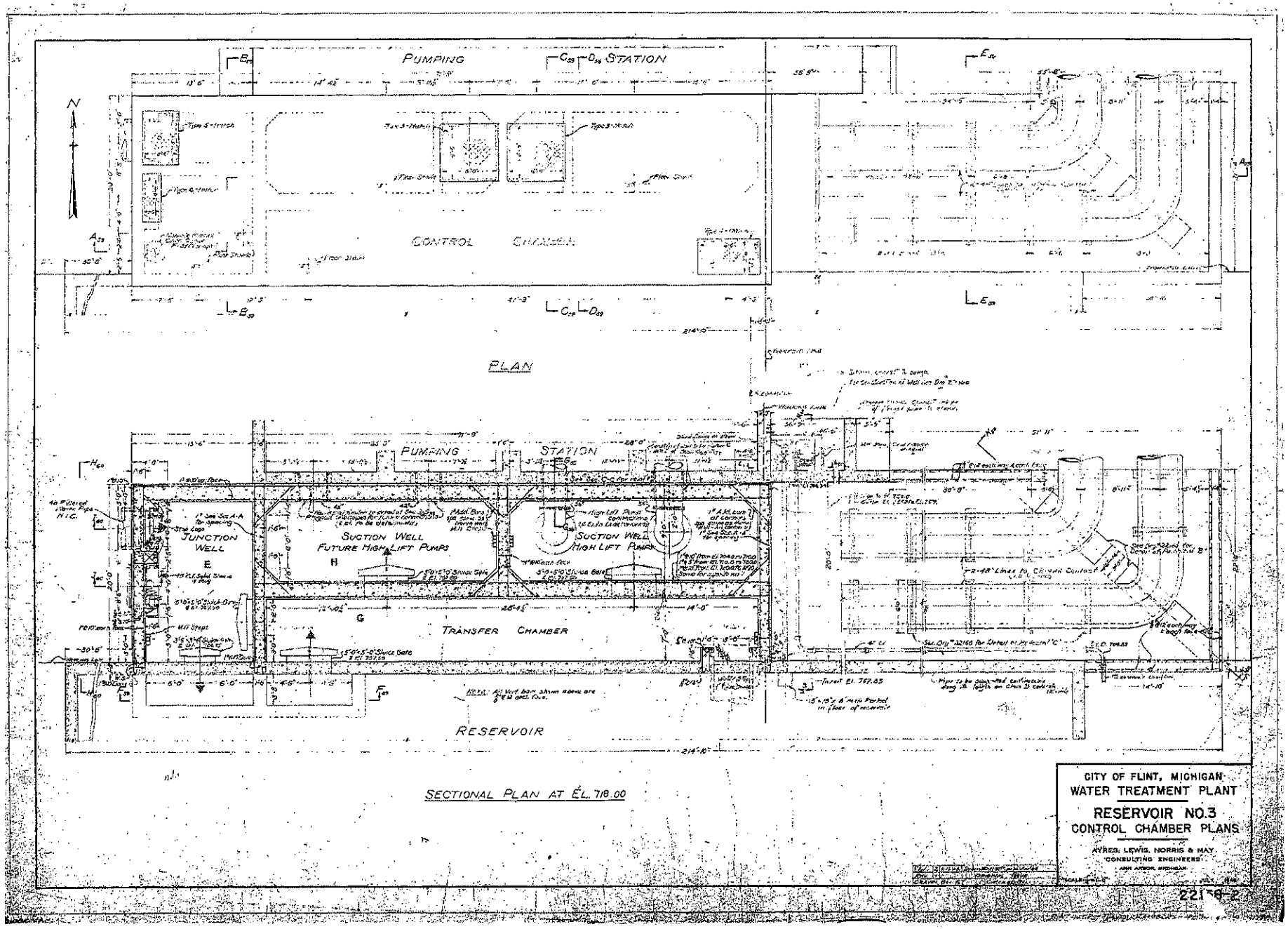
RESERVOIR NO.3
GENERAL PLANS & SECTIONS

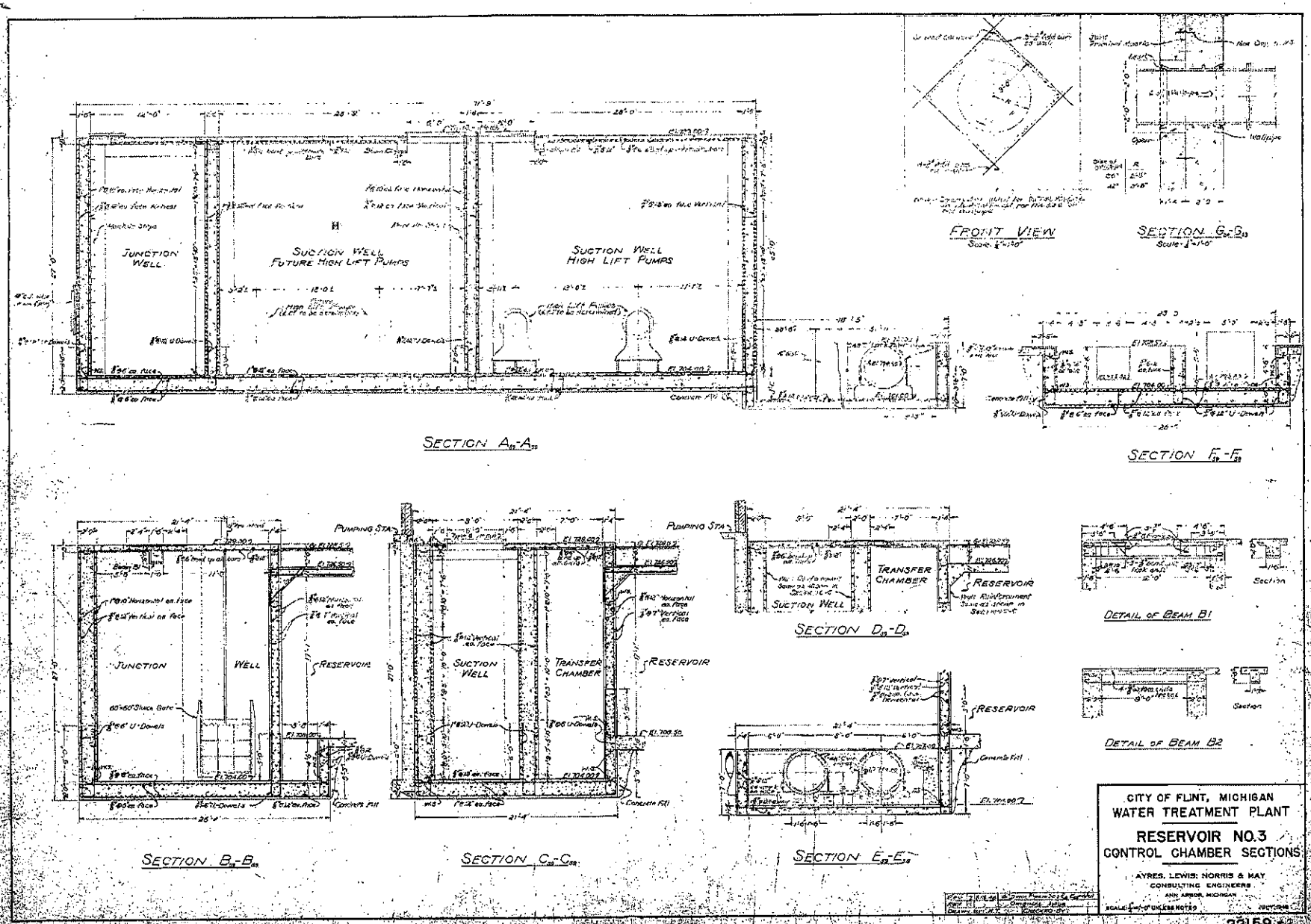
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

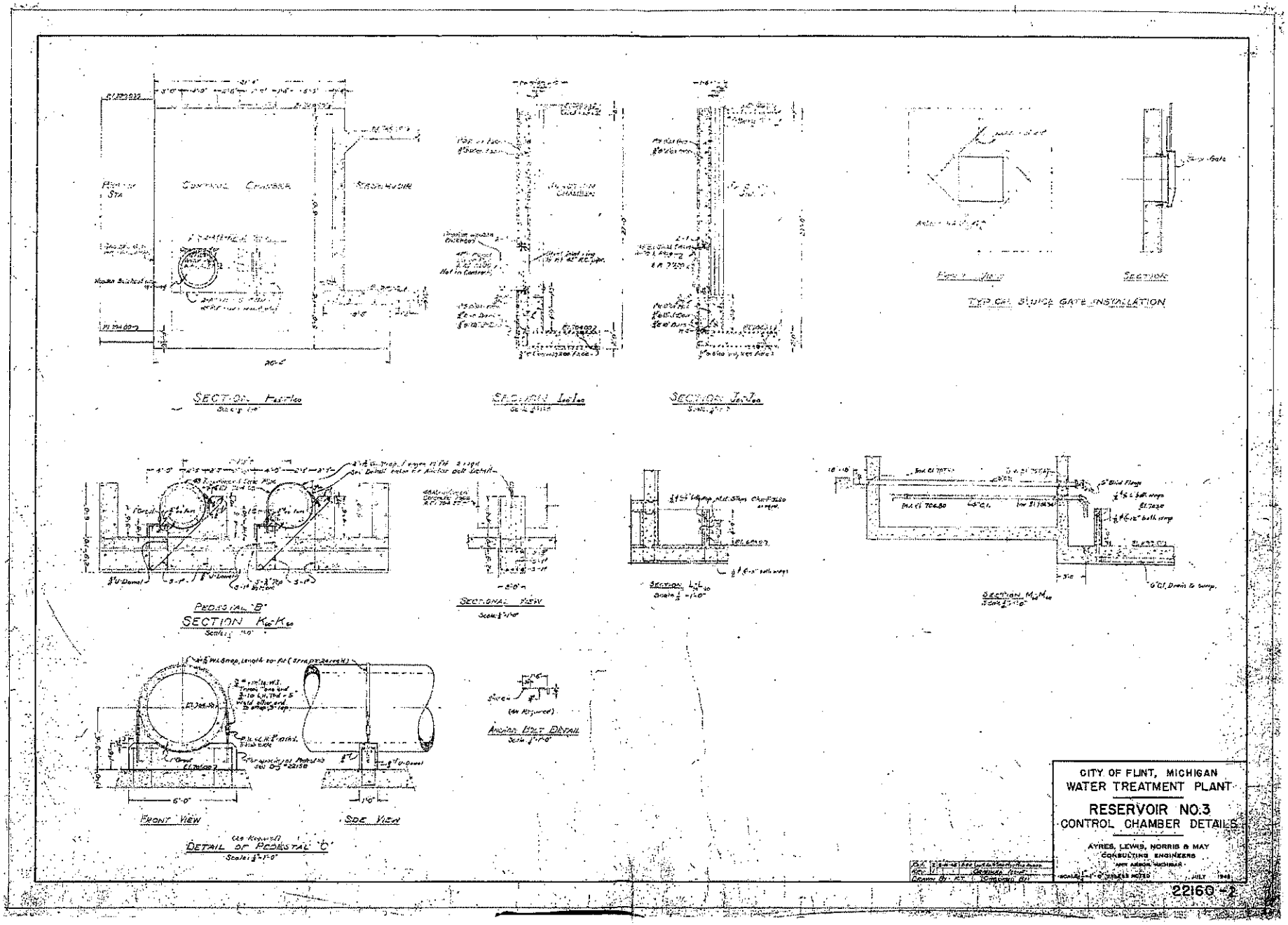
SCALE 1/8"=1'-0" JUNE 1948

22148-2


Typical Detail of Tile Baffle Wall
Scale: 1/2" = 1'-0"
Wall Section at Transfer Chamber
Scale: 1/2" = 1'-0"
Wall Section East of Transfer Chamber
Scale: 1/2" = 1'-0"
Sectional Plan at Transfer Chamber & Reservoir Wall
Scale: 1/2" = 1'-0"
Sectional Elevation Detail at 8" C.I. Transfer Line of Reservoir Walls
Scale: 1/2" = 1'-0"
Sectional Plan A-B
Elevation of Typical Column
Scale: 1/2" = 1'-0"
Typical Wall Section
(Where wall varies, See other Sections)
Scale: 1/2" = 1'-0"
Typical North Corner Detail
Scale: 1/2" = 1'-0"
Typical Vertical Joint
Scale: 1/2" = 1'-0"
Horizontal Water Stop
Scale: 1/2" = 1'-0"
Typical For Corners 1 & 6
Scale: 1/2" = 1'-0"
Typical For Corners 2 & 5
Scale: 1/2" = 1'-0"
Concrete Cover for Reinforcing Steel
Roof Fill Detail
No Scale
Plan
Typical Cross Section
Air Vent Detail
Scale: 1/2" = 1'-0"
Note: See concrete cover for reinforcing steel note sheet
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO. 3
DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22157


PUMPING STATION
CONTROL CHAMBER
PLAN
PUMPING STATION
JUNCTION WELL
SUCTION WELL
FUTURE HIGH LIFT PUMPS
SUCTION WELL
HIGH LIFT PUMPS
TRANSFER CHAMBER
RESERVOIR
SECTIONAL PLAN AT EL. 718.00
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER PLANS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
2215-2


JUNCTION WELL
SUCTION WELL
FUTURE HIGH LIFT PUMPS
SUCTION WELL
HIGH LIFT PUMPS
SECTION A-A
FRONT VIEW
SECTION G-G
SECTION F-F
PUMPING STA.
JUNCTION
WELL
RESERVOIR
SECTION B-B
SUCTION WELL
TRANSFER CHAMBER
SECTION C-C
TRANSFER CHAMBER
SECTION D-D
SECTION E-E
DETAIL OF BEAM B1
DETAIL OF BEAM B2
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO. 3
CONTROL CHAMBER SECTIONS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22159-2


CONTROL CHAMBER
RESERVOIR
SECTION H₀H₀
SECTION I₀I₀
SECTION J₀J₀
TYPICAL SLUICE GATE INSTALLATION
PEDESTAL 'B'
SECTION K₀K₀
SECTIONAL VIEW
SECTION L₀L₀
SECTION M₀M₀
FRONT VIEW
SIDE VIEW
DETAIL OF PEDESTAL 'C'
ANCHOR BOLT DETAIL
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22160-2

Prysby, Mike (DEQ)

From:	Hansen, Jeff <jrhansen@lan-inc.com>
Sent:	Wednesday, July 08, 2015 8:52 AM
To:	Busch, Stephen (DEQ)
Cc:	Prysby, Mike (DEQ); Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com; Matta, Samir; Green, Warren
Subject:	RE: Flint WTP GAC Permit Application
Attachments:	CarbonExchangeGravityFilters_carbontransferprocedure.pdf; FS.SOP.4.8 - Filter Disinfection Using Sodium Hypochlorite.pdf; Calgon_F400.pdf; Flint WTP Ph-II Seg-3 GAC_07-07-15-to-MDEQ.pdf; Flint-GACandCL2-specs-toMDEQ_07-07-15.pdf

Steve,

In general response to your comments, our agreement with Flint is a design/build type so on the plans we have called out specific make/models to match what Flint currently uses for a number of items on your list rather than developing entire spec sections.

Specific responses to your comments are shown below in red. Revised plans and specs are attached and we will send hard copies by mail. Attachments are as follows:

1. Calgon Filtrasorb 400 GAC media data sheet
2. Calgon media change out procedures
3. Calgon disinfection procedures
4. Revised plans – there is only 1 change to a single note on sheet 6 as described below
5. Revised specs – added sections for piping, valves and pipe testing

Thanks,

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
T 810.820.2682 **C** 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Monday, July 06, 2015 3:50 PM
To: Hansen, Jeff
Cc: Matta, Samir; Green, Warren; mglasgow@cityofflint.com; Brent Wright (bwright@cityofflint.com); Prysby, Mike (DEQ)
Subject: Flint WTP GAC Permit Application

Our office received the permit application "Fint WTP Phase II, Segment 3 Filter Media Replacement" on June 30, 2015.

The only specifications provided with the permit application were for the following:

- 05550 Bolts, Anchor Bolts And Expansion Anchors
- 09928 Protective Coating Systems

Aside from information shown on the plan sheets and what was listed in the previously submitted basis of design document, no other specifications were provided regarding:

- GAC and sand media including removal, installation, ripening, and disinfection procedures
  Plan sheet 5 calls out effective size, uniformity coefficient, and specific gravity for GAC and sand. Also, we have selected Calgon's product Filtrasorb 400 in our agreement. We did not want to dictate means and methods on the plans or specs. However, Calgon procedures are attached for your reference as well as their Filtrasorb 400 product sheet.

- Chlorine piping, joints, valves, installation, support, etc.
  Chlorine piping and valves are to be ASAHI Chem Prolok which are dual wall HDPE with butt fused joints and also the same type as the existing mid point chlorination piping. We will add a specification for this and have added some wording to the pipe call out near the center of sheet 6. Specific supports are called out on the plans and notes refer to sections 09928 for coating and 05550 for anchor bolts. See Key Note #1 on sheet 6. Key note call outs are designated with a number inside a hexagon in the plan view.

- Water tight hatch to be installed
  The Bilco hatch specified in Key Note #2 on sheet 6 with the options listed is water tight.

- Chlorine gas detector equipment
  The specific make/model of the chlorine detection equipment is called out with Key Note #3 on sheet 6. That type was selected to match other chlorine gas detectors currently used at the plant.

Regarding the Protective Coating Systems specs and their related appendix, these are general in nature listing every part of the plant as potentially being recoated. Plan notes discuss a few items to be coated/recoated, but it is not entirely clear what the full scope of the coating work will consist of. **Coating will only be applied to those items where it is called for on the plans, which are the hangers/supports.**

We request any additional specification information regarding the above be provided for approval.

It is also noted that the basis of design is based on a flow of 30 MGD, approximately 2.5 gpm/ft^2 filter loading rate. The existing filters are currently rated for 36 MGD at 3 gpm/ft^2. This would cause the WTP capacity rating to be lowered to 30 MGD. Any future request to expand filter capacity back to 36 MGD would need to be demonstrated through filter performance testing. **We showed 30 mgd in the basis of design and on the application form only because it is unlikely Flint demands will reach 36 mgd in the next 20 years. However, we would like to maintain the 36 mgd rating – do you need the basis of design and permit application resubmitted for this?**

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

CONFIDENTIALITY AND PRIVILEGE NOTICE: This email communication, including any and all attachments, (collectively, this "Communication"), is intended solely for the person(s) to whom it is addressed. This Communication may contain information that is privileged, confidential and/or proprietary. Any unauthorized use, disclosure or copying of this Communication is strictly prohibited. If you have received this Communication in error, please contact the sender immediately and destroy any and all copies of this Communication.

	S
Volume (gallons)	2,000,000
Flowrate (MGD)	24
Flowrate (gpm)	16656
Flowrate (cfs)	37.11
Detention time (min)	120.08
Baffling Factor	0.28
Water Temperature (°C)	0.5
Min Cl (ppm)	2.9
Max pH	9
Min Cl for calculation	2.90
C*T Attained	97.50
C*T Req (1 log removal)	97.00
% inactivation attained	100.52

0.5
log inactivation required

100.5
% of required attained

Title

Assumptions:
Softening - pH 9.0, 0.5 deg C, 24.0 MGD, CT from 3MGAL Well only
Well's lowest operating level at 10 ft - 66.67% full.

These calculations were performed using the regression method and may differ from those calculated using the tabular method. Please refer to Appendix E of EPA's Disinfection Profiling and Benchmarking Guidance Manual for more info. (EPA-815-R-99-013)

	S
Volume (gallons)	2,000,000
Flowrate (MGD)	24
Flowrate (gpm)	16656
Flowrate (cfs)	37.11
Detention time (min)	120.08
Baffling Factor	0.28
Water Temperature (°C)	0.5
Min Cl (ppm)	1.75
Max pH	8
Min Cl for calculation	1.75
C*T Attained	58.84
C*T Req (1 log removal)	57.81
% inactivation attained	101.77

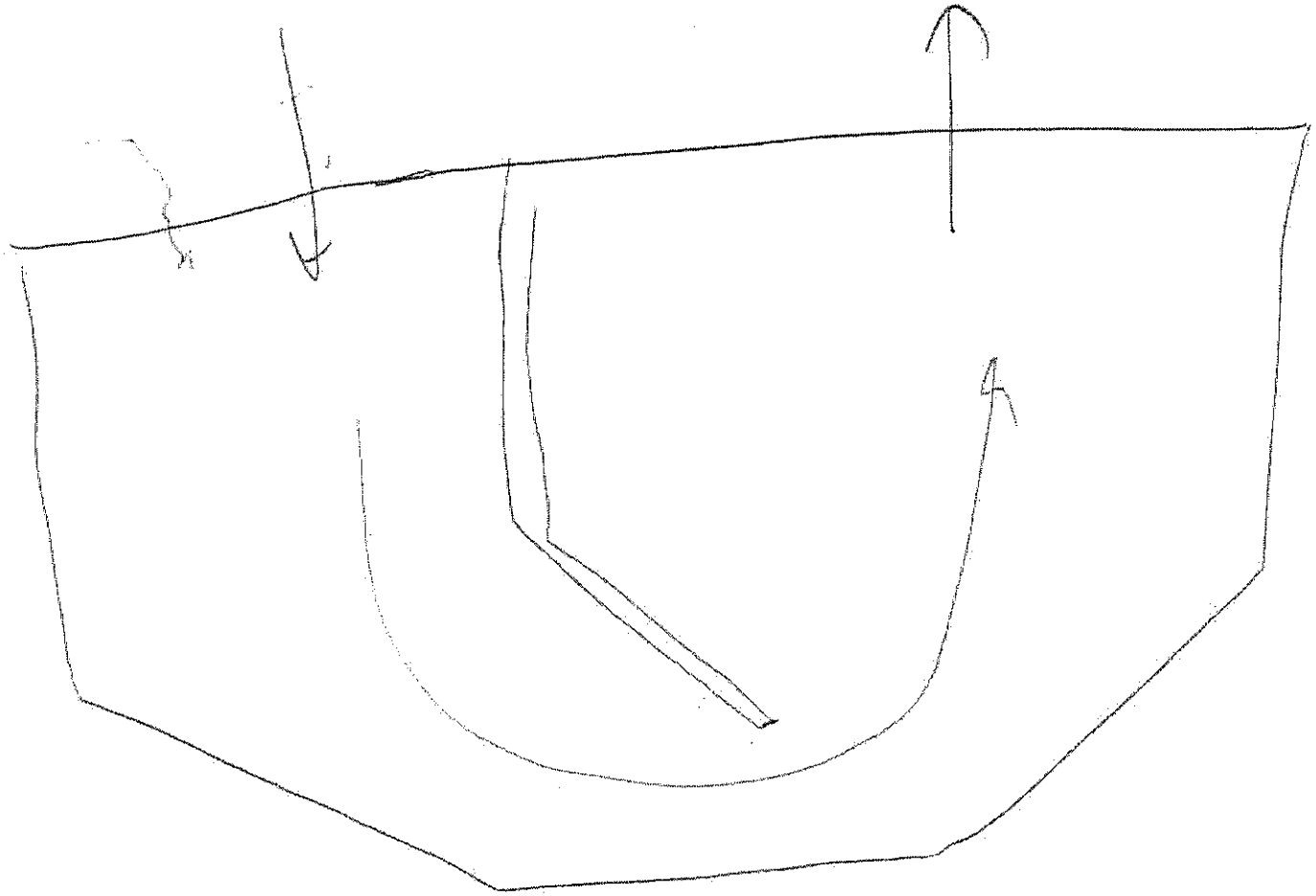
0.5
log inactivation required

101.8
% of required attained

Title

Assumptions:
Softening - pH 8.0, 0.5 deg C, 24.0 MGD, CT from 3MGAL Well only
Well's lowest operating level at 10 ft - 66.67% full.

These calculations were performed using the regression method and may differ from those calculated using the tabular method. Please refer to Appendix E of EPA's Disinfection Profiling and Benchmarking Guidance Manual for more info. (EPA-815-R-99-013)



	S
Volume (gallons)	2,000,000
Flowrate (MGD)	24
Flowrate (gpm)	16656
Flowrate (cfs)	37.11
Detention time (min)	120.08
Baffling Factor	0.28
Water Temperature (°C)	0.5
Min Cl (ppm)	2.9
Max pH	9
Min Cl for calculation	2.90
C*T Attained	97.50
C*T Req (1 log removal)	97.00
% inactivation attained	100.52

0.5
log inactivation required

100.5
% of required attained

Title

Assumptions:
Softening - pH 9.0, 0.5 deg C, 18.0 MGD, CT from 3MGAL Well only
Well's lowest operating level at 10 ft - 66.67% full.

GAC to be installed by
L June/E July

GP Farms
Manistique
A-

Visit
Also if gradation
of sand transfer.
- initial!
Sand qual.

- Pick the GAC closer to 10-sales
ie - Filtersorb 300

* How long will the GAC last?
* Enough to test GAC 1/4 ly to 2 yrs
near life span of GAC
* small system column - yes
* did core samples - 40" column Six of em
to enough for testing

These calculations were performed using the regression method and may differ from those calculated using the tabular method. Please refer to Appendix E of EPA's Disinfection Profiling and Benchmarking Guidance Manual for more info. (EPA-815-R-99-013)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT APPLICATION FOR WATER SUPPLY SYSTEMS

(CONSTRUCTION - ALTERATION - ADDITION OR IMPROVEMENT) AS DESCRIBED HEREIN

Required under the Authority of 1976 PA 399, as amended

ENTERED

This application becomes an Act 399 Permit only when signed and issued by authorized Michigan Department of Environmental Quality (DEQ) Staff. See instructions below for completion of this application.

1. Municipality or Organization, Address and WSSN that will own or control the water facilities to be constructed. This permit is to be issued to:

City of Flint
4500 N. Dort Highway
Flint, MI 48505

WSSN: 02310

2. Owner's Contact Person (provide name for questions):

Contact: Brent Wright

Title: Water Plant Supervisor

Phone: 810.787.6537

Permit Stamp Area (DEQ use only)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 151104 OCT 28 2015

EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

3. Project Name (Provide phase number if project is segmented):	4. Project Location (City, Village, Township):	5. County (location of project):
Flint WTP Phase II, Segment 4 Corrosion Control	Flint, MI	Genesee

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR OF THE DEPARTMENT OF ENVIRONMENT QUALITY

cc: DEQ RESOURCE MANAGEMENT DIVISION OCT 16 2015 LANSING DISTRICT

Issued by: Michael Prysby

Reviewed by: Michael Prysby

☐ **If this box is marked see attached special conditions.**

Instructions: Complete items 1 through 5 above and 6 through 21 on the following pages of this application. Print or type all information except for signatures. Mail completed application, plans and specifications, and any attachments to the DEQ District Office having jurisdiction in the area of the proposed construction.

Please Note:

a. This **PERMIT** only authorizes the construction, alteration, addition or improvement of the water system described herein and is issued solely under the authority of 1976 PA 399, as amended.
b. The issuance of this **PERMIT** does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other DEQ permits, or approvals from other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the date of issuance in accordance with R 325.11306, 1976 PA 399, administrative rules, unless construction has been initiated prior to expiration.
d. Noncompliance with the conditions of this permit and the requirements of the Act constitutes a violation of the Act.
e. Applicant must give notice to public utilities in accordance with 1974 PA 53, (MISS DIG), being Section 460.701 to 460.718 of the Michigan Compiled Laws, and comply with each of the requirements of that Act.
f. All earth changing activities must be conducted in accordance with the requirements of the Soil Erosion and Sedimentation Control Act, Part 91, 1994 PA 451, as amended.
g. All construction activity impacting wetlands must be conducted in accordance with the Wetland Protection Act, Part 303, 1994 PA 451, as amended.
h. Intentionally providing false information in this application constitutes fraud which is punishable by fine and/or imprisonment.
i. Where applicable for water withdrawals, the issuance of this permit indicates compliance with the requirements of Part 327 of Act 451, Great Lakes Preservation Act.

6. **Facilities Description** – In the space below provide a detailed description of the proposed project. Applications without adequate facilities descriptions **will be returned**. SEE EXAMPLES BELOW. Use additional sheets if needed.

The project entails installation of phosphate feed systems at both Control Station #2 (CS#2) and Pump Station #4 (PS#4). Feed at CS#2 will provide the ability to add phosphate for corrosion control to finished water supplied from the Detroit Water & Sewer Department (DWSD). Feed at PS#4 will provide the ability to add phophate to finished water to supply from either the Flint River or Lake Huron via the Karegondi Water Authority (KWA). Both feed systems are temporary systems until the planned filter transfer pump station is constructed. A permanent phosphate feed system will be constructed as part of that contract.

The feed rate will be proportionally controlled based on the water flow rate and will be tied to the existing SCADA system. See attached basis of design for more detailed information.

EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES

Water Mains	500 feet of 8-inch water main in First Street from Main Street north to State Street. **OR** 250 feet of 12-inch water main in Clark Road from an existing 8-inch main in Third Avenue north to a hydrant.
Booster Stations	A booster station located at the southwest corner of Third Avenue and Main Street, and equipped with two, 15 Hp pumps each rated 150 gpm @ 200 feet TDH. Station includes backup power and all other equipment as required for proper operation.
Elevated Storage Tank	A 300,000 gallon elevated storage tank located in City Park. The proposed tank shall be spherical, all welded construction and supported on a single pedestal. The tank shall be 150 feet in height, 40 feet in diameter with a normal operating range of 130 – 145 feet. The interior coating system shall be ANSI/NSF Standard 61 approved or equivalent. The tank will be equipped with a cathodic protection system, and includes a tank level control system with telemetry.
Chemical Feed	A positive displacement chemical feed pump, rated at 24 gpd @ 110 psi to apply a chlorine solution for Well No. 1. Chlorine is 12.5% NaOCL, ANSI/NSF Standard 60 approved and will be applied at a rate of 1.0 mg/l of actual chlorine.
Water Supply Well	Well No. 3, a 200 foot deep well with 170 feet of 8-inch casing and 30 feet of 8-inch, 10 slot screen. The well will be equipped with a 20 Hp submersible pump and motor rated 200 gpm @ 225 feet TDH, set at 160 feet below land surface.
Treatment Facilities	A 5 million gpd water treatment plant located at the north end of Second Avenue. The facility will include 6 low service pumps, 2 rapid mix basins, 4 flocculation/sedimentation basins, 8 dual media filters, 3 million gallon water storage reservoir and 6 high service pumps. Also included are chemical feed pumps and related appurtenances for the addition of alum, fluoride, phosphate and chlorine.

General Project Information – Complete all boxes below.

7. Design engineer's name, engineering firm, address, phone number, and email address:

Jeremy Nakashima, PE
Lockwood, Andrews and Newnam, Inc.
1311 South Linden Rd, Suite B
Flint, MI 48532
jnnakashima@lan-inc.com

8. Indicate who will provide project construction inspection:
☐ Organization listed in Box 1.
☒ Engineering firm listed in Box 7.
☐ Other - name, address, and phone number listed below.

9. Is a basis of design attached?
☒ YES ☐ NO

If no, briefly explain why a basis of design is not needed.

10. Are sealed and signed engineering plans attached?
☒ YES ☐ NO

If no, briefly explain why engineering plans are not needed.

11. Are sealed and signed construction specifications attached?
☒ YES ☐ NO

If specifications are not attached, they need to be on file at DEQ.

12. Were Recommended Standards for Water Works, Suggested Practice for Water Works, AWWA guidelines, and the requirements of Act 399 and its administrative rules followed?
☒ YES ☐ NO

If no, explain which deviations were made and why.

13. Are all coatings, chemical additives and construction materials ANSI/NSF or other adequate 3rd party approved?
☒ YES ☐ NO

If no, describe what coatings, additives or materials did not meet the applicable standard and why.

14. Are all water system facilities being installed in the public right-of-way or a dedicated utility easement? (For projects not located in the public right-of-way, utility easements must be shown on the plans.)
☒ YES ☐ NO

If no, explain how access will be obtained.

15. Is the project construction activity within a wetland (as defined by Section 324.30301(d)) of Part 303, 1994 PA 451?
☐ YES ☒ NO

If yes, a wetland permit must be obtained.

16. Is the project construction activity within a 100-year floodplain (as defined by R 323.1311(e)) of Part 31, 1994 PA 451, administrative rules?
☐ YES ☒ NO

If yes, a flood plain permit must be obtained.

17. Is the project construction activity within 500 feet of a lake, reservoir, or stream?
☐ YES ☒ NO

If yes, a Soil and Erosion Control Permit must be obtained or indicate if the owner listed in box 2 of this application is an Authorized Public Agency (Section 10 of Part 91, 1994 PA 451) ☐ Owner is APA.

18. Will the proposed construction activity be part of a project involving the disturbance of five (5) or more acres of land?
☐YES ☒NO
If yes, is this activity regulated by the National Pollutant Discharge Elimination System storm water regulations?
☐YES: NPDES Authorization to discharge storm water from construction activities must be obtained.

☒NO: Describe why activity is not regulated:
Please call 517-241-8993 with questions regarding the applicability of the storm water regulations.

19. Is the project in or adjacent to a site of suspected or known soil or groundwater contamination?
☐YES ☒NO

If yes, attach a copy of a plan acceptable to the DEQ for handling contaminated soils and/or groundwater disturbed during construction. Contact the local DEQ district office for listings of Michigan sites of environmental contamination.

20. IF YOU ARE A CUSTOMER/WHOLESALE/BULK PURCHASER, COMPLETE THE FOLLOWING

1) Name and WSSN of source water supply system (seller) _____

2) Does the water service contract require water producer/seller to review and approve customer/wholesale/bulk purchaser water system construction plans?
☐YES ☐NO

If yes to #2, the producer/seller approval letter must be attached when submitted to DEQ.

21. **Owner's Certification** The owner of the proposed facilities or the owner's authorized representative shall complete the owner's certification. It is anticipated that the owner will either be a governmental agency (city, village, township, county, etc.) or a private owner (individual, company, association, etc.) of a Type I public water supply.

OWNER'S CERTIFICATION

I, BRENT F WEIGHT (print) (name), acting as the PLANT SUPERVISOR (print) (title/position) for CITY OF FLINT WATER PLANT (print) (entity owning proposed facilities) certify that this project has been reviewed and approved as detailed by the Plans and Specifications submitted under this application, and is in compliance with the requirements of 1976 PA 399, as amended, and its administrative rules.

Signature* 10-16-2015 Date (810) 787-4537 Phone

*Original signature only, no photocopies will be accepted.

PROJECT BASIS OF DESIGN – FOR WATER MAIN PROJECTS

PROJECT NAME: Flint WTP Phase II, Segment 4 Corrosion Control

For this PROJECT the following information must be provided per Act 399 unless waived by the Department. For projects other than water main installation, or if additional space is needed, attach separate sheet(s) with detailed Basis of Design calculations.

A. A general map of the initial and ultimate service areas
☒ Included on engineering plans ☐ Attached separately

B. Number of service connections served by this permit application all customers

C. Total number of service connections ultimately served by entire project all customers

D. Residential Equivalent Units (REUs) served by this permit application _____

E. Total Residential Equivalent Units (REUs) ultimately served by entire project _____

F. Water flow rates for proposed project based on REUs listed in "D' and "E" above

1. Initial design average day flow (mgd) 18.3
2. Initial design maximum day flow (mgd) 25.4
3. Total design average day flow (mgd) 24.0
4. Total design maximum day flow (mgd) 36.0
5. Required fire flows: (1) _____ gpm for _____ hours

G. Actual flows and pressures of existing system at the connection point(s) (2)
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi
_____ gpm at _____ psi

H. Estimated minimum flows and pressures within the proposed water main system (3) _____ gpm at _____ psi

(1) Every water system must decide what levels of fire fighting flows they wish to provide. Fire flow should be appropriate for the area (residential, commercial, industrial) being served by the project. Typical fire flow rates can be obtained from the water supply, local fire dept., ISO or AWWA. The water system must then be designed to be able to provide the required fire flows while maintaining at least 20 psi in all portions of the distribution system.

(2) Flows and pressures at the connection points must be given to determine if the existing water main(s) are able to deliver water to the new service area. These numbers can be obtained from a properly modeled and calibrated distribution system hydraulic analysis or hydrant flow tests performed in the field. If more than one connection is proposed, list as needed.

(3) List what the estimated minimum flows can be expected in the proposed water mains based on estimated water demands, head losses, elevation changes and other factors that may affect flows, such as dead end mains.

City of Flint
Phase II, Segment 4 Corrosion Control
Basis of Design

Given that Flint will require lead and copper corrosion control and given that Detroit utilizes orthophosphate for their corrosion control methodology, and that Flint will be receiving Detroit water for the immediate future, orthophosphate is the appropriate corrosion control methodology for Flint. A dosage of 0.8 mg/l as PO_4 has been recommended for the Detroit water. Numerous utilities utilizing Lake Michigan water have a target dosage of 0.9 mg/l as PO_4. Therefore, a target dosage in the range of 0.8 to 0.9 mg/l appears appropriate.

It is expected that initially there will be a significant PO_4 demand in the system. This will require a significantly higher dosage until this demand is satisfied and the target residual can be maintained. We are therefore designing for capability of a maximum dosage of 1.5 mg/l.

The arriving Detroit water will likely have some residual PO_4 when it arrives at Flint. It has been reported that this residual will be approximately 0.4 mg/l. The system must therefore be capable of a minimum dosage of 0.4 mg/l.

Based upon the usage of 75% Phosphoric Acid and a flow range of 4 MGD to 25 MGD, with an average day of 16 MGD, the expected feed rate will be 1.35 to 32 gpd. Average Phosphoric Acid feed is expected to be 10.8 gpd, requiring 30 days storage of 325 gal. Phosphoric acid will be stored in delivered totes and will be placed with containment pallets for dual containment.

Orthophosphate will need to be applied at two locations. Detroit water will enter the Flint system at Control Station CS2, and supplementary phosphate will be applied there. However, on occasion some incoming water may need to be diverted to the Dort Reservoir, bypassing CS2. This water would then be introduced to the system through High Service Pump Station PS4 and phosphate would be introduced at this location.

Lockwood, Andrews & Newnam, Inc.

PLANNING

ENGINEERING

PROGRAM MANAGEMENT

Est. 1935

AUSTIN, TX
CHICAGO, IL
CLEARWATER, FL
COLLEGE STATION, TX
DALLAS, TX
FLINT, MI
FORT WORTH, TX
HOUSTON, TX
HUNTINGTON BEACH, CA
LAS VEGAS, NV
LOS ANGELES, CA
MIAMI, FL
MILPITAS, CA
PHOENIX, AZ
SACRAMENTO, CA
SAN ANTONIO, TX
SAN MARCOS, TX
WACO, TX

TRANSMITTAL

Filing Data Code 1-07

☐ UPS ☐ FEDEX
☐ DELIVERY SERVICE ☐ HAND DELIVER ☐ OVERNIGHT
☐ REGULAR MAIL ☐ PICK-UP ☒ OTHER Extranet(To PM)

To: Michael Prysby	**Date** 10-16-13
	Project Number 130-10701-001
Company: MDEQ	**Routing:**
Address: 525 WEST ALLEGAN STREET Lansing, MI 48933	
Project: City of Flint Water Treatment Plant Improvements.	

We Are Sending You:		These Are Transmitted:
☐ Shop Drawings	☐ Reports	☐ As Requested
☐ Original Drawings	☐ Submittal Data	☒ For Your Use
☒ Prints	☐ Proposal	☒ For Review and Comment
☐ Specifications	☐ As Noted	☐ For Your Signature
☐	☐	☐
☐	☐	☐

Quantity	Description
3	Full Set of Plans for Ph2-Seg4 Corrosion Control
1	Act 399 Permit Application
1	11x17 Set of Plan for Ph2-Seg4 Corrosion Control

Remarks

These plans have been modified slightly from the set electronically submitted last night.

We look forward to your comments and approval.

Thanks,

DEQ
RESOURCE MANAGEMENT DIVISION
OCT 16 2015
LANSING DISTRICT

Distribution	Prepared By
1- Mike Glasgow 2- Brent Wright 3- File	Samir Matta, PE

1311 SOUTH LINDEN ROAD
SUITE B
FLINT, MI 48532
TEL 810.820.2682
FAX 810.820.2703
www.lan-inc.com

If enclosures are not as noted, kindly notify us at once.

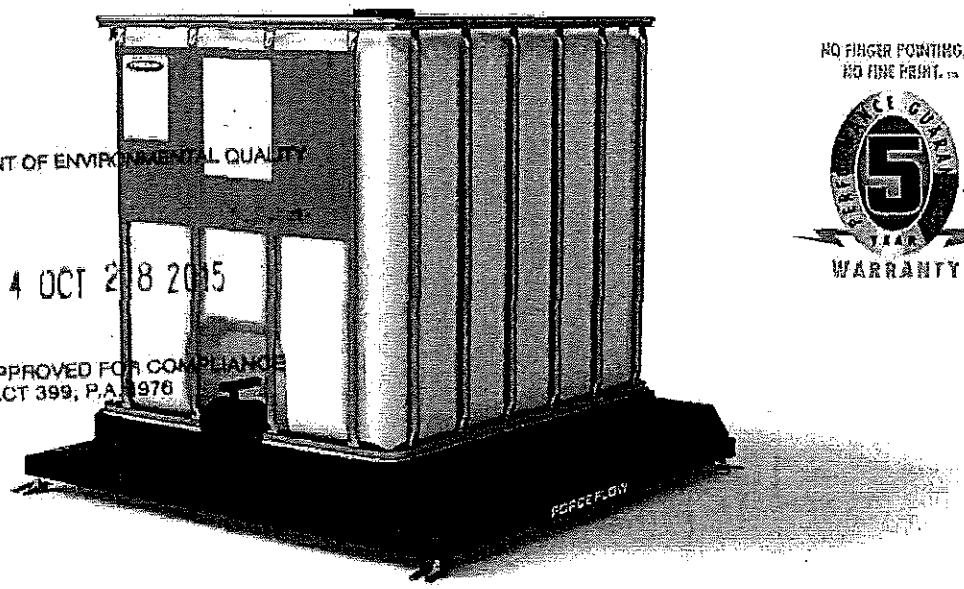
B-018-11

411 BULLETIN

IBC TOTE SCALE

FOR CHEMICAL IBC TOTES

Safely track chemical usage and tank levels	**Warn of dangerous** over and under-feed conditions	**Prevent system** from running empty	**4-20mA remote** monitoring reduces operator exposure to chemicals



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 151104 OCT 28 2015

EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

MEP

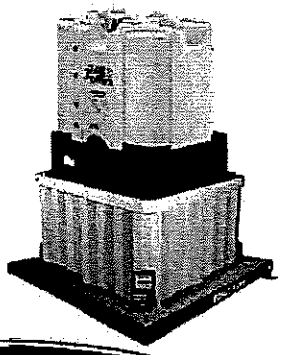
NO FINGER POINTING. NO FINE PRINT.™

5 YEAR WARRANTY™

Strict federal and state reporting requirements have created a need for water and wastewater plant operators to easily and accurately track chemical feed rates and usages. The IBC Tote Scale gives you this information along with the assurance that your chemical supply will not unexpectedly run out.

The heavy duty steel platform is protected with our advanced 80 mil thick TUF-COAT™ Environmental Armor. Tuf-Coat is highly resistant to chemicals, abrasion, impact and ultraviolet light degradation making the IBC Tote Scale ideal for even the harshest environments. Options include 316 stainless steel and MaxSense™ high accuracy models.

The IBC Tote Scale utilizes weighing technology to create a highly reliable, non-contacting chemical monitoring system that avoids problems other sensor technologies face caused by irregular tank shapes, corrosive chemical fumes, fluctuating temperatures and changes in specific gravity.



FORCE FLOW

2430 Stanwell Drive, Concord, CA 94520 USA 925-686-6700 Fax: 925-686-6713 | info@forceflow.com | www.forceflow.com

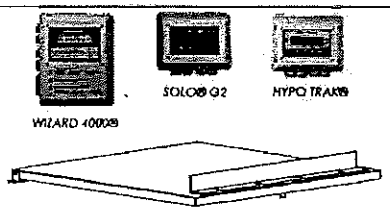
IBC TOTE SCALE

MODELS AND ORDERING INFORMATION

IBC Tote Scales do not include weight indicating instrument. Select from the following: Wizard 4000® Advanced Digital Display (Bulletin 518), the SOLO® G2 Digital Weight Display (Bulletin 516), the SOLO XT® Hydraulic Digital Display (Bulletin 514), the Century Hydraulic dial (Bulletin 519)or Hypo Track® (Bulletin 517). Please order indicator separately.

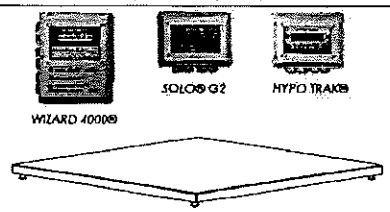
***ELECTRONIC* - Single Load Cell Platform** (Includes platform with backstop and electronic load cell with 20 ft. cable. Lengths up to 100 ft. available; request when ordering.)

MODEL	MATERIAL	X	Y	Z	H	ACCURACY
54-DR××TB	TUF-COAT® STEEL	54"	54"	58"	3.25"	1/4 of 1% FS
54-DR××TBS	316 STAINLESS STEEL	54"	54"	58"	3.25"	1/4 of 1% FS
60-DR××TB	TUF-COAT® STEEL	60"	60"	64"	3.25"	1/4 of 1% FS
60-DR××TBS	316 STAINLESS STEEL	60"	60"	64"	3.25"	1/4 of 1% FS



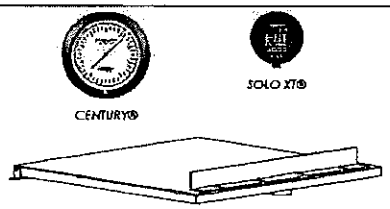
***ELECTRONIC* - Hi Accuracy 4-Load Cell Platform** (Includes platform and (4) electronic load cells with 20 ft. of cable. Lengths up to 100 ft. available; request at time of purchase. Backstop not included or necessary on these models but available upon special request.)

MODEL	MATERIAL	X	Y	Z	H	ACCURACY
54-DR××TB-HA4	TUF-COAT® STEEL	54"	54"	N/A	3.25"	1/10 of 1% FS
54-DR××TBS-HA4	316 STAINLESS STEEL	54"	54"	N/A	3.25"	1/10 of 1% FS
60-DR××TB-HA4	TUF-COAT® STEEL	60"	60"	N/A	3.25"	1/10 of 1% FS
60-DR××TBS-HA4	316 STAINLESS STEEL	60"	60"	N/A	3.25"	1/10 of 1% FS

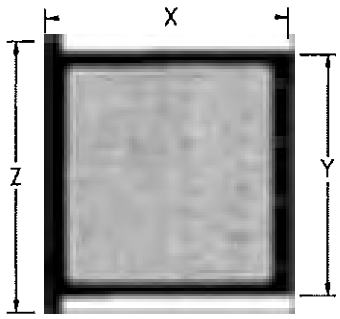


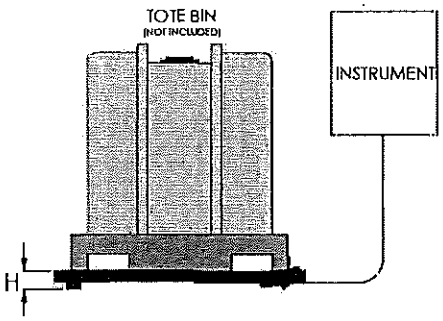
***HYDRAULIC* - Single Load Cell Platform** (Includes platform with backstop, and hydraulic load cell with 12 ft. Hose and quick connect. Hose/tubing lengths up to 100 ft. available to allow remote mounting of indicator; request at time of purchase.)

MODEL	MATERIAL	X	Y	Z	H	ACCURACY
54-HY××TB	TUF-COAT® STEEL	54"	54"	58"	3.25"	1/2 of 1% FS
54-HY××TBS	316 STAINLESS STEEL	54"	54"	58"	3.25"	1/2 of 1% FS
60-HY××TB	TUF-COAT® STEEL	60"	60"	64"	3.25"	1/2 of 1% FS
60-HY××TBS	316 STAINLESS STEEL	60"	60"	64"	3.25"	1/2 of 1% FS



×× = CAPACITY: 1000 lbs = "10", 2000 lbs = "20", 3000 lbs = "30", 4000 lbs = "40", 5000 lbs = "50"





SPECIFYING GUIDELINES:

A. For maximum accuracy, size scale capacity to match the gross weight (chemical plus tote tare weight).

B. Tote size should not exceed platform size.

C. Supply connections must be flexible and preferably connected to tote over pivoted side of platform.

Please visit www.forceflow.com for drawings, engineered specifications and manuals.

FORCE FLOW

2430 Stonwell Drive, Concord, CA 94520 USA 925-686-6700 Fax: 925-686-6713 | info@forceflow.com | www.forceflow.com

MODEL NUMBERS (for Load Cell & Platform)

60-DR30TC-HA4	(3,000 Lbs.)	60" x 60" x 3.25"
60-DR40TC-HA4	(4,000 Lbs.)	60" x 60" x 3.25"
60-DR50TC-HA4	(5,000 Lbs.)	60" x 60" x 3.25"
60-DR60TC-HA4	(6,000 Lbs.)	60" x 60" x 3.25"

For Stainless Steel platform, as "S" after "TC", i.e. 60-DR30TCS-HA4.
For other capacities and platform sizes, consult factory.

MODEL NUMBER (for SOLO 1000 Indicator)

SR-1000-1	1-Channel SOLO 1000 Indicator
SR-1000-2	2-Channel SOLO 1000 Indicator

MODEL NUMBER (Containment Unit)

PAK467	400 gal. NEW PIG Poly IBC Containment Unit

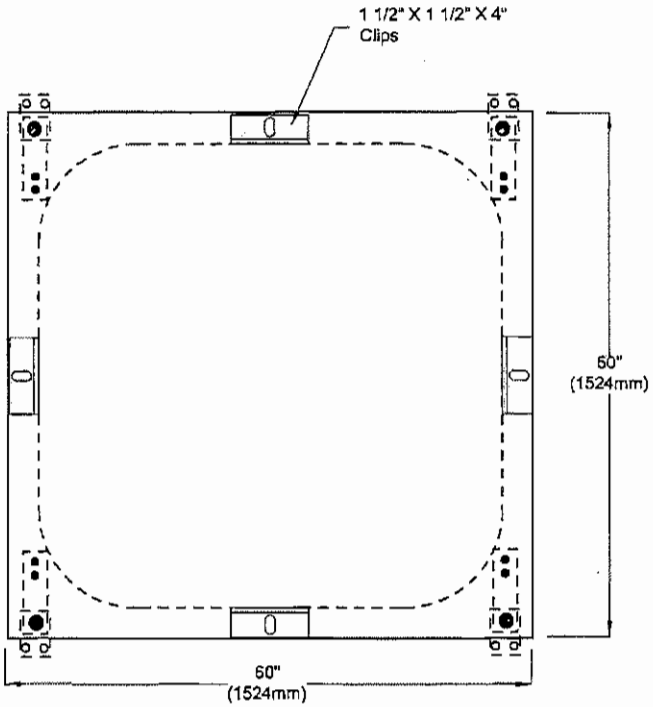
_____ Scale Model Number

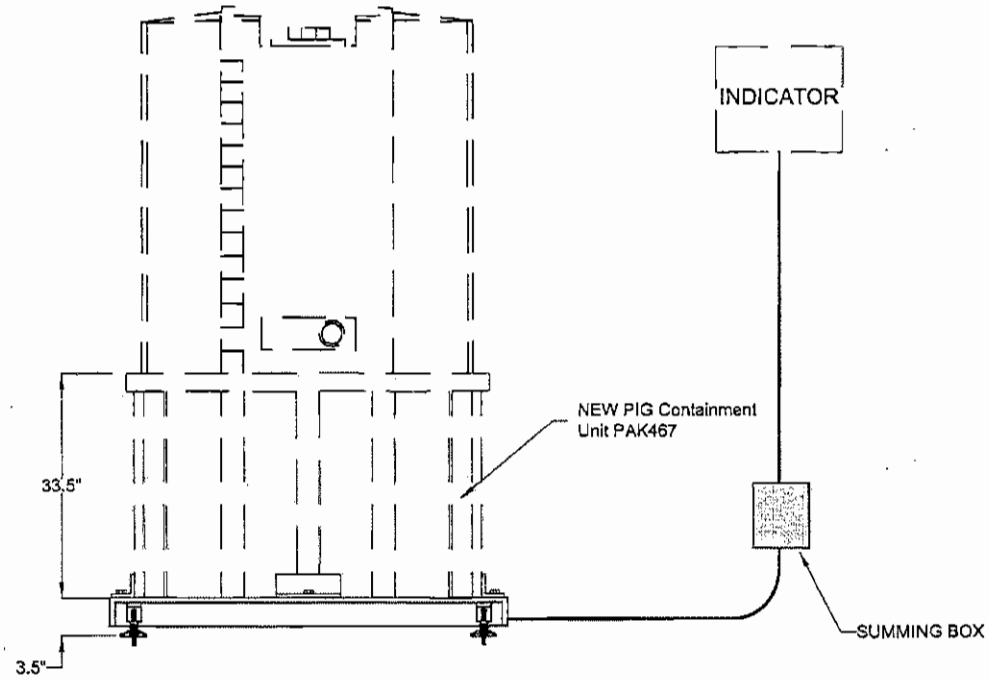
_____ Pounds or Kilogram Indication

_____ Feet of Cable (20' Standard)

_____ Tote Skid Size

400 Containment Size (Gallons)





INSTALLATION NOTE:

We recommend using a forklift to load/unload totes.
If a pallet jack is to be used, scale platform must be pit mounted so deck is flush with floor surface.
Surface mounting with use of inclined load ramps are NOT RECOMMENDED.

FORCE FLOW

2430 Stanwell Dr, Concord, Ca 94520 USA
1-800-893-6723 US & Canada, Fax: 925-686-6713
WWW.forceflow.com / info@forceflow.com

P:_EMAIL_SUBMITTAL FORMS\Autocad Drawings\31431 HA Tote Bin Scale 60 Containment.dwg

HI-ACCURACY ELECTRONIC
60" TOTE BIN SCALE
CONTAINMENT

Drawn by: KBV

Date: 1/23/09

Revised: 4/13/10

Scale:

Drawing Number

31431

---NOT SUPPLIED BY FORCE FLOW----
For use with Force Flow Scale Model 60-DR100TCHA4

New Pig

Your partner for a clean and safe workplace.
1-800-HOT-HOGS® (468-4647)

Product Data Sheet

Item Number: PAK467

Item Name: PIG® Poly IBC Containment Unit

Load Capacity UDL:

- 12000 lbs./each (5443.2 kg/each)

Sump Capacity:

- 400 gal./each (1514 L/each)

Options Available:

Item #	Size	Color	Misc. Features	Amount	Length	Width	Height	Depth	Int. Dia.	Ext. Dia.	Weight	Qty/Pallet
PAK467	—	—	—	1 each	58" (147.3cm)	58" (147.3cm)	33.5" (85.1cm)	—	—	—	415lbs. (188.2kg)	1

Color: White/Black

Description:

Polyethylene containment unit used to help meet containment regulations when storing IBCs.

Application:

Used to help meet containment regulations when storing IBCs of 400 gallons or less containing materials compatible with polyethylene. IBCs can be stacked two high.

Product Features:
Super-strong Containment Unit helps you comply with regulations and store IBC tanks safely. Capture leaks, drips and spills to keep floors dry and workers safe.

- Heavy-duty construction permits double-stacking of IBCs to save space
- Solid anti-slip deck holds a variety of IBC sizes; if tank has feet or pegs, be sure to use proper support pads or plates
- Positioning pegs in pedestals keep deck from shifting
- Polyethylene construction resists UV rays, rust, corrosion and most chemicals
- Translucent white sidewalls allow easy visual inspection
- Arrives ready to use with no assembly required

Composition:

- Sump - Polyethylene
- Grates - Injection Molded Polyethylene

This product helps you comply with:

Regulatory Citation	Summary
40 CFR 264.175	Hazardous waste containment systems must be free of structural cracks or gaps, be designed to keep spilled liquids from remaining in contact with the container, prevent run-on and "have sufficient capacity to contain 10% of the volume of the containers, or the volume of the largest container, whichever is greater."

Additional Specifications:

- Dimensions (Grate): 52" L x 52" W

Disclaimers:

- **Flammables Notice:** If using this product with flammable liquids, please consider the regulations that apply to storage and handling of flammable liquids and the safety of this application, specifically flammable vapors, static discharge and heat sources. For further assistance, please call Technical Services.

PDS generated: Jul 14, 2008

One Pork Avenue, Tipton, PA 16684-0304 • 1-800-HOT-HOGS® (468-4647)
Fax: 1-800-621-PIGS® (621-7447) • Email: hothogs@newpig.com • Web: newpig.com

© 2009 New Pig Corporation. All rights reserved.

Flint Phosphate Calculations

Chemical will be 75% NSF certified Phosphoric acid

75% acid has a density of 13.17 #/gal. (5,974 g/gal) 13.17×453.5923

Of this 75% is Phosphoric acid (H_3PO_4) = 4,480 g H_3PO_4/gal 5,974 × 0.75

Molecular weight of H_3PO_4 is 97.9913 g/mole

Moles H_3PO_4 / gal = 45.72 4,480/97.9913

Moles H_3PO_4 = Moles Orthophosphate (PO_4^{-3}) = Moles Phosphorus (P)

Species	Molecular Wt.	Moles / gal	g/gal
H_3PO_4	97.9913	45.72	4,480
PO_4^{-3}	94.9676	45.72	4341.92
P	30.97	45.72	1407.72

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT NO. W 2 5 1 1 0 4 OCT 2 8 2015
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976
MFP

Proposed Operating Parameters

Assumptions per DEQ:

- City of Detroit residual is 0.39 mg/l as P
- MDEQ wants Flint to maintain a residual of approximately 1.0 mg/l as P
- Feed pump capacity should be sized for a max dose of 2.0 mg/l as P

	Plant Flow	Dosage as PO_4^{-3}*	Dosage as P
Maximum	25 MGD	6.13 mg/l	2.0 mg/l
Average	16 MGD	3.07 mg/l	1.0 mg/l
Minimum	8 MGD	1.53 mg/	0.5 mg/l

*Equivalent dosage to P dosage

Feed Rate Calculations

Maximum feed rate (Max Flow × Max Dosage)

25 MGD × 3782 g/gal H_2O × 2.0 ppm / 1,408 g/gal = 134.30 gpd Phosphoric Acid

Average feed rate (Avg Flow × Avg Dosage)

16 MGD × 3782 g/gal H_2O × (1.0 ppm – 0.39 ppm) / 1,408 g/gal = 26.21 gpd Phosphoric Acid

Minimum feed rate (Min Flow × Min Dosage)

8 MGD × 3782 g/gal H_2O × (1.0 ppm – 0.39 ppm) / 1,408 g/gal = 13.10 gpd Phosphoric Acid

Storage Requirements

30 days supply at average flow and dosage = 26.21 gpd × 30 days = 786 gal.

Assuming the use of 275 gal semi-bulk totes, 3 totes required (recommend 2 in service, 1 spare)

Four Function Valve
AUTOPRIME ™ liquid End
High Viscosity Liquid End
Low Level Float Switch
Digi-Pulse Flow Monitor
Repair & Preventive Maintenance Kits
Calibration Columns

2015 LMI. Information and specifications may change without notice. | Legal | Promotional Products | Privacy Policy

Hamm

Sut

LMI®
an Accudyne Industries brand

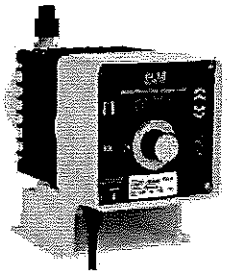
COMPANY PRODUCTS MARKETS DISTRIBUTOR LOCATOR RESOURCES CONTACT US

LMI PRODUCTS Metering Pumps Series C Chemical Metering Pumps

Series C Chemical Metering Pumps

Series C Chemical Metering Pumps

Series C Chemical Metering Pumps have been an industry standard for over 20 years. Designed for Municipal/ Industrial applications, the familiar yellow and black pumps have a rugged, totally enclosed, chemically resistant housing for protection in the harshest environments. Encapsulated electronics and a rigid housing and stroke bracket ensure years of precise, repeatable performance.



High Resolution Image

Request a Quote

Features Tab Information Tab Options Tab

Adjustable stroke frequency and the flexibility of up to 1000:1 turndown ratio

Manually adjustable stroke length provides accurate pump output adjustment

NEMA 4X / IP65 enclosures for protection against corrosive environments

Time tested electronics for reliable, repeatable performance

Totally encapsulated electronics for protection against moisture and corrosive conditions

Inputs for low level switch available on certain models

Models with external pacing for flow proportional applications

Advanced control options for simplified system integration (pulse multiply/divide, 4-20 mA, remote on/off)

*UL, *CUL, NSF 50, NSF 61, *CE Certifications

Control Codes:
1 – Dual Manual Control (speed and stroke length)
7 – Pulse Input / Dual Manual Control
9 – Pulse/Analog Input / Dual Manual Control

Output Codes with standard liquid end	
Max Capacity:	**Max Pressure:**
*CX0 – 1.3 GPH (4.9 l/h)	300 psi (20.7 Bar)
*CX1 – 2.5 GPH (9.5 l/h)	150 psi (10.3 Bar)
*CX2 – 4.0 GPH (15.1 l/h)	100 psi (6.9 Bar)
*CX3 – 8.0 GPH (30.3 l/h)	60 psi (4.1 Bar)
*CX4 – 20 GPH (75.7 l/h)	25 psi (1.7 Bar)
C76 – 4.0 GPH (15.1 l/h)	175 psi (12.1 Bar)
C77 – 10.0 GPH (38.0 l/h)	80 psi (5.5 Bar)
C78 – 25 GPH (95.0 l/h)	30 psi (2.07 Bar)

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT NO. W 15 1 0 4 OCT 3 0 2015

EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

MtP

Prysby, Mike (DEQ)

From: Lytle, Darren <Lytle.Darren@epa.gov>
Sent: Monday, October 19, 2015 12:05 PM
To: Prysby, Mike (DEQ)
Cc: Schock, Michael; Kempic, Jeffrey; Busch, Stephen (DEQ)
Subject: RE: Flint WTP PH2 SEG4 - Corrosion Control

Clarify as dosage PO4 as product or PO4 as P

Mike,

Thank-you for giving us the opportunity to review the city of Flint's corrosion control plan.

We believe it is necessary that Flint boosts orthophosphate dosage. Given that the distribution system has not received orthophosphate in over a year, we expect that orthophosphate will need to be boosted to 1) meet the demand of the distribution system, 2) reach the service lines and other lead-containing components in premise plumbing, and 3) accelerate lead reduction at the consumer's taps. Orthophosphate should preferably be added in the same form as the Detroit source which is phosphoric acid from our understanding. This is the proposed case here, however, a simple test should be performed to make sure that the pH is not impacted in a significant way at the desired target dose.

As P

We have not been able to obtain comprehensive water quality data for the finished water characteristics of the Detroit water that will be fed to Flint, to assess ranges of major chemical characteristic fluctuations. However, based upon the email trail, Detroit water entering the Flint system appears to only contain around 0.4 PO4/L. This concentration range is entirely too low compared to that needed in studies presented and published in the last 20+ years that have focused on lead released directly from lead pipes, and the solubility of the most likely lead orthophosphate pipes scales. We also strongly feel that targeted dose of 0.8 mg PO4/L is also too low, for the very same reason. We would be glad to share with you numerous standard corrosion control and treatment reference works, best practices guides and published results from US and international lead corrosion control field and pilot studies. Secondly, the basis for that target (other communities using Lake Huron source use the same dose) is not scientifically derived nor does it consider water quality and the current state of Flint's distribution system. We have reviewed the original Detroit corrosion study and have seen some of the LCR monitoring data, and besides the fact that it did not directly pertain to this water source, few dosages were tested in the cited 1994 pipe loop study, and the higher dosage than the one implemented in the field currently was more effective. Based on the limited amount of data on the quality of Detroit water, what we know about the history of Detroit corrosion control, we think an orthophosphate residual of 3 to 4 mg PO4/L should be the minimum starting test target residual for pipe passivation. It is likely that, at least initially a higher dosage will be necessary to reach the far ends of the distribution system and sufficiently reduce lead solubility and release from all lead sources. To allow flexibility, we feel the design of the chemical feed and storage systems should be able to consistently deliver a maximum dose of 5 to 6 mg PO4/L, if substantial orthophosphate loss is observed, if the starting dose is set for the desired residual level of 3 to 4 mg/L as PO4. We suggest that jar tests be performed in advance of orthophosphate addition to Detroit water to evaluate the impact of orthophosphate dose on turbidity that could result from interactions between orthophosphate and background Detroit water quality parameters (e.g., aluminum, calcium, etc.).

We want to stress that immediately shifting to Detroit water and adding orthophosphate will not necessarily translate to immediate improvements. Furthermore, this is a change, albeit a return to past conditions. Nonetheless, a period of system upset should be anticipated. The need for a communication strategy and a distribution system plan are critical.

Lastly, we see no mention of a water quality monitoring program. Two programs need to be put in place immediately (before return to Detroit water) to 1) identify lead sources, 2) assess treatment effectiveness against lead release from all of the simultaneously operating mechanisms (solubility, particulate release, galvanic corrosion), and 3) assess orthophosphate levels and stability of water quality in the distribution system.

There are multiple sources of lead in the Flint distribution system to the consumers' taps, such as: pipes; leaded brass; leaded solder; accumulations on old galvanized steel pipes; possibly accumulated on copper or some plastic pipes. It is critical that the fate of orthophosphate in the distribution system is understood, and how effective it is against each type of lead source, so dosing adjustment can be properly made. For this purpose, we recommend that a number of residences throughout Flint that meet the following plumbing criteria, be identified for an assessment of the contribution lead from the different potential service line and interior plumbing sources, through detailed mapping of plumbing materials, lengths, sizes, and location and type of inline devices and faucets using profile sampling. For confidence in interpretation, probably at least 5 sites from each of the configurations will be necessary. The configurations we would estimate to be most important (but should be changed or added to if local construction practice indicates it's necessary): Lead service line, galvanized steel interior plumbing; lead service line, copper with leaded solder joints; lead service line, plastic interior plumbing. It is also possible that interior plumbing may differ from the material used for the customer-side service line segment. We would be glad to discuss the specifics of this sampling effort.
For the purpose of assessing stability of water quality in the distribution system and to inform on orthophosphate residual adjustment, we suggest that 8 to 10 locations in the distribution system be selected to measure pH, alkalinity, orthophosphate, turbidity ~~and iron on a weekly basis~~. These could be collected from TCR sampling locations, or other readily-accessible buildings, should be located at a distribution of locations in the distribution system and should be collected after a flush sufficiently long to assure that "fresh" distribution system water is being measured. Research has shown that over time, orthophosphate can reduce disinfectant demand associated with corroding metallic distribution system materials. These measurements need to be performed in the field and can simply be done with a portable HACH test kit or spectrophotometer.

A lead sampling plan needs to be in place to access the effectiveness of water change and treatment boost. LCR monitoring sites with confirmed lead service lines can be in the sampling pool. Sampling should consist of a 1 liter first draw sample (LCR sample without 5 minute pre-flush), followed by an additional flushed sample or two depending on profile sample results which is intended to capture major lead source(s). The specific details of this effort need to be worked out by the technical committee as soon as possible. We would gladly work with Flint on establishing a water sampling program to identity and verify lead service line sites. The plan and initial sampling effort should be performed before the switch so that one baseline sample set is collected.

Lastly, our strength does not fall under full-scale pump and chemical feed delivery systems. We would only say that the systems need to be scaled-up in size to accommodate our suggested dosing needs. Also, there is the some discussion about diverting water to the Dort reservoir and an associated orthophosphate feed system. We are not familiar with the reservoir but are wondering if it is an open reservoir?

Of course this is a lot of information to share and we would gladly be available to discuss the technical and scientific basis for our suggestions.
Let us know if you have any questions and thanks again,

Darren and Mike

Darren A. Lytle, Ph.D., P.E.
Branch Chief (Acting)
U.S. Environmental Protection Agency
26 West Martin Luther King Dr.
Cincinnati, Ohio 45268
Phone: (513) 569-7432
Fax: (513) 487-2543
email: lytle.darren@epa.gov

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Friday, October 16, 2015 1:32 PM

To: Lytle, Darren <Lytle.Darren@epa.gov>; Schock, Michael <Schock.Michael@epa.gov>
Cc: Busch, Stephen (DEQ) <BUSCHS@michigan.gov>
Subject: FW: Flint WTP PH2 SEG4 - Corrosion Control

Darren, Michael

We have received Flint's corrosion control proposal from their consultant. If you have comments, please provide them to me by Monday morning.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Matta, Samir [mailto:SFMatta@lan-inc.com]
Sent: Friday, October 16, 2015 12:02 AM
To: Prysby, Mike (DEQ)
Subject: Flint WTP PH2 SEG4 - Corrosion Control

Hi Mike,

Please see attached plans for the Corrosion Control Plan for the City of Flint. I will have the official submittal package to you tomorrow afternoon after I get Brent or Mike's signature on the permit application. I will call you when I get back in Lansing to drop the package. Is three sets of full size plans adequate? Would you like some half size plans? Let me know.

Basis of Design

Given that Flint will require lead and copper corrosion control and given that Detroit utilizes orthophosphate for their corrosion control methodology, and that Flint will be receiving Detroit water for the immediate future, orthophosphate is the appropriate corrosion control methodology for Flint. A dosage of 0.8 mg/l as PO_4 has been recommended for the Detroit water. Numerous utilities utilizing Lake Michigan water have a target dosage of 0.9 mg/l as PO_4. Therefore, a target dosage in the range of 0.8 to 0.9 mg/l appears appropriate.

It is expected that, at least initially, there will be a significant PO_4 demand in the system. This will require a significantly higher dosage until this demand is satisfied and the target residual can be maintained. We are therefore designing for capability of a maximum dosage of 1.5 mg/l.
The arriving Detroit water will likely have some residual PO_4 when it arrives at Flint. It has been reported that this residual will be approximately 0.4 mg/l. The system must therefore be capable of a minimum dosage of 0.4 mg/l.

Based upon the usage of 75% Phosphoric Acid and a flow range of 4 MGD to 25 MGD, with an average day of 16 MGD, the expected feed rate will be 1.35 to 32 gpd. Average Phosphoric Acid feed is expected to be 10.8 gpd, requiring 30 days storage of 325 gal.

Orthophosphate will need to be applied at two locations. Detroit water will enter the Flint system at Control Station CS2, and supplementary phosphate will be applied there. However, on occasion some incoming water may need to be diverted to the Dort Reservoir, bypassing CS2. This water would then be introduced to the system through High Service Pump Station PS4 and phosphate would be introduced at this location.

Please let me know if the information is adequate or you require additional information.

Thanks.

Samir F. Matta, PE
Team Leader

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
2121 University Park Dr, Suite 100 • Okemos, MI 48864-6901
D 517.819.2367 **C** 517.819.2367
www.lan-inc.com • sfmatta@lan-inc.com

CONFIDENTIALITY AND PRIVILEGE NOTICE: This email communication, including any and all attachments, (collectively, this "Communication"), is intended solely for the person(s) to whom it is addressed. This Communication may contain information that is privileged, confidential and/or proprietary. Any unauthorized use, disclosure or copying of this Communication is strictly prohibited. If you have received this Communication in error, please contact the sender immediately and destroy any and all copies of this Communication.

Questions

1. Clarify that you are expressing dosage of Phosphoric Acid as PO_4 Product
   ie 3 - 4 mg/l prod → ≈ 1.0 mg/l as P

2. Flint's pH WQP - on FNT/DW&D
   maintain range (7.2 — 7.8)

3. set WQ monitoring for Oct - Dec QTR

   EPA sugg 8-10 sites for pH, Alk, ortho, turb, Fe 1/wk
   from TCR or other?

4. Incoming PO_4 level @ P

5. PB sampling plan - use LCR sites w/ Lead services

* ~~@ we can~~ we concur w/ DOS-yes
  & we can establish WQP mon & PB mon.
  in accordance to @ LCR

* mini-study core w/ TAC

WL Performance
Products LP

PRODUCT DATA SHEET

PRODUCT: Phosphoric Acid, 75%

NSF

GRADE: Technical

CODE: 750

GENERAL DESCRIPTION: Clear colorless liquid with no foreign odor

FORMULA: H_3PO_4

MOLECULAR WEIGHT: 98.0

CAS NO.: 7664-38-2

DATE EFFECTIVE: November 5, 2005

CHARACTERISTICS	SPECIFICATION LIMITS
Specific Gravity @ 25°/15.5°C	1.574 Minimum
Equivalent H_3PO_4, %	75.0 Minimum
Equivalent P_2O_5, %	54.3 Minimum
Color, APHA	20 Maximum

NOTE: Specification Limits are subject to change from time to time. Please contact us for current data sheet.

Plant Location:	Carondelet (St. Louis), MO; Carteret, NJ; Lawrence, KS
Packaging:	3000 gal. tank truck; 14,000 gal. tank cars. 15 gal.(200 lb.) & 55 gal. (700 lb.) plastic drums (nonreturnable)
Labeling Requirements:	Product Label and DOT CORROSIVE label required by law.
Shipping Classification:	1. Single package of 5000 lbs. or more: Phosphoric Acid CORROSIVE MATERIAL, UN 1805, RQ STCC4930248 2. Single package of less than 5000 lbs.: Phosphoric Acid CORROSIVE MATERIAL, UN 1805 STCC4930248

10495 10495

Handling Precautions:

NOT FOR FOOD OR DRUG USE. CORROSIVE TO MILD STEEL. DANGER! CAUSES BURNS TO EYES AND SKIN. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

FIRST AID: If in eyes or on skin, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

IN CASE OF SPILL OR LEAK: Contain spill or leak to prevent discharge to environment. Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

This Product Data Sheet is subject to the terms and conditions on the reverse side hereof.

Key Properties:

- Phosphoric acid is relatively non-volatile and stable at elevated temperatures; it is a much milder acid than sulfuric, nitric, or hydrochloric acids.
- Heavy, viscous liquid, 13.1 to 13.2 lbs./gal.
- Remains liquid at very low temperatures: Freezing point, -18°C (0.5°F)
- Shelf-life •-• 24 months

Applications:

- Bonding agent for refractory materials
- Industrial and institutional cleaning and sanitizing products
- Liquid fertilizers
- Aluminum bright-dipping
- Metal treating and phosphatizing
- Flameproofing agent
- Catalyst in chemical processes
- Effluent treatment
- Animal feed supplement
- Potable Water Treatment: ICL Performance Products LP Phosphoric Acid, 75%, conforms to the requirements of ANSI / NSF Standard 60; used for corrosion and scale control.
  Maximum Use Level = 13 mg/L.

FOR MORE COMPLETE INFORMATION ON PROPERTIES AND SAFE HANDLING OF THIS MATERIAL, SEE THE ICL PERFORMANCE PRODUCTS LP MATERIAL SAFETY DATA SHEET (MSDS).

NOTICE: Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ICL Performance Products LP makes no representations or warranties as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ICL Performance Products LP be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information or the product to which Information refers. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and ICL Performance Products LP makes no representation or warranty, express or implied, that the use thereof will not infringe any patent. The data set forth herein are based on samples tested and are not guaranteed for all samples or applications. Such data are intended as guides and do not reflect product specifications for any particular product. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

ICL PERFORMANCE PRODUCTS LP © November, 2005

Corporate Offices:

622 Emerson Road
Suite 500
St. Louis, Missouri 63141
314-983-7500

For order assistance, please call our Customer Service Department Toll Free: 1-800-244-6169

ICL
Where needs take us

Safety Data Sheet

RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Identification

Product Name:	PHOSPHORIC ACID (35% - 95%)	Multi 0484
Reference Number:	AST10046	
Date:	May 19, 2015	
Synonyms:	Emulsi-Phos®; LuminEtch™, LuminEtch™ Ultra, PurEtch®; monophosphoric acid; orthophosphoric acid;	

Use of the substance or preparation

Phosphates and fertilizers, acid cleaners, aluminum brighteners and metal phosphatizing, leather tanning, varnish, synthetic rubber, and water treatment. Food grade is used as an acidulate for cola drinks, yeast nutrient, etc. NSF International certifies phosphoric acid under Standard 60 as an acceptable drinking water treatment chemical.

Company/Undertaking Identification

ICL PERFORMANCE PRODUCTS LP
622 Emerson Road - Suite 500
St. Louis, Missouri 63141

Emergency telephone: In USA call CHEMTREC: 1 800 424 9300

Outside the USA, including ships at sea, call CHEMTREC's international and maritime telephone number (collect calls accepted): +1 (703) 527-3887.

In Canada call CANUTEC: 1 613 996 6666

General Information: +1 800 244 6169 (Worldwide)

2. HAZARDS IDENTIFICATION

GHS

Danger

GHS05

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Composition

Substance	CAS No.	%w/w	EINECS No.
Phosphoric Acid	7664-38-2	35 - 95	231-633-2
Water	7732-18-5	5 - 65	231-791-2

4. FIRST AID MEASURES

General

This material is an acid; treatment is symptomatic and supportive. Phosphoric acid has irritating effects to mucous membranes.

Eye contact

Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. If irritation persists, contact an ophthalmologist.

Skin contact

May cause skin irritation. Wash effected area with plenty of soap and water. Get medical attention.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion

IF SWALLOWED, do NOT induce vomiting. Give victim 2-4 glasses of water to drink. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

5. FIRE FIGHTING MEASURES

Extinguishing media

Not combustible. No special requirements.

Unsuitable extinguishing media

Non-combustible. No special requirements.

Exposure hazard

Not combustible. May give off toxic fumes (oxides of phosphorus) in a fire. May react with metals to liberate hydrogen, a flammable gas.

Protective equipment

Firefighters should wear self-contained breathing apparatus & personal protective clothing (PPE).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid unnecessary exposure and remove all material from eyes, skin and clothing. Do not ingest or inhale mists of phosphoric acid.

Environmental precautions

Small quantities: Avoid discharge into the environment
Large quantities: May cause pollution. Avoid discharge into the environment. Note methods for cleaning up in the next section.

Methods for cleaning up

Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Neutralize washings with a base such as soda ash or lime. Flush residual spill area with large amounts of water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling

Do not get in eyes, on skin, or on clothing.
Avoid breathing mist or vapor.
Do not taste or swallow.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.

Engineering measures

Provide natural or mechanical ventilation to minimize exposure. The use of local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment. Consult National Fire Protection Association (NFPA) Standard 91 for design of exhaust systems.

Transfer product from drums to process in closed system (hermetically) and if not possible use effective local exhaust ventilation. Empty drums as thoroughly as possible to facilitate disposal.

For bulk transfer, purge lines with nitrogen to remove residual liquid before disconnect. When unloading bulk vehicles, personnel should wear chemical goggles and rubber or neoprene gloves. All fittings should be properly secured prior to energizing unloading system. Care should be taken to avoid acid contact when disconnecting lines/hoses after unloading.

For bulk storage type 316L stainless is recommended. Glass, polyethylene and FRP (depending on resin used) are satisfactory, steel, aluminum and type 304 stainless are not recommended because of rapid or potential corrosion. Vessels should be vented and operated at ambient conditions. Maintenance heat (hot water preferred) may be used to prevent freezing. Dike area around storage tank with sufficient volume to hold entire tank contents.

Storage

Store in plastic, rubber-lined, or 316L stainless steel tanks designed for Phosphoric Acid. Store drums away from heat and out of direct sunlight. Store in a well-ventilated dry area away from alkalis and most metals. Store above freezing point. Contact with reactive metals, i.e. mild steel and aluminum may generate hydrogen that may form and explosive mixture in storage vessels.

For tank inspection, follow manufacturer's recommended safety guidelines (ex. temperature, etc.). In addition, corrosion data for phosphoric acid (ex. Handbook of Corrosion Engineering, McGraw-Hill, 2000) must be followed to match the storage container of choice (ex. stainless, rubber lined, etc.).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

State	Standard	Limit
Australia	Occupation Exposure Limit	1 mg/m^3 8-hr. TWA, 3 mg/m^3 STEL
Austria	Occupation Exposure Limit	MAK 1 mg/m^3 8-hr
Belgium	Occupation Exposure Limit	1 mg/m^3 8-hr. TWA, 3 mg/m^3 STEL
Denmark	Occupation Exposure Limit	1 mg/m^3 8-hr. TWA
Finland	Occupation Exposure Limit	1 mg/m^3 8-hr. TWA, 3 mg/m^3 STEL
France	Occupation Exposure Limit	VME 1 mg/m^3 VLE 3 mg/m^3
Japan	Occupation Exposure Limit	1 mg/m^3 8-hr.
United Kingdom	Occupation Exposure Limit	2 mg/m^3 STEL
United States	Occupation Exposure Limit	1 mg/m^3 8-hr. TWA, 3 mg/m^3 STEL

Respiratory protection

Avoid breathing vapor or mist. Use NIOSH/MSHA approved respiratory protection equipment (full face piece recommended) when airborne exposure limits are exceeded (see below). If used, full-face piece replaces the need for face shield and/or chemical goggles. Refer to U.S. OSHA regulations 29 CFR 1910.134 or European Standard EN 149.

Hand/Skin protection

Wear impervious protective gloves and clothing to prevent contact to skin. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean personal protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Eye protection

Wear chemical goggles, a face shield, and if necessary, a full face respirator when conditions warrant or exceed the Occupation Exposure Limit. Refer to U.S. OSHA regulations 29 CFR 1910.133 or European Standard EN 166.

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

a) Appearance: Clear, colorless, syrupy liquid
b) Odor: None
c) Odor threshold: Undetermined.
d) pH: (as a 1% solution @ 25 °C) 75%:1.6; 80%:1.6; 85%: 1.6; 95%:1.7
e) Melting point/freezing point: Freezing point °C: 75%:-17.5; 80%:4.6; 85%: 21.1;95%:24.7
f) Initial boiling point and boiling range: (°C) 75%:135; 80%:144; 85%:154; 95%:202
g) Flash point: Undetermined
h) Evaporation rate: Undetermined.
i) Flammability (solid, gas) : Undetermined.
j) Upper/lower flammability or explosive limits: Undetermined.
k) Vapor pressure: (100% acid): 0.0285 mm Hg @ 20 °C
l) Vapor density: Undetermined.
m) Relative density: @ 25/15.5 °C: 75%:1.575; 80%:1.633; 85%:1.692; 95%: 1.808
n) Solubility(ies) : Complete
o) Partition coefficient: n-octanol/water: Undetermined.

p) Auto-ignition temperature: Undetermined.
q) Decomposition temperature: Undetermined.
r) Viscosity: @ 25 °C 75%:12; 80%:17; 85%:23; 95%:55

Chemical Formula: H_3PO_4

	75%	80%	85%	95%
% Equivalent H_3PO_4:	75.1	80.35	85.5	95.0
Kg/l @ 25 °C	1.57	1.64	1.69	1.81
lb/gallon @ 25 °C	13.17	13.66	14.15	15 - 15.2

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Product is stable under normal conditions of storage and handling.

Conditions to avoid

Incompatible materials

Materials to avoid

Avoid contact with metals (such as mild steel and aluminum), which may liberate flammable hydrogen gas that can produce an explosion in confined vessels. Avoid contact with materials such as sulfides and sulfites, which could release toxic gases. Be cautious in mixing with strong bases because high heat of reaction can generate steam.

Hazardous decomposition

Phosphorus oxides may form when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

Data from ICL Performance Products LP single-dose (acute) animal studies with this material are given below:

Phosphoric Acid 75%

Oral - rat LD_{50}:	4,400 mg/kg; slightly toxic
Dermal - rabbit LD_{50}:	> 3,160 mg/kg; slightly toxic
Eye Irritation - rabbit (24-hr. exp):	corrosive
Skin Irritation - rabbit (24-hr. exp):	corrosive
DOT Skin Corrosion - rabbit (4-hr. exp):	non-corrosive

Phosphoric Acid 80%

Oral - rat LD_{50}:	4,200 mg/kg; slightly toxic
Dermal - rabbit LD_{50}:	> 3,160 mg/kg; slightly toxic
Eye Irritation - rabbit (24-hr. exp):	corrosive
Skin Irritation - rabbit (24-hr. exp):	corrosive
DOT Skin Corrosion - rabbit (4-hr. exp):	non-corrosive

Phosphoric Acid 85%

Oral - rat LD_{50}:	3,500 mg/kg; slightly toxic
Dermal - rabbit LD_{50}:	> 1,260 mg/kg; slightly toxic
Eye Irritation - rabbit (24-hr. exp):	corrosive
Skin Irritation - rabbit (24-hr. exp):	corrosive
DOT Skin Corrosion - rabbit (4-hr. exp):	corrosive

The results of single exposure tests indicate that these concentrations of Phosphoric Acid are slightly toxic orally and no more than slightly toxic after skin application. Following a 24-hour exposure, irreversible eye and skin damage occurred at all tested concentrations of Phosphoric Acid.

Phosphoric Acid has produced no genetic changes in standard tests using bacterial cells.

Additional Information

This material is severely corrosive to steel based on DOT, 49 CFR criteria.

Phosphoric Acid has a low vapor pressure at room temperature and is not expected to present a significant inhalation hazard under ambient conditions. Phosphoric Acid can, however, be irritating to the respiratory tract if inhaled as a mist or if the material is vaporized. The American Conference of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV) for Phosphoric Acid. For further information on this material, please refer to the current edition of the Documentation of The Threshold Limit Values and Biological Exposure Indices.

12. ECOLOGICAL INFORMATION

Environmental toxicity

Phosphoric acid is practically nontoxic to one species of freshwater fish. No toxicity data was located for other freshwater species, algae, or Daphnia magna in a search of the available scientific literature.

The following data have been classified using the criteria adopted by the European Economic Community (EEC) for aquatic organism toxicity.

96-hr. LC_{50} Mosquitofish: 138 mg/L, practically nontoxic

Environmental Fate

No specific biodegradation test data was located in a search of the available scientific literature. It was reported in the literature that while acidity of this material may be reduced readily in natural waters, the phosphate may persist indefinitely.

13. DISPOSAL CONSIDERATIONS

This material when discarded is a hazardous waste as defined by the U.S. Resource Conservation and Recovery Act (RCRA), 40 CFR 261.22, due to its characteristic of corrosivity, EPA hazardous waste number D002. Best Demonstrated Available Treatment (BDAT) as defined by RCRA for D002 characteristic wastes is DEACTIVATION plus meet 40 CFR 268.48 (Universal Treatment Standards) for non-CWA/non-CWA equivalent/non-Class I SDWA systems. Dispose of in accordance with local, state and federal regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Road/Rail, Sea and Air

IMDG/UN	UN 1805, Phosphoric acid, solution, 8, III
ICOA/IATA	UN 1805, Phosphoric acid, solution, 8, III
RID/ADR	UN 1805, Phosphoric acid, solution, 8, III
Canadian TDG	UN 1805, Phosphoric acid, solution, 8, III *
US DOT	UN 1805, Phosphoric acid, solution, 8, III *

*Reportable Quantity/ Reportable Limit (RQ/RL):
Canadian: Regulated limit (RL) for packages greater than or equal to 230 kg
U.S. DOT: Reportable quantity (RQ) for packages greater than or equal to 5,000 lb

15. REGULATORY INFORMATION

Chemical Inventory

USA TSCA	Listed	Australia	Listed
Canada DSL	Listed	Korea	Listed
EC	Listed	Philippines	Listed
Japan	Listed	China	Listed

Additional information

WHMIS Classification: D2 (B) - Materials Causing Other Toxic Effects
E - Corrosive Material

SARA Hazard Notification

Hazard Categories Under Title III Rules (40 CFR 370):	Immediate
Section 302 Extremely Hazardous Substances:	Not Applicable
Section 313 Toxic Chemical(s):	Not Applicable

CERCLA Reportable Quantity: 5,000 lbs. of phosphoric acid

Release of 5,000 lbs. or more of this product into the environment in a 24-hour period requires notification to the U.S. National Response Center (800-424-8802 or 202-426-2675). Since local, state, and federal laws vary; consult your attorney or appropriate regulatory officials for information relating to spill reporting.

FDA: Food grades of phosphoric acid are sanctioned as Generally Recognized as Safe (GRAS) by the U.S. Food and Drug Administration and is codified in 21 CFR 182.1073.

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

16. OTHER INFORMATION

	Health	Fire	Reactivity	Additional Information
Suggested NFPA Rating	3	0	0	
Suggested HMIS Rating	3	0	0	H H = Splash goggles, gloves (nitrile rubber recommended), synthetic apron, dust & vapor respirator

Reason for revision: Revised section 1 and 9. Supersedes MSDS dated: May 2, 2013

Responsible Care ® is a registered trademark of the American Chemistry Council.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ICL Performance Products LP makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ICL Performance Products LP be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS

The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Wednesday, October 28, 2015** at 12:15 a.m. Eastern Time. Please contact NSF International to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information: http://info.nsf.org/Certified/PwsChemicals/Listings.asp?CompanyName=ICL+Performance+Products+LP&ChemicalName=Phosphoric+Acid&ProductFunction=Corrosion+Control&

NSF/ANSI 60
Drinking Water Treatment Chemicals - Health Effects

ICL Performance Products LP

622 Emerson Road
St. Louis, MO 63141
United States
314-983-7500
Visit this company's website (http://www.icl-pplp.com)

Facility : Lawrence, KS

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
Phosphoric Acid 36%-38% - Food Grade	Corrosion & Scale Control	27 mg/L
Phosphoric Acid 36%-38% - Technical Grade	Corrosion & Scale Control	27 mg/L
Phosphoric Acid 70% Food Grade	Corrosion & Scale Control	14mg/L
Phosphoric Acid 70% Technical Grade	Corrosion & Scale Control	14mg/L
Phosphoric Acid 75% - Food Grade	Corrosion & Scale Control	13 mg/L
Phosphoric Acid 75% - Technical Grade	Corrosion & Scale Control	13 mg/L
Phosphoric Acid 80% - Food Grade	Corrosion & Scale Control	12 mg/L
Phosphoric Acid 80% - Technical Grade	Corrosion & Scale Control	12 mg/L
Phosphoric Acid 85% - Food Grade	Corrosion & Scale Control	12 mg/L
Phospboric Acid 85% - Technical Grade	Corrosion & Scale Control	12 mg/L
Thermal Select 75%	Corrosion & Scale Control	13mg/L
Thermal Select 80%	Corrosion & Scale Control	12mg/L
Thermal Select 85%	Corrosion & Scale Control	12mg/L

Facility : St. Louis, MO

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
36-38% Food Grade	Corrosion & Scale Control	27 mg/L
36-38% Technical Grade	Corrosion & Scale Control	27 mg/L
75% Food Grade	Corrosion & Scale Control	13 mg/L
75% Technical Grade	Corrosion & Scale Control	13 mg/L
80% Food Grade	Corrosion & Scale Control	12 mg/L
80% Technical Grade	Corrosion & Scale Control	12 mg/L
85% Food Grade	Corrosion & Scale Control	12 mg/L
85% Technical Grade	Corrosion & Scale Control	12 mg/L

Facility : Carteret, NJ

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
Phosphoric Acid 36%-38% - Food Grade	Corrosion & Scale Control	27 mg/L
Phosphoric Acid 36%-38% - Technical Grade	Corrosion & Scale Control	27 mg/L
Phosphoric Acid 50% - Food Grade	Corrosion & Scale Control	20mg/L
Phosphoric Acid 50% - Technical Grade	Corrosion & Scale Control	20mg/L
Phosphoric Acid 75% - Food Grade	Corrosion & Scale Control	13 mg/L
Phosphoric Acid 75% - Technical Grade	Corrosion & Scale Control	13 mg/L
Phosphoric Acid 80% - Food Grade	Corrosion & Scale Control	12 mg/L
Phosphoric Acid 80% - Technical Grade	Corrosion & Scale Control	12 mg/L
Phosphoric Acid 85% - Food Grade	Corrosion & Scale Control	12 mg/L
Phosphoric Acid 85% - Technical Grade	Corrosion & Scale Control	12 mg/L

Facility : Distribution Center - 1 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
Phosphoric Acid 35%-85%	Corrosion & Scale Control	12mg/L

Facility : Distribution Center - 12 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
70% Phosphoric Acid - Food Grade	Corrosion & Scale Control	14mg/L
70% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	14mg/L
75% Phosphoric Acid - Food Grade	Corrosion & Scale Control	13mg/L
75% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	13mg/L
80% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
80% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L
P2O5 Thermal Intermediate	Corrosion & Scale Control	13mg/L
Thermal Select 75%	Corrosion & Scale Control	13mg/L

Facility : Distribution Center - 13 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
70% Phosphoric Acid - Food Grade	Corrosion & Scale Control	14mg/L
70% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	14mg/L
75% Phosphoric Acid - Food Grade	Corrosion & Scale Control	13mg/L
75% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	13mg/L
80% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
80% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L

Facility : Distribution Center - 15 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
75% Phosphoric Acid - Food Grade	Corrosion & Scale Control	13mg/L
75% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	13mg/L
85% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L

Facility : Distribution Center - 2 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
Phosphoric Acid 75%	Corrosion & Scale Control	13mg/L

Facility : Distribution Center - 4 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
70% Phosphoric Acid - Food Grade	Corrosion & Scale Control	14mg/L
70% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	14mg/L
75% Phosphoric Acid - Food Grade	Corrosion & Scale Control	13mg/L
75% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	13mg/L
80% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L

Facility : Distribution Center - 6 USA

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
70% Phosphoric Acid - Food Grade	Corrosion & Scale Control	14mg/L
70% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	14mg/L
75% Phosphoric Acid - Food Grade	Corrosion & Scale Control	13mg/L
75% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	13mg/L
80% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
80% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Food Grade	Corrosion & Scale Control	12mg/L
85% Phosphoric Acid - Technical Grade	Corrosion & Scale Control	12mg/L

Facility : M.P. Arava, Israel

Phosphoric Acid

Trade Designation	*Product Function*	*Max Use*
Orthophosphoric Acid 93%	Corrosion & Scale Control	12mg/L
Phosphoric Acid Food Grade 93%	Corrosion & Scale Control	12mg/L

Number of matching Manufacturers is 1

Number of matching Products is 72

Processing time was 0 seconds

Requested By	Client Name	Desk Phone #	Cell Phone #	Client User ID
Melissa Charbonneau	Megan McMahon	517-284-6668	517-230-3442	MCMAHONM1
Melissa Charbonneau	Carla Davidson	517-284-6663	517-243-1249	DAVIDSONC
Melissa Charbonneau	Susan Doty	517-284-6664	517-230-1430	DOTYS2
Melissa Charbonneau	Brent Bodnar	517-284-6661	517-243-8011	BODNARB
Melissa Charbonneau	Justin Smith	517-284-6669	517-230-4675	SMITHJ8

* WTP needs to DTM what its ability is for opt corr. control on KWA — logistics of getting KWA water to WTP prior to switch
- Before KWA — hard: what needs to be done? How do we accomplish this?

pH corr control How to DTM optimization before it starts test loop

Flint WTP Improvements
Corrosion Control Proposal
MDEQ Comments
October 16, 2015

1. **The compound being referenced is 75% Phosphoric Acid. We are assuming this is the orthophosphate compound. What is the % available orthophosphate as phosphate (P)?** See attached calculations.

2. **What is the density of the phosphate compound in lbs/gal?** 13.17 lb/gal @ 25°C

3. **Water from Detroit is approx. 03 – 0.4 mg/l o orthophosphate as phosphate (P). We will concur with the proposal to add sufficient orthophosphate in order to maintain a 0.5 – 1.0 mg/l as P in the distribution system.** This is the intent of the system. Dosage will be adjusted based upon measured results in the distribution system.

4. **The orthophosphate compound needs to be an NSF Standard 60 approved product.** The specification that will be used for purchase requires NSF certfication.

5. **How will the phosphate dosage be measured? Weigh scale or scada? If scales are to be used, this needs to be included in the proposal.** We will add IBC tote scales with secondary containment. The drawings will be modified to show this; see attached manufacturer's information.

6. **What is the purpose of the boosted water supply that mixes with the phosphate compound?** The boosted water supply is intended to provide sufficient injected volume to ensure complete mixing.

Here's what we plan to say to FNT / want EPA's concurr.
- Dosage >1 as P @ opt optimum.
- Feed at higher rate to get residual @ 1 in dist.
- go to 25 sites — here's what we look samples

Short term — draft corr on our plan to FNT

Long-term — WQPs @ Rocc. sites / other to DCM

Meet w/ city to discuss & EPA. Yes — 4 hr DTM pipe loop / jar tests studies

EPA CALL RE CORROSION CONTROL 10/20/15.
Proposal.

(1) Expressed as PO_4 in the water - yes

- EPA tech. mem - we will confirm

(2) EPA wants 3-4 mg/l as PO_4 - yes
wants to estab. 1.0 mg/l as P in Dist.

- need meas ~~level~~ in system, but maintain 1.0 mg/l

NSF limits
PO4 @ DWSD → 12 mg/l MAX DOSO (as prod?) - P. look to confirm

EPA wants quick JAR test to verify no sig. pH Δes

(3) - Regarding the testing / - we have parameters that can be correlated
we have 4-5 sites for WQ
pH, Alk, ortho, CA, cond, temp
tub? FC? → CAN add these too
Rule
we have prior data from when FAT was on DWSD
+ 100 data
also Any TC pts the WQ parameter pt? - we will verify
areas to target are outlined CI

(4) we can work on TAC - to do the mini study
8-10 sites
DHHS - looking @ exposure assessment too - basic understanding
Blood testing @ school / Elevated levels → Assess homes - BB scan paint soil
- Agree that EPA needs to work w DHHS / contact?
Id. how much lead is coming from various parts of services
& other post pipe designs - diagnostic sampling to track
Urgentistic

Timing to complete? Earlier the better - Q+1/4 track ?
EPA can help to assist city / confirm start now
lead service - w. test results
A service line test loops can also be installed

COMMENTS RE CORROSION Control

1. Establish Phosphoric Acid dose at NO LESS than 1.0 mg/l as P (3.2 mg/l as PO_4)

2. Dose PO_4 Product at a rate > 1.0 mg/l as P to establish minimum distribution residuals of 1.0 mg/l as P (3.2 mg/l as PO_4) As needed

3. Re-establish WQP monitoring at the 25 locations previously used when on Detroit water. In addition to monitoring for the parameters called out in the LCR, include the parameters for turbidity, iron, & chlorine

4. Conduct JAR test at proposed dosage to verify optimal pH range is maintained

5. Provide product cut-sheet showing MAX. dosage and NSF Std. 60 certification

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	BENZIE, RICHARD E
Address:	De Witt MI 48820
County:	Clinton

License Information

License Type:	Professional Engineer
License Number:	6201028029
Specialties:	
Status:	Active
Limitations:	
Issue Date:	03/25/1981
Expiration Date:	10/31/2017

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	BLOEMKER, JON W
Address:	Midland MI 48640
County:	Midland

License Information

License Type:	Professional Engineer
License Number:	6201028875
Specialties:	
Status:	Active
Limitations:	
Issue Date:	03/18/1982
Expiration Date:	10/31/2017

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	BUSCH, STEPHEN BENJAMIN
Address:	Dewitt MI 48820
County:	Clinton

License Information

License Type:	Professional Engineer
License Number:	6201051635
Specialties:	
Status:	Active
Limitations:	
Issue Date:	08/13/2004
Expiration Date:	10/31/2017

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	COOK, PATRICK LEON
Address:	Dewitt MI 48820
County:	Clinton

License Information

License Type:	Professional Engineer
License Number:	6201042012
Specialties:	
Status:	Active
Limitations:	
Issue Date:	08/28/1996
Expiration Date:	10/31/2017

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	LONDON, ROBERT A
Address:	Bay City, MI 48708
County:	Bay

License Information

License Type:	Professional Engineer
License Number:	6201035581
Specialties:	
Status:	Active
Limitations:	
Issue Date:	03/13/1990
Expiration Date:	10/31/2016

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	PRYSBY, MICHAEL
Address:	Bath, MI 48808
County:	Clinton

License Information

License Type:	Professional Engineer
License Number:	6201038769
Specialties:	
Status:	Active
Limitations:	
Issue Date:	12/07/1993
Expiration Date:	10/31/2016

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Bureau of Professional Licensing / Corporations, Securities & Commercial Licensing Bureau

VERIFY A LICENSE/REGISTRATION

Licensee Information

Name:	SHEKTER SMITH, LIANE J
Address:	Marshall MI 49068
County:	Calhoun

License Information

License Type:	Professional Engineer
License Number:	6201036885
Specialties:	
Status:	Active
Limitations:	
Issue Date:	03/18/1991
Expiration Date:	10/31/2017

Employed/Managed By

Employer/Manager:	
License Number:	
Address:	
County:	

Back New Search

Attention Mobile Device Users: Not all mobile devices are compatible with all functions of this website.

Additional information pertaining to the occupations regulated by the Bureau of Professional Licensing can be found on the Licensing Division site.

DISCLAIMER

The Issue Date is the date the license/registration was first issued. Please note this information is not always available in the database. The Expiration Date given above is the date the license/registration expired or will expire. The license/registration may not have been active from the Issue Date to the Expiration Date. There may have been periods of non-licensure or non-registration. Please view the status history for more information.

Licensing and registration records are made available at this site by LARA to provide immediate access to information for the convenience of interested persons. While LARA has taken steps to update this information daily, we make no guarantee as to the accuracy, completeness, timeliness or current status of the information. LARA assumes no responsibility for any errors or omissions, or for the use of information obtained from this site.

Copyright © 2005-2016 State of Michigan

Requirements for Michigan Department of Environmental Quality Engineers – Office of Drinking Water and Municipal Assistance

Engineers in the Office of Drinking Water and Municipal Assistance at the Michigan Department of Environmental Quality (MDEQ) must be professionally licensed as required by state law. The four components for licensure are as follows:

- Education - obtain an engineering degree from an accredited university.
- Work Experience - have a minimum of 4 years of verified engineering work experience after graduation – 5 references needed, with 3 being professional engineers.
- Testing - pass the Fundamentals of Engineering Exam and then the Professional Engineers Exam
- Continuing Education - 30 hours of continuing education are required every 2 years to retain license, beginning with licenses expiring on October 31, 2015.

  For more detailed information see the Michigan Department of Licensing and Regulatory Affair's website: http://www.michigan.gov/lara/0,4601,7-154-72600_72602_72731_72865---,00.html

Professional engineers at MDEQ seek continuing education credit from a variety of sources, and track their own credits and licensure requirements. They also participate, present and teach at conferences and seminars, in addition to serving on committees and workgroups at the state and national level. Organizations that offer continuing education in the water supply field include, but are not limited to this list:

United States Environmental Protection Agency
National and Michigan Environmental Health Association
American Water Works Association and its Michigan Section
National and Michigan Onsite Wastewater Recycling Association
Michigan Water Environment Association
State Onsite Regulators Alliance
International and National Sanitation Foundation
Centers for Disease Control and Prevention Model Aquatic Health Code
Michigan Rural Water Association
National Swimming Pool Foundation
Association of RV Parks and Campgrounds of Michigan
Michigan Association of Recreation Vehicles and Campgrounds

Continuing Education Opportunities for Professional License Renewal

American Waterworks Association (AWWA) - MDEQ Partnership
Spring Regional Meetings
Fall Regional Meetings
Spring U.P. Waterworks Institute
Fall U.P. Distribution Seminar
Michigan Section AWWA Annual Conference
Triennial AWWA Ground Water and Source Water Conference
Biennial Borchardt Conference
Basic Cross-Connection Seminar
Advanced Cross-Connection Seminar

3-Day Courses:

Water Chemistry Short Course
Water Treatment I Short Course
Water Treatment II Short Course
Limited Treatment Short Course
Bacti Short Course
Basic Math & Hydraulics Short Course
Distribution Short Course
Plankton Course
Basic Electricity Short Course

13-Week Course in Math, Hydraulics, and Chemistry (when offered)

<u>Other Opportunities</u>

University of Wisconsin Engineering Extension Workshops (2016 Offerings)

- Control of Water Quality in Municipal Distribution Systems
- Instrumentation and Control for Water and Wastewater Processes
- Understanding Water Chemistry
- Fundamentals of Drinking Water Treatment
- Pumps and Motors
- Essentials of Hydraulics for Civil and Environmental Professionals
- Introduction to Hydraulic and Hydrologic Modeling
- Advanced Asset Management Practices for Water and Wastewater Utilities

AWWA National Conference
AWWA Membrane Conference
Waterborne Disease Conference
Association of State Drinking Water Administrators Conferences
Invasive Species Conference
Michigan Rural Water Conferences
US Environmental Protection Agency-Office of Drinking Water Small Systems Webinars
National Ground Water Association Seminars
MDEQ Workshops/Seminars by other MDEQ Divisions/Offices
Michigan Water Environment Association Annual Conference
AWWA-Michigan Water Environment Association Joint Expo

March 9, 2016

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AND THE
MICHIGAN DEPARTMENT OF HEALTH AND HUMAN SERVICES
FOR
EXCHANGE OF DATA AND PUBLIC HEALTH INFORMATION

This Memorandum of Understanding (MOU) is made between the Michigan Department of Environmental Quality (MDEQ) and the Michigan Department of Health and Human Services (MDHHS). The purpose of this MOU is to implement the activities identified herein. This MOU is subject to the terms and conditions specified herein and is effective upon signature of all parties.

MDHHS's Contacts

Name: Timothy Becker
Title: Chief Deputy Director
Phone: 517-373-3626
E-mail: beckert1@michigan.gov

Name: Susan Moran
Title: Population Health and Community Services Administration Director
Phone: 517-335-8024
E-mail: morans@michigan.gov

MDEQ's Contact

Name: Jim Sygo
Title: Chief Deputy Director
Phone: 517-284-6709
E-mail: sygoj@michigan.gov

PURPOSE/BACKGROUND:

The purpose of this MOU is to provide a process to ensure that data and public health information is appropriately exchanged.

The MDEQ and MDHHS administer programs that share many commonalities and goals in the protection of public health. Sharing data and educational material to provide for the protection of public health is an ongoing process for both departments. It is important that, when both departments are working on the same issues, their recommendations and educational material are based upon accurate data and recommendations that are consistent with the protection of public health. To this end, this MOU will provide guidance to each department's staff to ensure that data and information is being appropriately shared.

RESPONSIBILITIES:

Coordination of Data and Information Between the MDEQ and MDHHS

The MDEQ administers chemical contaminant criteria developed for the protection of human health, safety, welfare, and the environment. The MDEQ endeavors to incorporate the best available science in the development and review of these criteria. Human health, safety, welfare, and environmental risk assessment issues encountered in these efforts may have department-wide implications, and any decisions made concerning these issues may have

impacts in several programmatic areas. Human health-related issues of particular concern include, but are not limited to, protection of children's health and assessment of the risks associated with exposures to chemical mixtures.

The MDHHS is the state department with primary responsibility to administer the Public Health Code, 1978 PA 368, as amended, and for protection of public health in Michigan. MDHHS staff use the best available science to evaluate the public health impact of chemical exposures throughout Michigan, based on guidance from the U.S. Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry. The MDHHS will evaluate potential human exposure at any location, including emergency chemical releases and fires, with data or provide recommendations to collect data when applicable. MDHHS evaluations provide health protective recommendations for the most sensitive or vulnerable populations. MDHHS staff work with MDEQ staff, including the Toxics Steering Group (TSG) members, on a regular basis as needed. Products provided to MDEQ staff include written and verbal health protective recommendations.

The TSG is the MDEQ's forum for discussion of human health risk assessment issues related to the exposure to chemical contaminants in environmental media. Members include risk assessors, toxicologists within the MDEQ, MDHHS, and Department of Agriculture and Rural Development. The TSG meets quarterly, or more often if needed, with the goal of using the best available science to address human health and risk assessment issues identified by TSG members, the MDEQ Chief Deputy Director, the MDHHS Population Health and Community Services Administration Director, or the MDHHS Chief Deputy Director. Discussions and decisions by the TSG will foster and facilitate consistency of risk assessment practices and minimize the duplication of effort among the departments. The TSG may formulate consensus recommendations that will be distributed as appropriate, based on the directive or questions provided by the originator of the request.

The TSG Chair, as selected pursuant to the TSG's Policy and Procedure, will be responsible for a monthly communication to the MDEQ and MDHHS Chief Deputy Directors and the MDHHS Population Health and Community Services Administration Director by telephone or by e-mail that will identify any immediate issue being evaluated by the TSG. The Chief Deputy Directors will communicate any concerns to the MDEQ and MDHHS Directors to ensure that combined interest are consistent and provide the public with consistent recommendations.

Occasionally, circumstances may require actions that will not allow the TSG to meet to have a complete discussion on the risk that is being evaluated. When this occurs, MDHHS's Chief Deputy Director or Population Health and Community Services Administration Director will contact the MDEQ Chief Deputy Director to identify the action being taken so that it can be evaluated. Similarly, MDEQ staff proposing an action at one of their cleanup sites will contact the MDHHS Population Health and Community Services Administration Director and the MDHHS Chief Deputy Director to make them aware of the actions being proposed. Every effort should be made to have these interdepartmental discussions before any actions are taken.

Data Sharing Process

In the event that TSG members, the MDEQ Chief Deputy Director, the MDHHS Population Health and Community Services Administration Director, or the MDHHS Chief Deputy Director

identify an issue that, on a case-by-case basis, requires the TSG's consideration and a formal data sharing process, the below guidance will be followed:

Subject to the Confidential Nature of Data and Public Health Information section below, the originator of the request for TSG consideration will provide TSG members with information to determine the public health implications of exposure. TSG members may gather or provide additional information for consideration. This information should be reviewed and discussed with other TSG members. The TSG will discuss whether recommendations are needed and will work with the originator of the request on the work product required. Work products will be disseminated as described in the TSG Policy and Procedures document and through existing agency processes.

Confidential Nature of Data and Public Health Information

Data and public health information held by the MDHHS is confidential and protected under several laws, including but not limited to the Health Insurance Portability and Accountability Act of 1996, Public Law 104-191 (HIPAA); HIPAA's implementing regulations, 45 CFR Parts 160, 162, and 164; the Michigan Public Health Code, MCL 333.1101 *et seq*.; and administrative rules. To the extent practicable, the MDHHS will disclose aggregate and non-identifiable information to the MDEQ and its TSG.

Disclosure of MDHHS identifiable or other data and public health information that is confidential under applicable laws, rules, and regulations must be evaluated by the MDHHS on a case-by-case basis. Disclosure of MDHHS identifiable or other data and public health information that is confidential under applicable laws, rules, and regulations may require the parties, at MDHHS's discretion, to enter into a separate data sharing agreement that includes specific terms and conditions applicable to the data and public health information. TSG members may also be required, at MDHHS's discretion, to enter into a data sharing agreement that includes specific terms and conditions applicable to MDHHS identifiable or other data and public health information that is confidential under applicable laws. The parties agree to work cooperatively to facilitate the sharing of data and execution of separate data sharing agreements as necessary to achieve the purpose of this MOU.

STATUTORY AUTHORITY:

Nothing stated in this MOU will interfere with the MDEQ or the MDHHS fulfilling their primary responsibilities or authorities.

CHANGES:

Any changes to this MOU shall be requested in writing and approved in writing by the MDEQ and the MDHHS.

CANCELLATION:

This MOU may be canceled upon 30 days' written notice upon request by either department or upon mutual agreement by both departments.

The individuals signing below certify by their signatures that they are authorized to sign this MOU on behalf of his or her department and that the parties will fulfill the terms of this MOU and any attachments, as set forth herein.

For the Michigan Department of Environmental Quality:

April 12, 2016

Signature Date

Name and Title: Keith Creagh, Director

For the Michigan Department of Health and Human Services:

April 12, 2016

Signature Date

Name and Title: Nick Lyon, Director

FLINT WATER PLANT & FACILITIES

Water Quality Monitoring

3rd Quarter 2015

SAMPLE POINT IDENTIFICATION				PARAMETERS AND RESULTS				
Distribution System Location #	Sample Point Name & Address	Sample Date	Time	Temperature (C)	Conductivity (mS)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Calcium (mg/L Ca_{2+})
#1	Arby's 3742 Davison Rd.	9/2/2015	10:25	22.3	0.392	7.53	38	40.1
#2	BP Gas Station 822 S.Dort Hwy	9/2/2015	10:39	22.4	0.399	7.48	38	41.7
#3	Liquor Palace 3302 S. Dort Hwy	9/2/2015	10:55	23.8	0.380	7.49	46	40.1
#4	Taco Bell 3606 Corunna Rd.	9/2/2015	11:34	21.9	0.397	7.51	42	40.1
#5	University Market 2501 Flushing Rd.	9/2/2015	11:48	23.6	0.396	7.47	40	45.7
#6	Salem Housing 3216 MLK Blvd.	9/2/2015	12:16	23.8	0.404	7.76	42	40.9
#7	Rite-Aid 5018 Clio Rd.	9/2/2015	12:32	20.9	0.394	7.45	44	40.9
#8	N. Flint Automotive 6204 N. Saginaw St.	9/2/2015	12:50	22.6	0.403	7.48	46	42.5
CS	Cedar Street Reservoir & Pump Station	9/2/2015	11:16	21.9	0.398	7.41	42	40.9
WS	West Side Reservoir & Pump Station	9/2/2015	12:00	22.2	0.408	7.38	40	43.3
N/A	Russell Collection Agency 3285 Van Slyke Rd	9/30/2015	15:34	19.8	0.479	7.30	38	41.7
N/A	Southwestern Academy High School 1420 W.12th St.	9/30/2015	15:21	22.4	0.478	7.40	40	38.5
N/A	St. Pius Church 3139 Hogarth Ave.	9/30/2015	16:06	22.7	0.478	7.46	40	41.7
N/A	Rite-Aid 3521 Corunna Rd.	9/17/2015	12:00	21.6	0.420	7.48	40	46.5
N/A	Clio Rd. Pharmacy 4902 Clio Rd.	9/17/2015	12:27	23.0	0.418	7.44	40	47.3
N/A	Tim Hortons 1274 Ballanger Hwy.	9/17/2015	12:15	22.5	0.421	7.46	40	43.3
N/A	Arby's 3559 S. Dort Hwy.	9/30/2015	12:58	20.5	0.482	7.40	42	39.3
N/A	Ya Ya's 519 S. Dort Hwy	9/30/2015	13:54	23.3	0.472	7.36	40	39.3
N/A	Taco Bell 1740 S. Dort Hwy	9/30/2015	13:09	22.1	0.479	7.42	40	41.7
N/A	Grandma's Recipe 3538 Richfield Rd.	9/30/2015	12:30	21.9	0.477	7.45	40	41.7
N/A	Flint City Hall 1101 S. Saginaw St.	9/30/2015	17:31	20.7	0.467	7.43	38	42.5
N/A	Quizzno's 3818 E. Court St.	9/30/2015	12:43	22.0	0.475	7.46	42	41.7
N/A	Whitehorse Tavern 621 W. Court St.	9/17/2015	11:48	21.8	0.424	7.44	44	47.3
N/A	Flint Public Library 1026 E. Kearsley Rd.	9/17/2015	12:48	22.9	0.425	7.69	44	40.9
N/A	Rite-Aid 3717 Fenton Rd.	9/17/2015	11:38	20.2	0.419	7.43	42	50.1

FLINT WATER PLANT & FACILITIES

Water Quality Monitoring

2nd Quarter 2015

SAMPLE POINT IDENTIFICATION				PARAMETERS AND RESULTS				
Distribution System Location #	Sample Point Name & Address	Sample Date	Time	Temperature (C)	Conductivity (mS)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Calcium (mg/L Ca^{2+})
#1	Arby's 3742 Davison Rd.	5/14/2015	10:17	15.1	0.475	7.53	62	62.5
#2	BP Gas Station 822 S.Dort Hwy	5/14/2015	13:32	14.7	0.471	7.51	56	60.9
#3	Liquor Palace 3302 S. Dort Hwy	5/14/2015	10:51	16.2	0.470	7.49	60	63.3
#4	Taco Bell 3606 Corunna Rd.	5/14/2015	11:25	15.2	0.471	7.52	58	61.7
#5	University Market 2501 Flushing Rd.	5/14/2015	11:42	16.5	0.480	7.48	61	64.1
#6	Salem Housing 3216 MLK Blvd.	5/14/2015	12:04	13.9	0.490	7.58	68	64.9
#7	Rite-Aid 5018 Clio Rd.	5/14/2015	12:25	11.9	0.485	7.52	64	65.7
#8	N. Flint Automotive 6204 N. Saginaw St.	5/14/2015	12:44	17.6	0.460	7.52	47	61.7
CS	Cedar Street Reservoir & Pump Station	5/12/2015	9:28	14.1	0.470	7.80	76	56.1
WS	West Side Reservoir & Pump Station	5/13/2015	10:22	17.1	0.497	7.59	70	67.3
N/A	Russell Collection Agency 3285 Van Slyke Rd	6/22/2015	12:06	19.1	0.512	7.61	77	69.7
N/A	Southwestern Academy High School 1420 W.12th St.	6/17/2015	11:14	22.3	0.523	7.66	84	70.5
N/A	Cummings Elementary School G-2200 Walton St.	6/17/2015	11:28	18.8	0.508	7.66	80	68.1
N/A	Rite-Aid 3521 Corunna Rd.	6/17/2015	11:35	19.3	0.536	7.79	92	74.5
N/A	Clio Rd. Pharmacy 4902 Clio Rd.	6/22/2015	12:30	21.4	0.498	7.69	84	66.5
N/A	Tim Hortons 1274 Ballanger Hwy.	6/17/2015	11:54	18.9	0.540	7.68	90	72.9
N/A	Arby's 3559 S. Dort Hwy.	6/15/2015	13:07	22.4	0.504	7.73	82	65.7
N/A	Ya Ya's 519 S. Dort Hwy	6/15/2015	13:17	20.4	0.506	7.70	82	68.9
N/A	Taco Bell 1740 S. Dort Hwy	6/15/2015	12:57	20.2	0.485	7.62	74	60.9
N/A	Grandma's Recipe 3538 Richfield Rd.	6/15/2015	10:27	19.3	0.496	7.61	76	64.1
N/A	Flint City Hall 1101 S. Saginaw St.	5/13/2015	10:00	18.5	0.484	7.69	68	64.9
N/A	Quizzno's 3818 E. Court St.	6/15/2015	12:45	23.6	0.495	7.73	76	64.9
N/A	Whitehorse Tavern 621 W. Court St.	6/17/2015	10:49	21.2	0.526	7.67	84	72.1
N/A	Flint Public Library 1026 E. Kearsley Rd.	6/23/2015	13:21	18.6	0.494	7.73	81	65.7
N/A	Rite-Aid 3717 Fenton Rd.	5/12/2015	9:10	17.6	0.506	7.67	80	68.9

FLINT WATER PLANT & FACILITIES

Water Quality Monitoring

1st Quarter 2014

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 30 2015
LANSING DISTRICT

SAMPLE POINT IDENTIFICATION				PARAMETERS AND RESULTS				
Distribution System Location #	Sample Point Name & Address	Sample Date	Time	Temperature (C)	Conductivity (mS)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Calcium (mg/L Ca^{2+})
#1	Arby's 3742 Davison Rd.	3/4/2015	10:11	6.5	0.594	7.65	119	70.5
#2	BP Gas Station 822 S.Dort Hwy	3/4/2015	10:34	3.6	0.594	7.77	128	71.3
#3	Liquor Palace 3302 S. Dort Hwy	3/4/2015	10:51	8.7	0.604	7.83	130	70.5
#4	Taco Bell 3606 Corunna Rd.	3/4/2015	11:13	4.8	0.607	7.87	128	72.1
#5	University Market 2501 Flushing Rd.	3/4/2015	11:28	3.5	0.618	7.85	124	75.4
#6	Salem Housing 3216 MLK Blvd.	3/4/2015	12:31	10.3	0.573	7.95	116	65.7
#7	Rite-Aid 5018 Clio Rd.	3/4/2015	12:46	8.1	0.602	7.93	128	77.0
#8	N. Flint Automotive 6204 N. Saginaw St.	3/4/2015	13:05	12.8	0.584	7.84	132	73.7
CS	Cedar Street Reservoir & Pump Station	3/17/2015	10:45	7.8	0.570	7.86	114	73.7
WS	West Side Reservoir & Pump Station	3/4/2015	11:49	1.9	0.609	7.86	120	77.8
N/A	Russell Collection Agency 3285 Van Slyke Rd	3/6/2015	9:49	6.4	0.540	7.69	110	81.0
N/A	Southwestern Academy High School 1420 W.12th St.	3/11/2015	11:08	19.7	0.630	7.99	128	80.2
N/A	Cummings Elementary School G-2200 Walton St.	3/11/2015	11:23	7.1	0.569	7.81	128	83.4
N/A	Rite-Aid 3521 Corunna Rd.	3/10/2015	11:10	8.4	0.596	7.88	130	78.6
N/A	Clio Rd. Pharmacy 4902 Clio Rd.	3/5/2015	11:55	7.7	0.611	7.80	128	85.6
N/A	Tim Hortons 1274 Ballanger Hwy.	3/5/2015	11:06	5.3	0.620	7.76	124	82.6
N/A	Arby's 3559 S. Dort Hwy.	3/5/2015	10:36	11.0	0.629	7.80	130	83.4
N/A	Ya Ya's 519 S. Dort Hwy	3/13/2015	10:31	14.8	0.603	7.77	134	84.2
N/A	Taco Bell 1740 S. Dort Hwy	3/13/2015	10:41	4.7	0.586	7.77	134	84.2
N/A	Grandma's Recipe 3538 Richfield Rd.	3/5/2015	9:45	6.5	0.580	7.73	130	84.2
N/A	Flint City Hall 1101 S. Saginaw St.	3/6/2015	10:33	14.1	0.630	7.71	136	83.4
N/A	Quizzno's 3818 E. Court St.	3/12/2015	11:03	7.9	0.572	7.93	122	87.4
N/A	Whitehorse Tavern 621 W. Court St.	3/6/2015	10:12	9.1	0.634	7.60	134	84.2
N/A	Flint Public Library 1026 E. Kearsley Rd.	3/6/2015	10:56	20.7	0.606	7.85	126	81.8
N/A	Rite-Aid 3717 Fenton Rd.	3/10/2015	10:53	9.6	0.623	7.84	126	75.4

(7.81 Avg)

FLINT WATER PLANT & FACILITIES

Water Quality Monitoring

4th Quarter 2014

SAMPLE POINT IDENTIFICATION				PARAMETERS AND RESULTS				
Distribution System Location #	Sample Point Name & Address	Sample Date	Time	Temperature (C)	Conductivity (mS)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Calcium (mg/L Ca^{2+})
#1	Arby's 3742 Davison Rd.	11/25/2014	10:40	16.8	0.465	7.96	114	58.5
#2	BP Gas Station 822 S.Dort Hwy	11/25/2014	10:53	14.9	0.421	7.99	114	60.9
#3	Liquor Palace 3302 S. Dort Hwy	11/25/2014	11:08	11.6	0.461	7.98	118	59.3
#4	Taco Bell 3606 Corunna Rd.	11/25/2014	11:49	17.4	0.479	7.99	118	60.1
#5	University Market 2501 Flushing Rd.	11/25/2014	12:08	15.6	0.442	7.90	116	63.3
#6	Salem Housing 3216 MLK Blvd.	11/25/2014	12:34	15.0	0.437	7.85	104	58.5
#7	Rite-Aid 5018 Clio Rd.	11/25/2014	13:00	16.1	0.448	7.99	118	62.5
#8	N. Flint Automotive 6204 N. Saginaw St.	11/25/2014	13:14	16.1	0.488	8.00	114	59.3
CS	Cedar Street Reservoir & Pump Station	11/25/2014	11:25	11.1	0.442	7.99	108	60.9
WS	West Side Reservoir & Pump Station	11/25/2014	12:18	9.1	0.449	7.96	114	59.3
N/A	Russell Collection Agency 3285 Van Slyke Rd	12/2/2014	11:35	12.2	0.372	7.67	100	64.1
N/A	Southwestern Academy High School 1420 W.12th St.	12/2/2014	11:23	12.7	0.352	7.71	100	65.7
N/A	Cummings Elementary School G-2200 Walton St.	12/2/2014	11:51	11.2	0.382	7.65	108	64.1
N/A	Rite-Aid 3521 Corunna Rd.	11/28/2014	12:37	13.2	0.405	8.03	106	55.3
N/A	Clio Rd. Pharmacy 4902 Clio Rd.	12/2/2014	13:00	13.4	0.356	7.62	100	65.7
N/A	Tim Hortons 1274 Ballanger Hwy.	11/28/2014	12:58	11.7	0.404	7.95	106	50.5
N/A	Arby's 3559 S. Dort Hwy.	11/26/2014	11:07	15.5	0.443	7.87	108	68.1
N/A	Ya Ya's 519 S. Dort Hwy	11/26/2014	10:33	12.2	0.424	7.95	106	66.5
N/A	Taco Bell 1740 S. Dort Hwy	11/26/2014	10:50	9.5	0.414	7.86	108	64.1
N/A	Grandma's Recipe 3538 Richfield Rd.	11/26/2014	9:55	15.3	0.426	7.68	114	65.7
N/A	Flint City Hall 1101 S. Saginaw St.	12/3/2014	10:00	15.7	0.404	7.84	98	61.7
N/A	Quizzno's 3818 E. Court St.	11/26/2014	10:19	11.5	0.421	7.88	122	68.1
N/A	Whitehorse Tavern 621 W. Court St.	11/28/2014	12:00	12.0	0.405	8.10	104	56.9
N/A	Flint Public Library 1026 E. Kearsley Rd.	12/3/2014	11:00	18.4	0.449	7.76	100	59.3
N/A	Rite-Aid 3717 Fenton Rd.	11/28/2014	11:48	10.5	0.407	7.88	102	56.1

7.88 AVG

FLINT WATER PLANT & FACILITIES

Water Quality Monitoring

3rd Quarter 2014

SAMPLE POINT IDENTIFICATION				PARAMETERS AND RESULTS				
Distribution System Location #	Sample Point Name & Address	Sample Date	Time	Temperature (C)	Conductivity (mS)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Calcium (mg/L Ca^{2+})
#1	Arby's 3742 Davison Rd.	8/6/2014	10:36	23.0	0.388	7.74	60	49.7
#2	BP Gas Station 822 S.Dort Hwy	8/6/2014	10:49	23.9	0.372	7.76	70	52.1
#3	Liquor Palace 3302 S. Dort Hwy	8/6/2014	11:00	23.8	0.369	7.65	72	51.3
#4	Taco Bell 3606 Corunna Rd.	8/6/2014	11:34	26.8	0.359	7.69	74	53.7
#5	University Market 2501 Flushing Rd.	8/6/2014	11:47	26.5	0.383	7.56	80	56.9
#6	Salem Housing 3216 MLK Blvd.	8/6/2014	12:09	27.3	0.350	7.73	70	49.7
#7	Rite-Aid 5018 Clio Rd.	8/8/2014	10:22	20.9	0.387	7.74	78	50.5
#8	N. Flint Automotive 6204 N. Saginaw St.	8/6/2014	12:38	25.5	0.363	7.83	72	52.9
CS	Cedar Street Reservoir & Pump Station	8/6/2014	11:16	25.5	0.395	7.69	78	54.5
WS	West Side Reservoir & Pump Station	8/6/2014	11:57	26.5	0.406	7.56	82	52.1
N/A	Russell Collection Agency 3285 Van Slyke Rd	8/8/2014	11:12	25.6	0.370	7.78	74	55.3
N/A	Southwestern Academy High School 1420 W.12th St.	8/8/2014	11:42	26.7	0.403	7.82	86	59.3
N/A	Cummings Elementary School G-2200 Walton St.	8/8/2014	11:00	25.8	0.359	7.62	76	53.7
N/A	Rite-Aid 3521 Corunna Rd.	8/8/2014	10:47	23.0	0.390	7.86	86	56.1
N/A	Kroger 2629 W. Pierson Rd.	8/6/2014	12:24	27.3	0.370	7.76	88	58.5
N/A	Tim Hortons 1274 Ballanger Hwy.	8/8/2014	10:35	21.9	0.411	7.73	86	56.1
N/A	Arby's 3559 S. Dort Hwy.	8/5/2014	11:19	23.1	0.401	7.63	88	61.7
N/A	Ya Ya's 519 S. Dort Hwy	8/5/2014	10:57	23.7	0.392	7.60	90	60.1
N/A	Taco Bell 1740 S. Dort Hwy	8/5/2014	11:09	23.2	0.412	7.60	90	60.9
N/A	Grandma's Recipe 3538 Richfield Rd.	8/5/2014	10:28	23.1	0.406	7.69	88	61.7
N/A	Flint City Hall 1101 S. Saginaw St.	8/5/2014	11:35	23.0	0.396	7.75	88	56.9
N/A	Quizzno's 3818 E. Court St.	8/5/2014	10:48	23.3	0.415	7.67	86	60.1
N/A	Whitehorse Tavern 621 W. Court St.	8/8/2014	11:53	26.1	0.390	7.81	78	57.7
N/A	Flint Public Library 1026 E. Kearsley Rd.	8/8/2014	11:45	22.2	0.446	7.82	82	64.1
N/A	Rite-Aid 3717 Fenton Rd.	8/8/2014	11:30	22.0	0.394	7.78	88	58.5

(7.71 Avg)

FLINT WATER PLANT & FACILITIES

2014 2nd Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	4/9/2014	8.9	7.59	76	1.03
#2	BP Gas Station 822 S.Dort Hwy	4/9/2014	7.5	7.57	77	1.12
#3	Liquor Palace 3302 S. Dort Hwy	4/9/2014	13.9	7.44	76	1.13
#4	Taco Bell 3606 Corunna Rd.	4/9/2014	8.3	7.44	76	1.09
#5	University Market 2501 Flushing Rd.	4/9/2014	8.7	7.42	76	1.07
#6	Salem Housing 3216 MLK Blvd.	4/9/2014	15.7	7.48	77	1.06
#7	Rite-Aid 5018 Clio Rd.	4/9/2014	8.8	7.50	77	1.07
#8	N. Flint Automotive 6204 N. Saginaw St.	4/9/2014	15.6	7.46	76	1.09
CS	Cedar Street Reservoir & Pump Station	4/9/2014	5.9	7.50	76	1.08
WS	West Side Reservoir & Pump Station	4/9/2014	6.7	7.47	76	1.10

FLINT WATER PLANT & FACILITIES

2014 1st Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	1/29/2014	8.4	7.48	72	1.12
#2	BP Gas Station 822 S.Dort Hwy	1/29/2014	7.4	7.46	71	1.17
#3	Liquor Palace 3302 S. Dort Hwy	1/29/2014	10.0	7.40	73	1.04
#4	Taco Bell 3606 Corunna Rd.	1/29/2014	7.9	7.44	72	1.17
#5	University Market 2501 Flushing Rd.	1/29/2014	6.4	7.47	74	1.16
#6	Salem Housing 3216 MLK Blvd.	1/29/2014	9.2	7.44	72	1.12
#7	Rite-Aid 5018 Clio Rd.	1/29/2014	7.9	7.54	73	1.05
#8	N. Flint Automotive 6204 N. Saginaw St.	1/29/2014	10.7	7.44	73	1.10
CS	Cedar Street Reservoir & Pump Station	1/29/2014	8.3	7.53	73	1.09
WS	West Side Reservoir & Pump Station	1/29/2014	7.1	7.48	72	1.12

DEQ
RESOURCE MANAGEMENT DIVISION
FEB 25 2014
LANSING DISTRICT

FLINT WATER PLANT & FACILITIES

2013 4th Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	11/13/2013	17.3	7.49	76	1.00
#2	BP Gas Station 822 S.Dort Hwy	11/13/2013	15.0	7.52	74	1.15
#3	7-11 3302 S. Dort Hwy	11/13/2013	14.9	7.45	74	1.02
#4	Taco Bell 3606 Corunna Rd.	11/13/2013	14.6	7.47	73	1.06
#5	7-11 2501 Flushing Rd.	11/13/2013	15.3	7.48	74	1.03
#6	Salem Housing 3216 MLK Blvd.	11/13/2013	16.9	7.45	74	1.02
#7	Rite-Aid 5018 Clio Rd.	11/13/2013	16.6	7.53	77	1.10
#8	N. Flint Automotive 6204 N. Saginaw St.	11/13/2013	18.8	7.49	75	1.04
CS	Cedar Street Reservoir & Pump Station	11/13/2013	17.8	7.53	76	1.10
WS	West Side Reservoir & Pump Station	11/13/2013	16.1	7.50	75	1.21

DEQ
RESOURCE MANAGEMENT DIVISION
NOV 25 2013
LANSING DISTRICT

FLINT WATER PLANT & FACILITIES

2013 3rd Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	9/4/2013	22.6	7.76	74	1.15
#2	BP Gas Station 822 S.Dort Hwy	9/4/2013	23.6	7.58	75	1.16
#3	7-11 3302 S. Dort Hwy	9/4/2013	21.3	7.58	74	1.18
#4	Taco Bell 3606 Corunna Rd.	9/4/2013	21.8	7.52	75	1.23
#5	7-11 2501 Flushing Rd.	9/4/2013	24.4	7.53	75	1.08
#6	Salem Housing 3216 MLK Blvd.	9/4/2013	22.7	7.57	75	1.06
#7	Rite-Aid 5018 Clio Rd.	9/4/2013	22.2	7.75	76	1.10
#8	N. Flint Automotive 6204 N. Saginaw St.	9/4/2013	23.1	7.54	76	1.14
CS	Cedar Street Reservoir & Pump Station	9/4/2013	20.9	7.57	74	1.12
WS	West Side Reservoir & Pump Station	9/4/2013	21.4	7.52	75	1.15

FLINT
WATER PLANT & FACILITIES

2013 2nd Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	5/1/2013	16.7	7.62	73	0.87
#2	BP Gas Station 822 S.Dort Hwy	5/1/2013	14.6	7.45	74	1.01
#3	7-11 3302 S. Dort Hwy	5/1/2013	14.1	7.38	74	1.02
#4	Taco Bell 3606 Corunna Rd.	5/1/2013	10.8	7.38	73	0.90
#5	7-11 2501 Flushing Rd.	5/1/2013	12.1	7.40	74	0.93
#6	Salem Housing 3216 MLK Blvd.	5/1/2013	12.7	7.40	73	0.85
#7	Rite-Aid 5018 Clio Rd.	5/1/2013	12.5	7.50	74	0.94
#8	N. Flint Automotive 6204 N. Saginaw St.	5/1/2013	16.3	7.41	73	0.81
CS	Cedar Street Reservoir & Pump Station	5/1/2013	10.5	7.47	75	0.86
WS	West Side Reservoir & Pump Station	5/1/2013	10.4	7.36	74	0.85

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 07 2013
LANSING DISTRICT

FLINT
WATER PLANT & FACILITIES

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 11 2013
LANSING DISTRICT

2013 1st Quarter Water Quality Monitoring Results						
SAMPLE POINT IDENTIFICATION			PARAMETERS AND RESULTS			
Distribution System Location #	Sample Point Name & Address	Sample Date	Temperature (C)	pH (su)	Total Alkalinity (mg/L $CaCO_3$)	Total Phosphorous (mg/L)
#1	Arby's 3742 Davison Rd.	2/27/2013	11.1	7.43	76	1.05
#2	BP Gas Station 822 S.Dort Hwy	2/27/2013	8.1	7.35	75	1.15
#3	7-11 3302 S. Dort Hwy	2/27/2013	11.1	7.31	73	1.21
#4	Taco Bell 3606 Corunna Rd.	2/27/2013	7.0	7.33	74	1.28
#5	7-11 2501 Flushing Rd.	2/27/2013	6.4	7.33	73	1.09
#6	Salem Housing 3216 MLK Blvd.	2/27/2013	10.3	7.38	74	0.96
#7	Rite-Aid 5018 Clio Rd.	2/27/2013	10.1	7.45	74	1.05
#8	N. Flint Automotive 6204 N. Saginaw St.	2/27/2013	14.3	7.33	75	1.10
CS	Cedar Street Reservoir & Pump Station	2/27/2013	8.4	7.42	73	1.03
WS	West Side Reservoir & Pump Station	2/27/2013	8.1	7.35	72	1.19

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

October 22, 2015

Mr. Brent Wright
City Of Flint – D.P.W
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Revised Drinking Water Monitoring Schedule – 2015
Monthly Operation Reports
Siting Plans and Record Keeping

Monitoring Schedule:

Enclosed is your revised Drinking Water Monitoring Schedule for remainder of calendar year 2015 outlining the minimum requirements for your public water supply. Your schedule has been revised based on the City's change in source of its drinking water from the treatment of the Flint River utilizing the City's Water Treatment Plant to the Great Lakes Water Authority/Detroit Water and Sewerage Department. Collect samples early in the monitoring period of the year indicated on the schedule. If you use a private laboratory you are required to report the results to us within the first ten days of the month following the month that you received the results. To receive credit for monitoring, the **"WSSN"** (water supply serial number), the **"Site Code,"** and **"County"** must appear on the sample result. Bottles will NOT be mailed automatically. If you use the Department of Environmental Quality Laboratory, you can order bottles by calling 517-335-8184. Be certain of the United States Environmental Protection Agency sampling and analysis method requirements for hold times.

Monthly Operation Report (MOR) Requirements:

The City shall submit MORs as required under Administrative Rule 1502 (R325.11502). Please note required coliform bacteria monitoring results and associated chlorine residual monitoring shall be submitted to the department within the first 10 days following the end of the required monthly monitoring period. In addition, monthly operation reports shall be submitted to the department during the month following the month for which the monthly operation report was prepared.

Disinfection By-Product Sample Siting Plans:

The City of Flint shall continue routine standard monitoring of disinfection by-products, according to your Disinfection & Disinfectants By-Product (DDBP) plan which identifies 8 sites for routine quarterly monitoring.

Lead and Copper Monitoring Requirements and Site Sample Pool

Please note distribution system monitoring for water quality parameters (WQPs) continues at the expanded set of 25 sites per quarter. Lead and copper monitoring in accordance with the requirements of Administrative Rule 710a (R325.10710a) is being required for the 6 month period between January 1, 2016 and June 30, 2016. The City must ensure its sample site pool is large enough to collect the number of lead and copper tap samples required. All sites from which first draw samples are collected shall be selected from the pool of targeted sampling sites.

The City shall also conduct additional operational monitoring to demonstrate the effectiveness of corrosion control treatment.

Record Keeping:

The City shall maintain all monitoring records in accordance with all applicable requirements under the Administrative Rules including Rule 720a (R325.10720a), Rule 1506 (R325.11506), and Rule 1507 (R325.11507).

The Michigan Safe Drinking Water Act requires certain reports to be submitted to this office each year. Please remember that cross connection reports and annual pumpage reports are due by March 31, and the **Consumer Confidence Report** is due by July 1.

Also enclosed is the document "2015 Monitoring and Reporting Requirements." This provides additional details about monitoring and reporting requirements. If you have any questions, please contact us using the information below.

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-290-8817

Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-284-6644

Enclosure
cc/encl: Mr. Robert Bisnick, City Of Flint
Genesee County Health Department

2015 Monitoring Schedule

FLINT, CITY OF **WSSN: 02310**

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the **WSSN, Site Code,** and **County** on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on state holidays.

Location: Distribution System

Sample Type	Collect Samples According to the ...	# Samples/ Frequency	Collect	Site Code	Fee	Unit Number	Test Code
Bacteriological – coliforms	TCR Sampling Site Plan	100/Monthly	**Monthly**	DIST	$16.00	30	BPTC
Chlorine Residual	DBP Monitoring Plan	If serving chlorinated water, measure the residual disinfectant level at the same point and at the same time as the bacteriological sample and report the average to the DEQ.					
Total Trihalomethanes	DBP Monitoring Plan	8/3 months	**During February, May, August and November 2015**	See DBP Monitoring Plan	$65.00	36VO	CXTM
Haloacetic Acids		8/3 months	**During February, May, August and November 2015**	See DBP Monitoring Plan	$130.00	36HA	CXHA
Water Quality Parameters	Representative Sites	25/Quarterly	**Quarterly**	DIST	Various	Various	Various
Lead Copper for Corrosion Control	Lead and Copper Sampling Pool	60/6 months	Between 1/1 and 6/30/2016	DIST	$26.00	36CC	CCUB

Community Water Supply
2015 Monitoring and Reporting Requirements

Please Monitor Early: Collect samples early in the monitoring period (month, quarter, year) of the year indicated on the schedule. Bacteriological and partial chemistry samples should be collected close to the shipping time and sent overnight delivery to assure sample holding times are not exceeded (30 and 48 hour hold times respectively). We also recommend avoiding mailing bacteriological samples immediately preceding or following a holiday because samples tend to exceed the 30 hour hold time. When this occurs, a repeat sample must be collected as soon as possible upon notification.

If you use a private laboratory please report the results to us within the first ten days of the month following the month that you received the results. A list of certified laboratories is available on request. If samples are not collected as indicated on your monitoring schedule, you will incur a monitoring violation and possibly a fine. For information on the fines policy, visit http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, and Administrative Fines (under Laws and Rules).

To receive credit for monitoring, you must include the **"WSSN"** (water supply serial number), the **"Site Code,"** and the **"County"** when you submit samples for analysis. Site codes are listed on your monitoring schedule.

Special Instructions If You Use The DEQ Laboratory: Bottles will NOT be mailed automatically. To order bottles, call the DEQ Laboratory at 517-335-8184 or download the form EQP 2301 *Requisition for Water Sample Units* from www.michigan.gov/deq. Click on Key Topics, Laboratory Services, Drinking Water, Obtaining The Necessary Sampling Units, and 'test list'. Please note that the DEQ laboratory is closed on most state holidays. The DEQ laboratory prices are subject to change without notice.

Special Instructions For Automated Partial Chemistry, VOC and TTHM Samples: These sample bottles must be cooled and preserved during shipment to the laboratory. If you use the DEQ laboratory, you will receive the ice pack, acid dropper (if necessary) and small cooler when you request the bottles. Samples must be preserved correctly to be used for compliance purposes. To avoid resampling follow instructions contained with the sample bottle. If you would like more information, contact the DEQ lab, at 517-335-8184, or contact this office.

Cyanide: Previously, supplies that chlorinated the water were waived from monitoring for cyanide. The U.S. EPA now requires all supplies to sample the entry point for cyanide.

UCMR3 Monitoring: You may have monitoring requirements in 2015 under the third Unregulated Contaminant Monitoring Rule (UCMR3). The U.S. EPA will contact you directly if your water supply is required to monitor in 2015. A list of laboratories certified to analyze the samples collected for UCMR3 is available at http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/upload/lablist.pdf. Contact the U.S. EPA with questions.

Reminder if Lead and Copper Monitoring Due This Year: Provide individual lead tap results to people who receive water from sites that you sampled, even if lead was not detected, within 30 days of learning the results. Send us a certification that you met all the delivery requirements along with a sample copy of the customer notice within 3 months after the end of the monitoring period. Water supplies that failed to distribute the Consumer Notice of Lead Results must include the following statement in their CCR, "During the year, we failed to provide lead results to persons served at the sites that were tested as required by the Lead and Copper Rule." To download the *Lead and Copper Report and Consumer Notice of Lead Result Certificate* in Microsoft Word or PDF format, visit www.michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, and Reporting Forms (under Manuals, Forms & Brochures).

Annual Reports: These reports are due to this office each year.

- The **Cross Connection Report**, due by March 31, describes the status of your local cross connection control program. Manufactured housing communities are exempt from this requirements until 2016.

  Each year, water supplies must submit this report, even if a formal program has not been implemented. If cross connections do not exist in your water system, indicate so on the report. Download the Cross Connection Report form from http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Instructions are included with the form.

- The **Annual Pumpage/Usage Report**, due by March 31, is required of water supplies that do not submit monthly operation reports.

  This summary of water pumpage and water use must be submitted by each water supply that does not submit a monthly operation report. To manage our natural resources, pumpage data are compiled to determine water use demands in Michigan. Download the Annual Pumpage/Usage Report form from http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Please be sure to indicate the appropriate units on the report (e.g. million gallons or gallons).

- The **Consumer Confidence Report**, due by July 1 to your customers, to your local health department and to this office, describes the quality of the water and characterizes the risks, if any, from exposure to contaminants detected..

  Electronic delivery methods may be used to distribute the CCR to bill-paying customers, provided the method is direct. A paper copy must be delivered to bill-paying customers who request it or known to be unable to receive the CCR electronically. For more information on e-delivery, visit www.michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Consumer Confidence Report Rule (under Laws and Rules).