CITY OF FORTUNA

TOM COOKE MEMORIAL WASTEWATER TREATMENT PLANT

2016 ANNUAL REPORT

Prepared By Doug Culbert, Chief Plant Operator

January 31, 2017

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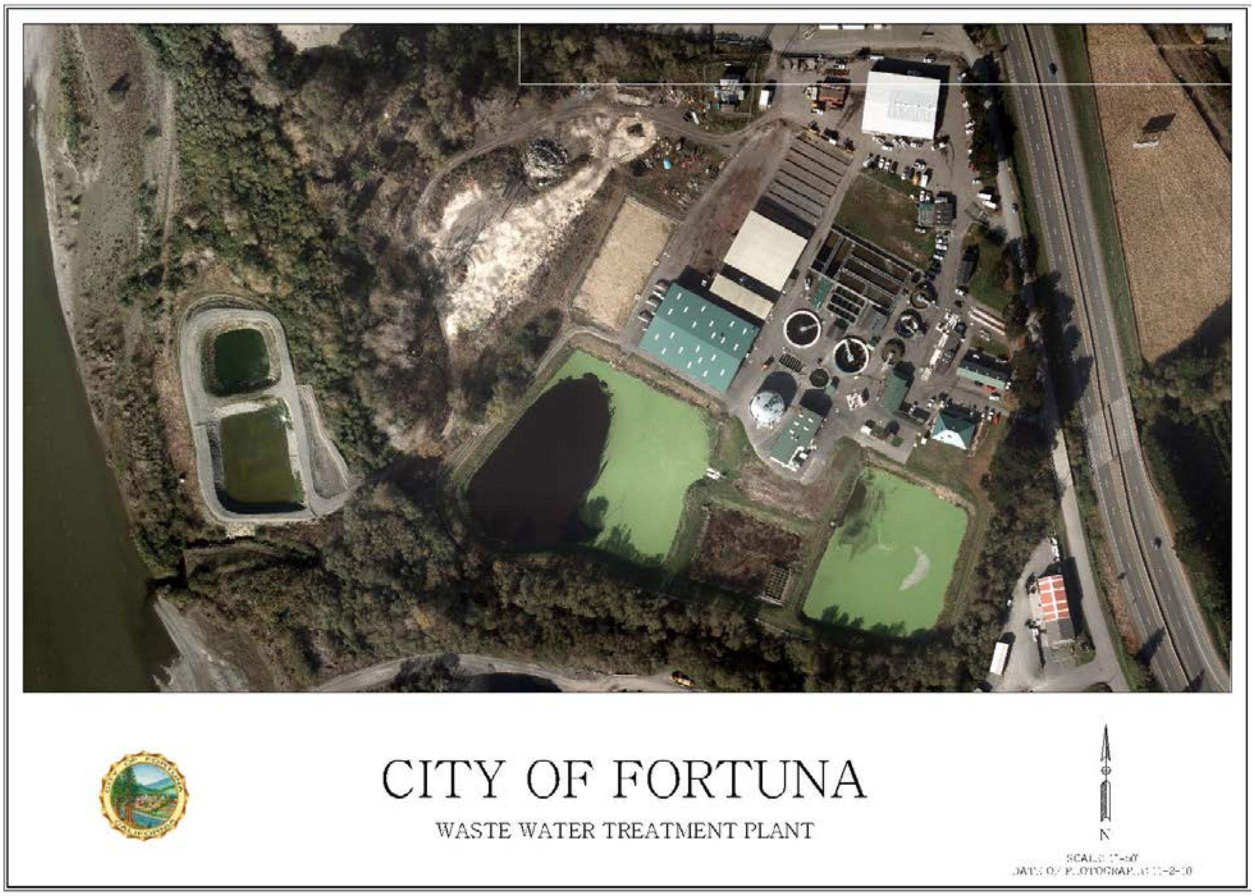


1. Introduction

The Tom Cooke Memorial Wastewater Treatment Plant (WWTP) is operated by the City of Fortuna. The plant is located at 180 Dinsmore Drive, in Fortuna, Humboldt County, California and serves a population of approximately 12,000. Major treatment processes include screening and grit removal, primary treatment, secondary treatment, mixed liquor recycle for biological nutrient removal (BNR), sludge thickening, anaerobic digestion, electrical cogeneration, solids dewatering and composting, side stream equalization, and effluent disinfection. Treated effluent is currently discharged to the percolation ponds during dry weather, and to Strongs Creek, a tributary of the Eel River, during the wet weather season. The facility is permitted to compost biosolids to Class A Exceptional Quality standards. Numerous auxiliary systems are required for proper operation of many plant processes including: potable water, process water, HVAC, electrical power distribution, gas, chemicals, instrument air, and others.

The State Water Resources Control Board (SWRCB) classified the Tom Cooke Memorial Wastewater Treatment Plant as a Class III Secondary Treatment wastewater treatment facility. The facility currently operates under the SWRCB Order Number R1-2011-0004 issued on January 27, 2011. The Report of Waste Discharge has been submitted for the 2016 NPDES permit. The 2017-22 permit draft went out for public comment on November, 2016 and is scheduled to be adopted in March, 2017

This report is a summary of plant operation and performance during 2016. In addition to a discussion of effluent quality and the plant's success in meeting treatment objectives, the report contains summaries of 2016 plant operations, maintenance, chemicals, utilities, and human resources.

2. Summary

The plant generally operated well throughout the entire year. Together with careful control of operational processes, addition of ammonia prior to chlorination to form chloramines and aeration of the plant effluent has successfully allowed the facility to meet Disinfection Byproduct limits for discharge to Strongs Creek in all but one month during the year.

Historically, the WWTP was allowed to bypass storm flows into the oxidation ponds. Until November of 2007, the facility was permitted to discharge directly from the ponds into Strongs Creek. As such, the WWTP secondary treatment system did not have to treat the volumes that it currently treats during winter flows. Typically, peak flows through the plant prior to 2007 were 1.8 MGD. 2016 while not a typical year as far as rainfall is concerned we had our highest rainfall in February and peak high flows reached a maximum of 4.1 MGD, which is .400 MG higher than in 2014.

The City retained GHD to complete a Preliminary Engineering Report in 2016 that identifies alternatives for treatment processes that would allow the City to comply with the regulations anticipated in our new NPDES permit. Year round discharge is being considered as part of the triennial review process for the North Coast Basin Plan.

Following is a list of effluent violations and Order Condition infractions from 2016. It should be noted that the City settled an Administrative Civil Liability Complaint(ACLC) with the Waterboard in January of 2017. Details of the settlement are confidential but alleged exceedances of effluent limitations were found dating back to October of 2010 and include the two exceedances listed below in January.

January

- Dichlorobromomethane Maximum Daily Average limit is 1.1 ug/L and reported value was 1.5 ug/L at M-001.
- Dichlorobromomethane 30-Day Average limit is 0.6 ug/L and reported value was 1.5 ug/L at M-001.
- pH 1-Hour Average (Mean) limit is 6.5 SU and reported value was 6.4 SU at M-001.

February

- None

March

- None

April

- (Order Condition)CL2 residual fell to 1.2 mg/l below minimum requirement of 1.5 mg/l in the chlorine contact chamber.

May

- (Order Condition)CL2 residual fell to 0 mg/l below minimum requirement of 1.5 mg/l in the chlorine contact chamber.

June

- None

July

- None

August

- (Order Condition)CL2 residual fell to 1.4 mg/l below minimum requirement of 1.5 mg/l in the chlorine contact chamber.

September

- None

October

- None

November

- None

December

- (Order Condition)CL2 residual fell to 0.8 mg/l below minimum requirement of 1.5 mg/l in the chlorine contact chamber.

As noted above, most of the violations were the result of low chlorine residual in the chlorine contact basin due to clogged ammonia eductors. This was an issue most of 2015 but through trouble shooting, repairs and changing our control strategy we were able to minimize this issue in 2016

3. OPERATIONS

a. Pretreatment

In 2016 the City of Fortuna, continued implementing the Fats, Oils and Grease (FOG) Control Program (Element 7 of the City's draft SSMP) by conducting regular inspections of pretreatment devices at food service establishments within the City. This work was conducted under the authority of the current Fortuna Municipal Code which requires interceptors, when necessary, at food service establishments and also requires that they be regularly maintained. Inspection procedure includes an informal interview of the food service establishment's Owner or Manager regarding their existing infrastructure and kitchen practices, and an educational discussion of FOG source control. Violations are documented and proof of corrective actions is required. There were no major violations and business owners were educated on BMPs for FOG containment.

City of Fortuna utilities crews continued to inspect sanitary sewer manholes and other infrastructure for inflow and infiltration that may contribute to unnecessary volumes of waste water to be treated. Routine maintenance and video was done on the City’s collection system. Staff is working on implementing a new procedure for rating the collection system and prioritizing maintenance and repairs.

b. Influent Treatment and Quality

The plant operates at an average dry weather flow of .760 Million Gallons per Day (MGD), and during wet weather can experience flows above 4.5 MGD. During high flow periods, plant influent is partially diverted to flow equalization ponds to allow the plant flow to remain at a controlled uniform rate below the plant’s current wet weather operational capacity of 3.8 MGD.

A summary of annual flow and influent parameter concentrations for the past three years is shown in Table 1.

Table 1: Influent Parameters

	2014	2015	2016
Mean Influent Flow, MGD	**.939**	**.960**	**1.4**
Total Annual Flow, MG	**343.6**	**348.9**	**427.8**
Mean Influent SS, mg/L	**347**	**313**	**341.5**
Mean Influent BOD_5, mg/L	**335**	**319**	**314.6**

c. Preliminary Treatment

The preliminary treatment process includes screening and grit removal as well as influent flow monitoring.

Wastewater enters the treatment facility at the head works structure, which provides a grit and screenings removal operation. There is one automatic stair-stepper type bar screen. This screening machine removes rags and large pieces of debris from the wastewater. Grit channels located downstream of the screen remove sand, gravel and similar heavy inorganic material by gravity separation. The grit channel operates at a lower velocity than standard because organics allowed to fall out of the waste stream are separated by a cyclone grit classifier and returned to the plant influent wet well. The grit and screenings are collected and hauled to a sanitary landfill site.

d. Primary Treatment

After the grit channels, the next wastewater treatment process is primary sedimentation where the velocity of flow entering the clarifier tanks is reduced, allowing the heavier solids in the wastewater to settle to the bottom by gravity. Sludge collectors in the tanks sweep the settled sludge (primary sludge) into a sludge hopper located on the bottom of the tank, from where the sludge is pumped either to the anaerobic digester or the Gravity Belt sludge thickener. There are three circular primary clarifiers. By varying the number of units online, staff implemented a control strategy to optimize secondary treatment and provide additional carbon material to effect nutrient removal. The viability of utilizing primary sludge elutriation, rinsing carbon rich volatile acids out and back into the secondary system via the gravity belt thickener, hinges on the ability to perform this process without undue odor formation.

Table 2 contains a summary of key primary treatment effluent parameter concentrations over the previous three years.

Table 2: Primary Treatment Effluent Parameters

	2014	2015	2016
Mean Primary Effluent TSS, mg/L	**88**	**82**	**81.7**
Mean Primary Effluent BOD_5, mg/L	**195.6**	**179**	**167.1**

e. Secondary Treatment

The secondary treatment process includes biological treatment of the waste stream as well as solids separation processes.

In the activated sludge process, effluent from the primary clarifiers flows to three parallel aeration basins where it is mixed with Return Activated Sludge (RAS) from final clarifiers and is aerated. As in the case of 2015, due to the low rainfall in 2016 only two of the basins were online for most of the year. The activated sludge is primarily comprised of micro-organisms and bacteria, which are a natural part of wastewater and are used to break down the organic solids in the wastewater. Micro-organism are monitored microscopically weekly by operations and laboratory staff to confirm number, type, and general health of the process.

A mixed liquor recycle system allows denitrification for removal of Nitrate Nitrogen from the waste stream. This process improves the secondary treatment process by returning a portion of the alkalinity removed during the nitrification process and reducing the need for caustic soda addition. At present, the process continues to require some caustic soda addition due to the inadequate supply of carbon which is necessary for anoxic conversion of Nitrate into Nitrogen gas.

The mixed liquor from the aeration basins flows to large final clarifiers where the activated sludge is allowed to settle. A controlled quantity of this sludge is "returned" to the aeration basins as Return Activated Sludge (RAS) to repeat the treatment process, and excess quantities are removed as Waste Activated Sludge (WAS) to the WAS holding tank. There are two final clarifiers, and the number in operation is adjusted to optimize performance during varying flow conditions. Flows indicative of low rainfall has allowed the operation of only one secondary clarifier for the entire year.

A summary of key aeration basin parameters for the previous two years is shown in Table 3.

Table 3: Secondary Treatment Process Parameters

	2014	*2015*	*2016*
Mean Mixed Liquor Suspended Solids, mg/L	**1464**	**1575**	**1504**
Mean F:M Ratio	**.25**	**.21**	**.23**
Mean Cell Residence Time, days	**14**	**14**	**13.5**

f. Final Effluent Treatment and Quality

Chlorine gas is combined with ammonia to form chloramines which are used to disinfect the final effluent before it is discharged. Ammonia is fed into the chlorine feed water at a carefully controlled dosage to limit the formation of Disinfection Byproducts. Aeration has been added immediately prior to discharge to further reduce Disinfection Byproducts and raise effluent pH and Dissolved Oxygen. In 2016, the plant continued to produce a high quality effluent. A summary of key final effluent parameters for 2016 is shown in Table 4. Details of the final effluent qualities are presented in graphical form in Appendix A. A summary of other key treatment parameters for 2016 is shown in Table 5.

Table 4: Treated Wastewater Parameters 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Ammonia Nitrogen (mg/L)	0.49	1.4	1.2	1.1	2.4	1.4	13	5.3	7	5.4	1.8	0.96
Unionized Ammonia Nitrogen (mg/L)	0.00078	0.0027	0.003	0.006	0.0062	0.0035	0.058	0.024	0.032	0.021	0.0045	0.0014
Nitrate as nitrogen (mg/L)	14	14	14	21	21	13	6.1	11	12	17	23	21
Total Phosphate Phosphorous (mg/L)	2.3	2.1	2.4	4.7	4.7	5.2	5.1	5.1	5.4	4.8	4.1	3.3
Copper (ug/L)	7.3	9.3	8.2	7.4	9	7.7	7.8	7.7	9.5	8.3	6.7	8.5
Bromodichloromethane (ug/L)	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate, lbs/day average	299	135	238	203	173	100	45	80	86	162	287	332

Table 5: Key Treatment Parameters 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EFFLUENT BOD, mg/L												
Max	7.5	5.9	5.9	4.9	8.1	8.4	9.3	7.1	8.2	8.3	5	9.9
Mean	5.4	5.3	4.2	3.8	5.4	5.3	7.4	6.4	6.8	5.8	4.1	5.5
Average lbs/day	116	51	71	37	45	41	54	46.4	47	55.4	51	89.7
INFLUENT BOD, mg/L												
Max	179	297	297	363	480	567	467	409	451	450	287	260
Mean	162	265	239	318	348	476	395	350	364	374	279	205
Average lbs/day	3076	2767	3598	2549	2410	2958	2405	2128	2206	3059	3034	2889
INFLUENT TSS, mg/L												
Max	212	335	297	373	545	713	556	408	456	427	327	250
Mean	170	276	253	318	455	599	432	298	350	391	286	270
Average lbs/day	3228	2882	3809	2549	3150	3722	2630	1809	2122	3195	3110	3524
EFFLUENT TSS, mg/L												
Max	7.7	5.5	4.8	5.4	10.5	15.4	10.4	7.4	456	10.6	4.9	4.2
Mean	5.9	4.8	2.9	3.1	6.6	5.5	7.2	4.5	7	4.9	3.3	6.6
Average lbs/day	126	46	49	30	54	42	53	32.6	48	46.1	41.6	69.8
INFLUENT FLOW, MGD												
Max	3.423	2.024	3.328	1.394	1.054	0.881	0.837	0.882	0.882	0.814	2.65	3.12
Mean	2.277	1.252	1.805	0.961	0.83	0.745	0.73	0.729	0.727	0.981	1.3	1.65
TOTAL	70.580	36.326	55.947	28.838	25.734	22.335	22.627	22.605	21.797	30.420	39.370	51.200
EFFLUENT FLOW, MGD												
Max	2.565	1.154	2.04	1.157	0.99	0.921	0.879	0.871	0.862	1.14	1.5	1.950
Mean	3.789	2.321	3.4	1.604	1.279	1.061	1.002	1.044	1.064	2.252	2.9	3.43
TOTAL	79.543	43.901	63.249	34.712	30.699	27.624	27.259	26.948	25.870	35.337	45.267	60.500
SETTLEABLE SOLIDS, ml/L												
Max	<0.1	0.1	<0.1	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<.01
Mean	<0.1	<0.1	<0.1	<0.1	<0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<.01
COLIFORM, MPN												
Median	6.5	2	2	1.9	1.9	1.9	1.8	2	1.8	<1.8	2	3.3
Max	22	4.5	49	4.5	2	4.5	2	2	2	<1.8	4.5	6.8
PH												
Max pH	6.9	6.9	7.1	7.3	6.8	6.9	7.2	7.2	7.1	7	6.8	6.9
Min pH	6.4	6.8	6.7	6.8	6.6	6.9	7	7	7	6.6	6.6	6.7

BASIN CHLORINE RESIDUAL, mg/L												
Mean	3.4	3.1	3.8	3.8	2.5	2.3	2.2	2.3	2.5	3.6	3	2.9
Max	7.2	4.7	6.2	6	4.6	3.4	3.7	2.9	3.6	5	4.6	4.8
Mixed Liquor Concentration, mg/L												
Max	1608	1397	1310	1206	1163	1755	1673	1708	1829	1674	1479	1247
Mean	2037	1608	1543	1406	1240	2028	1861	1947	2048	3210	1783	1463
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sludge Wasted, LBS												
Max	50000	52520	47,000	60000	67000	37000	38000	35500	36000	50000	57000	56000
Mean	40290	45347	37,935	55533	50903	30683	33952	31258	27400	41064	49433	47483
TOTAL(1000 lbs)	37.8	31.2	25.7	28.3	26.9	25	23.9	27.2	29.9	29.5	33.5	33.8
Primary Sludge Digested, LBS	32928	36154	37509	41208	36791	34025	35432	38606	41648	42367	60799	35019
Primary Sludge % solid	1.9	2.5	2.5	2.7	2.3	2.7	2.9	3	2.1	2	3	1.7
Cogeneration, kwh	106.8	86.5	112.75	0	0	0	0	0	0	0	0	0
Mean Primary Effluent BOD, mg/L	9.9	132	121	186	63	234	233	246	256	256	151	117
Mean Primary Effluent TSS, mg/L	49	66	54	76	84	93	97	112	117	99	71.3	62.3

g. *Solids Handling*

The anaerobic digestion process reduces sludge volume and stabilizes the solids to form biosolids. In 2016, an average of 1290 lb/day of raw sludge from primary treatment was pumped to the anaerobic digester for treatment. Average total solids (TS) concentration of raw sludge was 2.4% and total volatile solids content was 88% of TS. Waste activated sludge (WAS) was diverted from the mixed liquor recycling line to eliminate fluctuations in digester feed rates due to variations in RAS concentrations and pumped to the anaerobic digester after processing through the gravity belt thickener. In 2016, approximately 953 lb/day of WAS was thickened and sent to the digester. In 2016, approximately 153 dry metric tons of biosolids were produced. We produced approximately 1215 dry metric tons of Class A Exceptional Quality compost of which 945 DMT were given away to the public. Biosolids are composted for 15 days at temperatures in excess of 140 degrees to destroy pathogens and are tested quarterly for metals content to ensure Exceptional Quality status and safety of the finished material. Results of tests performed in 2016 are presented in Table 6. We did meet the CFR 40-503 standards for fecal coliform and salmonella which is what is required for Class A compost. We only tested two lots of compost which was during the 1st and 3rd quarters of 2016.

Table 6: Biosolids Quality Monitoring 2016

Compost monitoring in 2016, mg/kg

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Arsenic (As)	3.6	NA	ND	NA
Cadmium (Cd)	ND	NA	ND	NA
Chromium (Cr)	28	NA	27	NA

Copper (Cu)	190	NA	170	NA
Lead(Pb)	35	NA	33	NA
Mercury (Hg)	0.46	NA	0.48	NA
Molybdenum (Mo)	3.6	NA	3.4	NA
Nickel (Ni)	31	NA	26	NA
Selenium (Se)	4.8	NA	4.1	NA
Zinc (Zn)	470	NA	380	NA

Compost monitoring in 2016

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Salmonella, MPN/ 4 g TS	NA	NA	<0.4	NA
Fecal Coliform, MPN/ 1 g TS	18.5	NA	15.5	NA
% Moisture	29	NA	37	NA

(Manure Typically has >2,400 MPN/g TS Fecal Coliforms)

4. MAINTENANCE

a. Maintenance Summary

The WWTP performed a variety of scheduled, preventative, predictive and breakdown maintenance on a wide variety of equipment. The main goal of maintenance activities is to ensure equipment availability to meet plant process operation requirements.

The WWTP work area includes all major and auxiliary processes. Maintenance minimizes callouts, reduces overtime costs, limits potential for discharge violations due to mechanical failure, and costs associated with repairs are significantly lower than replacement costs.
In addition to routine lubrication and preventative maintenance activities, the following notable preventative maintenance was completed in 2016:

- New VFD for WAS Pump #2
- Rebuilt Electric Motor on WAS Pump #1
- Replaced all the boiler tubes and installed chemical system
- Replaced Grit Auger motor
- Installed new Influent Mixer
- Influent Pump #2 VFD replaced
- RAS Pump #2 VFD Replaced
- Rebuilt RAS Pump #2
- Rebuilt RAS Pump #3
- Rebuilt Pump #3 at Strongs Creek Lift Station
- Rebuilt Wet Well Pump #1
- New 4” Wasting meter
- New Valves for Primary Clarifiers #2 & #3
- 1 Ton CL2 cylinder Regulators replaced

- 1 Ton SO2 cylinder Regulator replaced

b. Flow Meter Calibration Record

Flow to the plant is measured at the head works and chlorine contact basin effluent weir. Meters are checked monthly for accuracy and functionality.

5. CHEMICALS AND UTILITIES

a. Chemicals

Several chemicals are used for a variety of treatment processes at the plant. Major process chemicals are discussed below and include:

- Sodium Hydroxide (Nutrient Removal, pH adjustment)
- Chlorine gas (Disinfection)
- Sulfur Dioxide gas (Dechlorination)
- Ammonia Hydroxide

i. Sodium Hydroxide for Nutrient Removal and pH Adjustment

Sodium Hydroxide consumption to provide for the increased demand for alkalinity associated with nitrification for nutrient removal (i.e. ammonia) during 2016 was approximately 94.7 tons. Sodium Hydroxide was applied to the mixing box upstream of the aeration basins and, if necessary, prior to discharge to Strongs Creek.

ii. Chlorine for Disinfection

Chlorine is used for disinfection of the final effluent. In 2016, approximately 13.8 tons were consumed for this purpose.

iii. Sulfur Dioxide for Dechlorination

Sulfur Dioxide is used for dechlorination of the final effluent prior to discharge to Strongs Creek. In 2016, approximately 13 tons was consumed for this purpose.

iv. Ammonia Hydroxide

Ammonia Hydroxide is used to eliminate free, uncombined chlorine and limit Disinfection Byproduct formation. Approximately 2.3 tons was consumed for this purpose in 2016.

b. Utilities

i. Reclaimed Water

The total amount of water reclaimed from the treated effluent for use in the treatment plant averaged 124.3 gallons per day for an estimated reclaimed water usage of 45.5 million gallons in 2016.

ii. Cogeneration

The cogeneration facility was not functioning for most of the year. Extensive maintenance and repairs were performed on the unit. The city has budgeted for a $200,000 overhaul project in 2017 to repair the unit. Part of this is the option of using the unit more with the blending of natural gas to maximize its use. The city is working with consultants to decide whether it's cost effective to do the overhaul or look at other options that don't include cogeneration.

6. SANITARY SEWER OVERFLOWS

There were no overflows reported in 2016

7. HUMAN RESOURCES

a. Staffing

In 2016 we saw some changes as we lost one Grade 3 operator who took a position at another facility as well as another Grade 3 operator moved out of the area . We replaced one with an OIT and chose not to backfill one of those positions and so our staffing was reduced by one operator from 2015. The City opened an agreement with the City of Rio Dell to provide services to cover their administrative duties. The Chief Plant Operator, through this agreement, is listed as the Chief Plant Operator and Legal Responsible Official for the Rio Dell WWTP. Services include but are not limited to, the monthly submissions of the Self Monitoring Reports We modified our weekend schedule so that only one operator was on duty. With the close proximity of six of the seven operators, living within 5 miles of the facility, there is operational assistance close by if needed by the lone operator working the weekend shift. Plant staffing for the majority of 2016 is shown in Table 7.

Table 7: Plant Staffing

Chief Plant Operator	1
Shift Supervisor	2
WWTP Operator	4
Plant Maintenance Mechanic	1
Lab Director	1

b. Staff Training & Development

The WWTP has developed an Operator Training Program that expands the abilities of the operational staff, resulting in better service to the public, and better, more efficient operation of the facility. The following topics were discussed during the course of the year:

- Accident/Incident/Injury Reporting Procedures
- Asbestos Pipe
- Bloodborne Pathogens
- Fall Protection
- Fire Extinguisher Training
- First Aid Training

- Hearing Conservation Awareness Training
- Lifting and Carrying
- Certified Review of Chlorine Procedures

c. Operator Certification

For the most part of 2016 the city employed two Grade 4 operators, two Grade 3 operators one Grade 2 operator and two Grade 1 operators. The Grade 2 operator obtained his Grade 3 late in the year. The WWTP continues to have two full time Shift Supervisor positions in the organizational structure of the water and wastewater treatment facilities. This allows for operational and process changes to be made when needed, including during weekends, in accordance with SWRCB Office of Operator Certification guidelines.

Table 8 summarizes the status of operator certification held by WWTP operators at the facility during 2016.

Table 8: Wastewater Treatment Certifications

Grade IV	2
Grade III	2
Grade II	1
Grade I	2

Additional certifications held by WWTP staff include Laboratory Analyst, Water Treatment, & Maintenance Technologist certifications. One staff member is qualified to perform Energized Electrical Work, as well. The Plant Mechanic received a Plant Maintenance Technology certificate from the California Water Environment Association in 2016. Not included in the count in Table 8 is the Lab Director who also holds a Grade 2 Operations certification.

8. Certification of Report

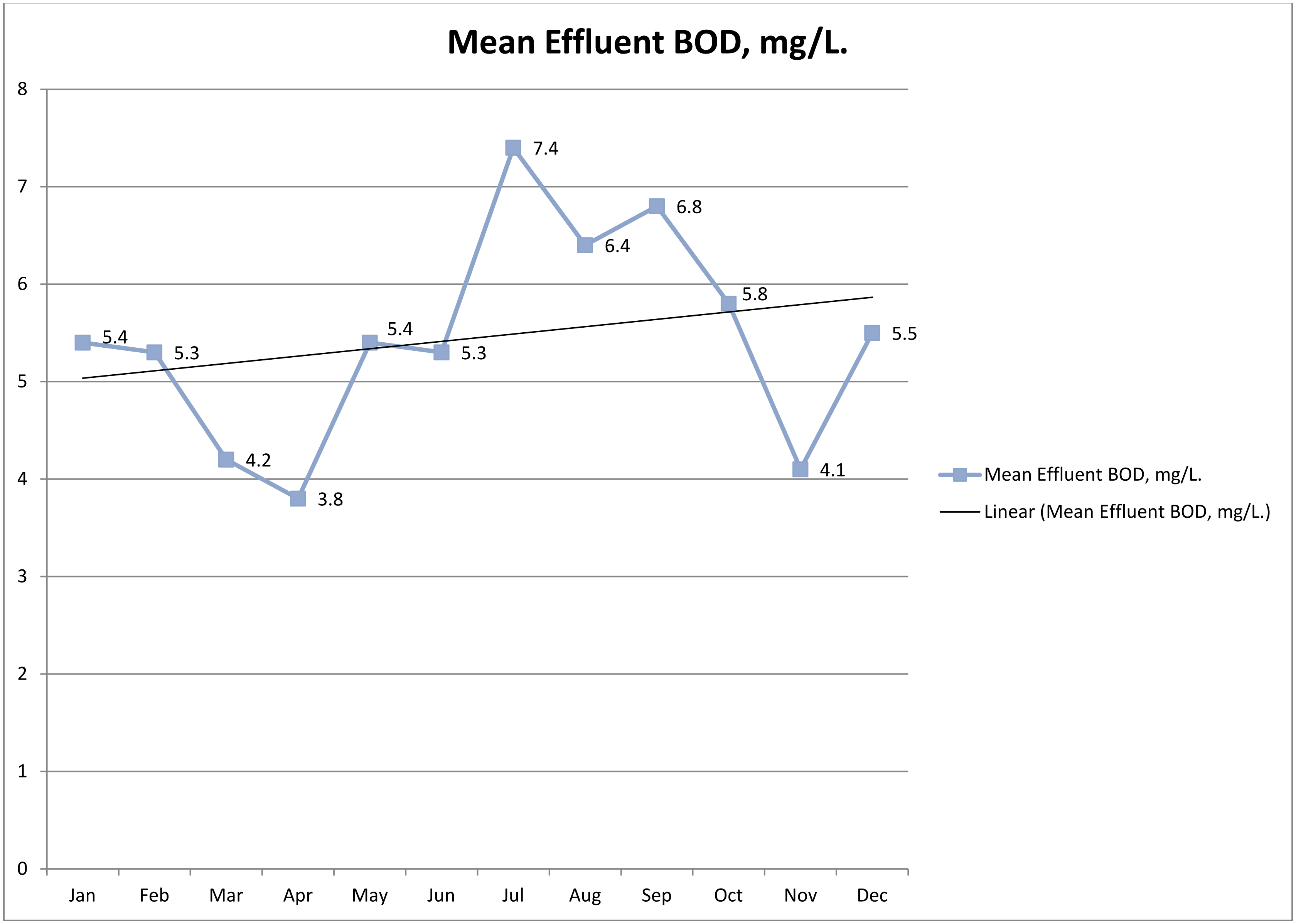
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including fine and imprisonment for withholding information regarding permit violations.

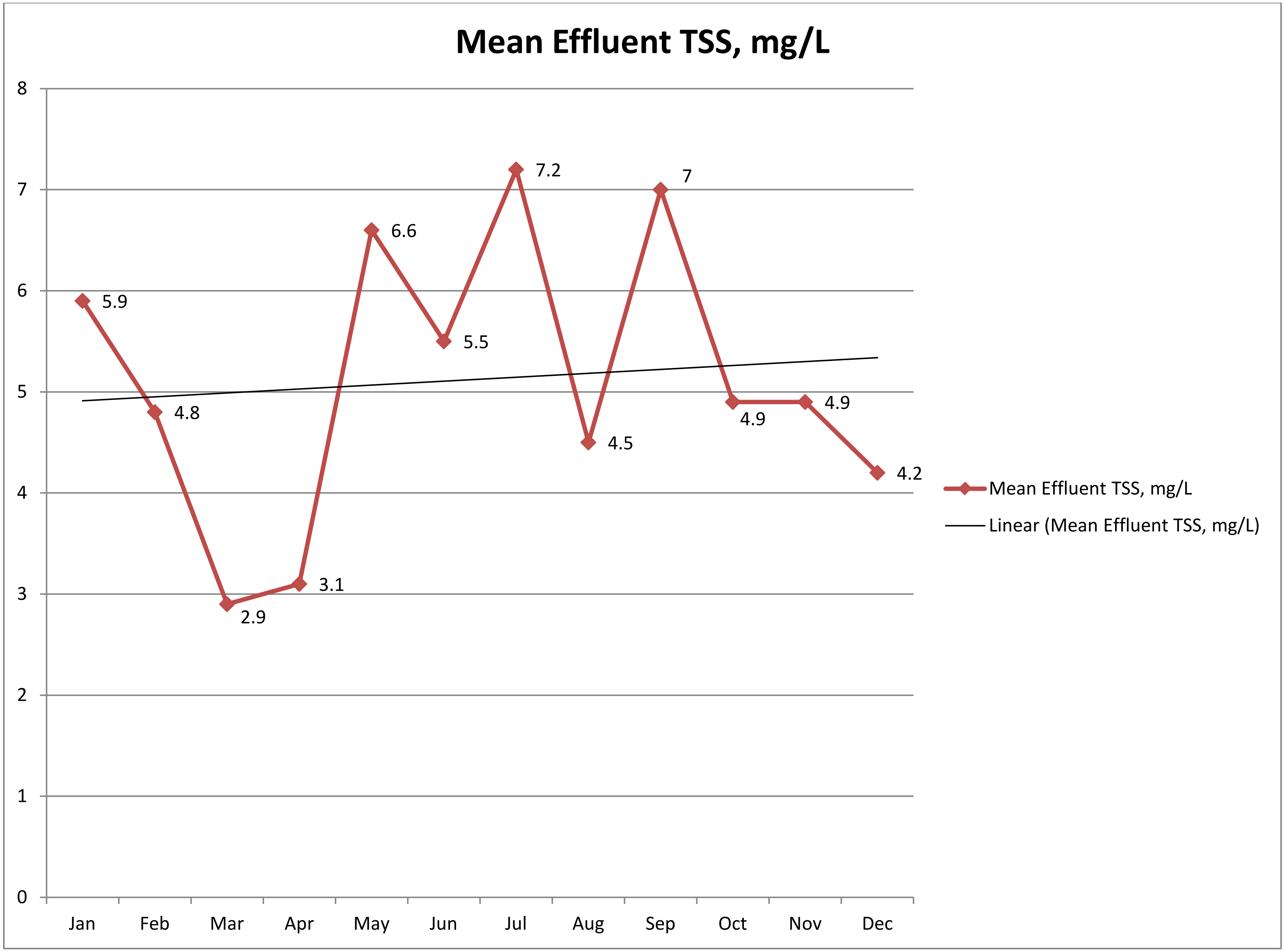
If you have any questions or need additional information, please feel free to contact me at dculbert@ci.fortuna.ca.us or (707)725-1476.

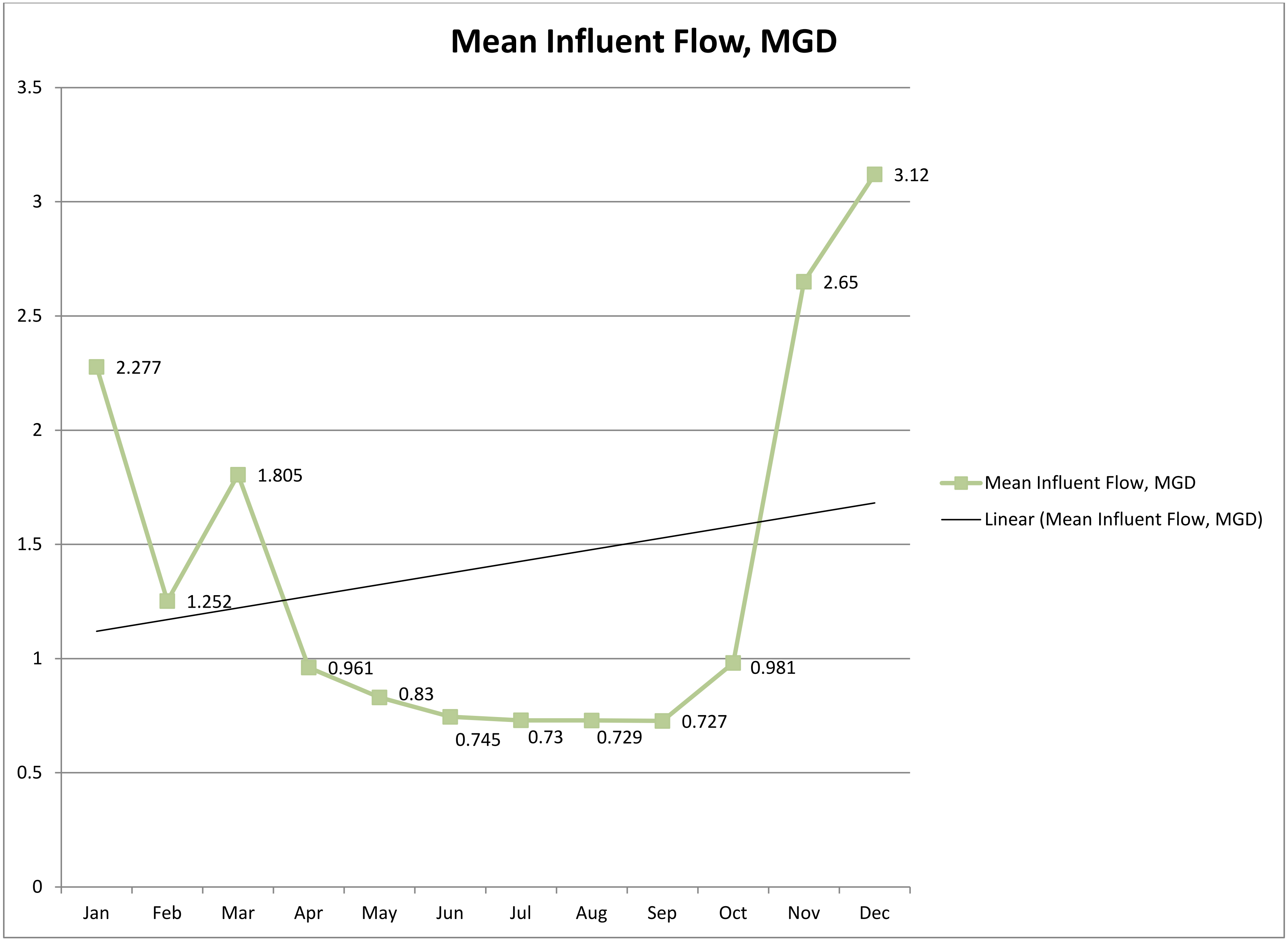
Sincerely,

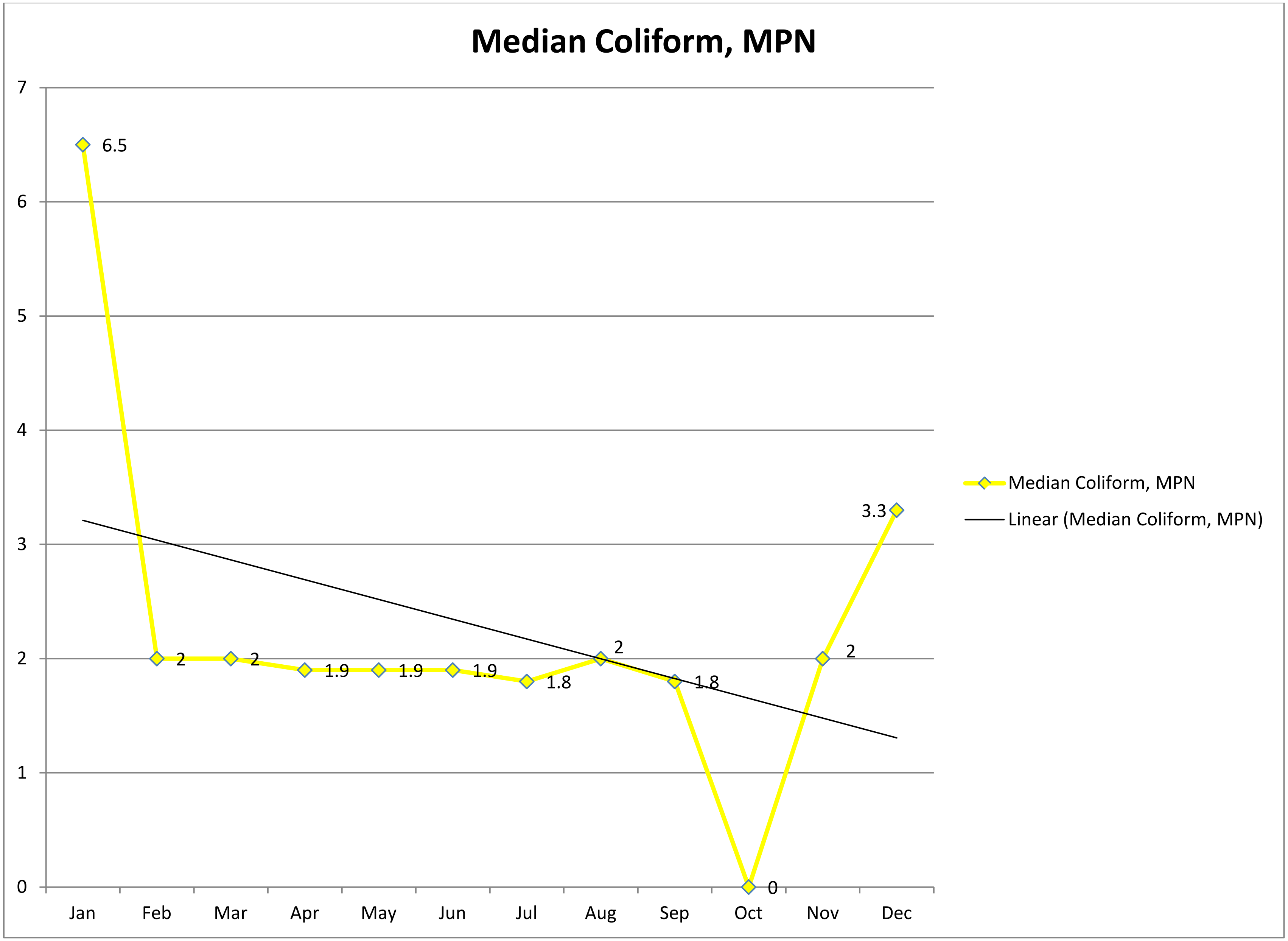
Doug Culbert, WWTPO IV-9678
Chief Plant Operator
City of Fortuna, Tom Cooke Memorial WWTP

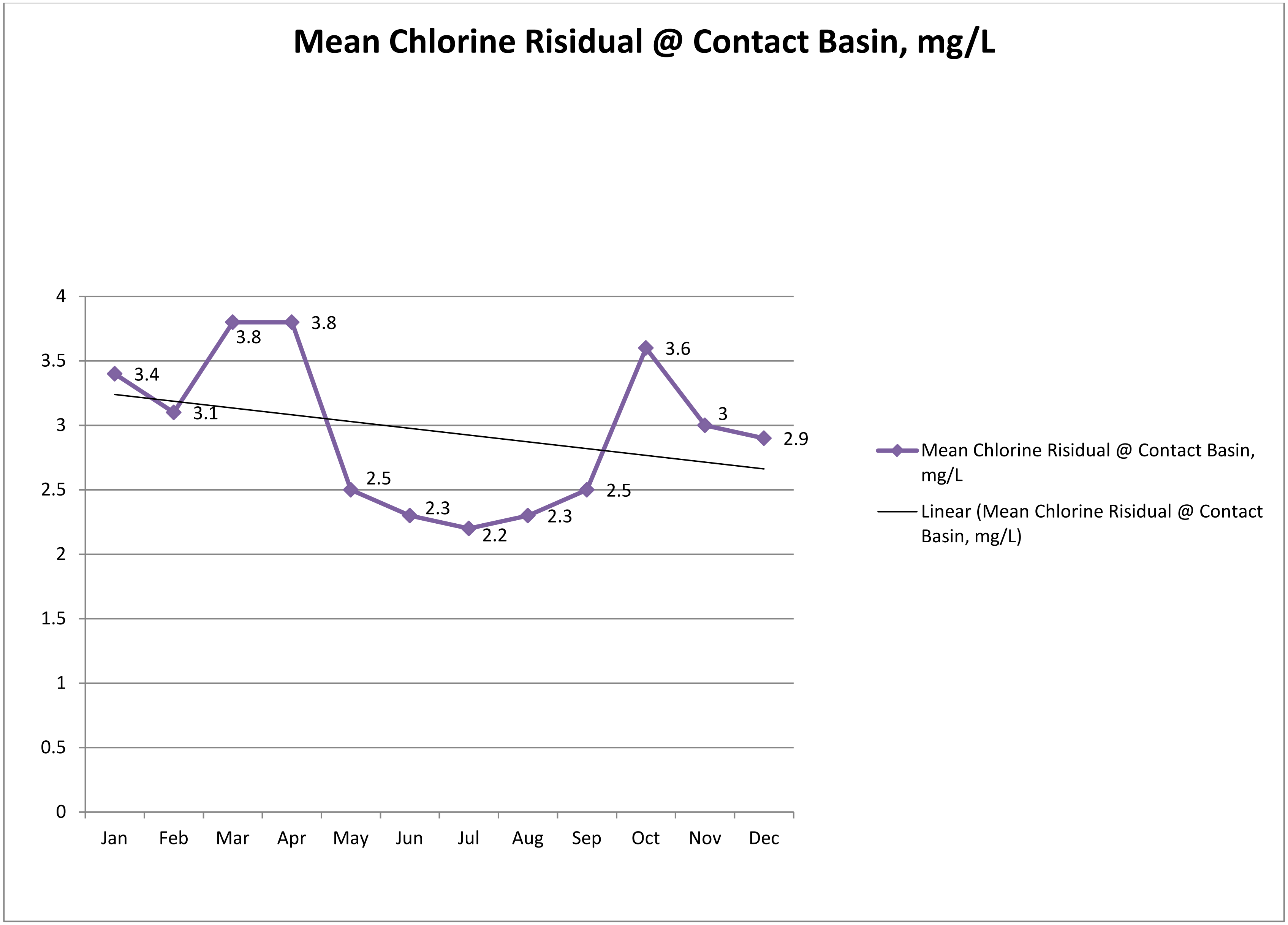
Appendix A PERFORMANCE CHARTS

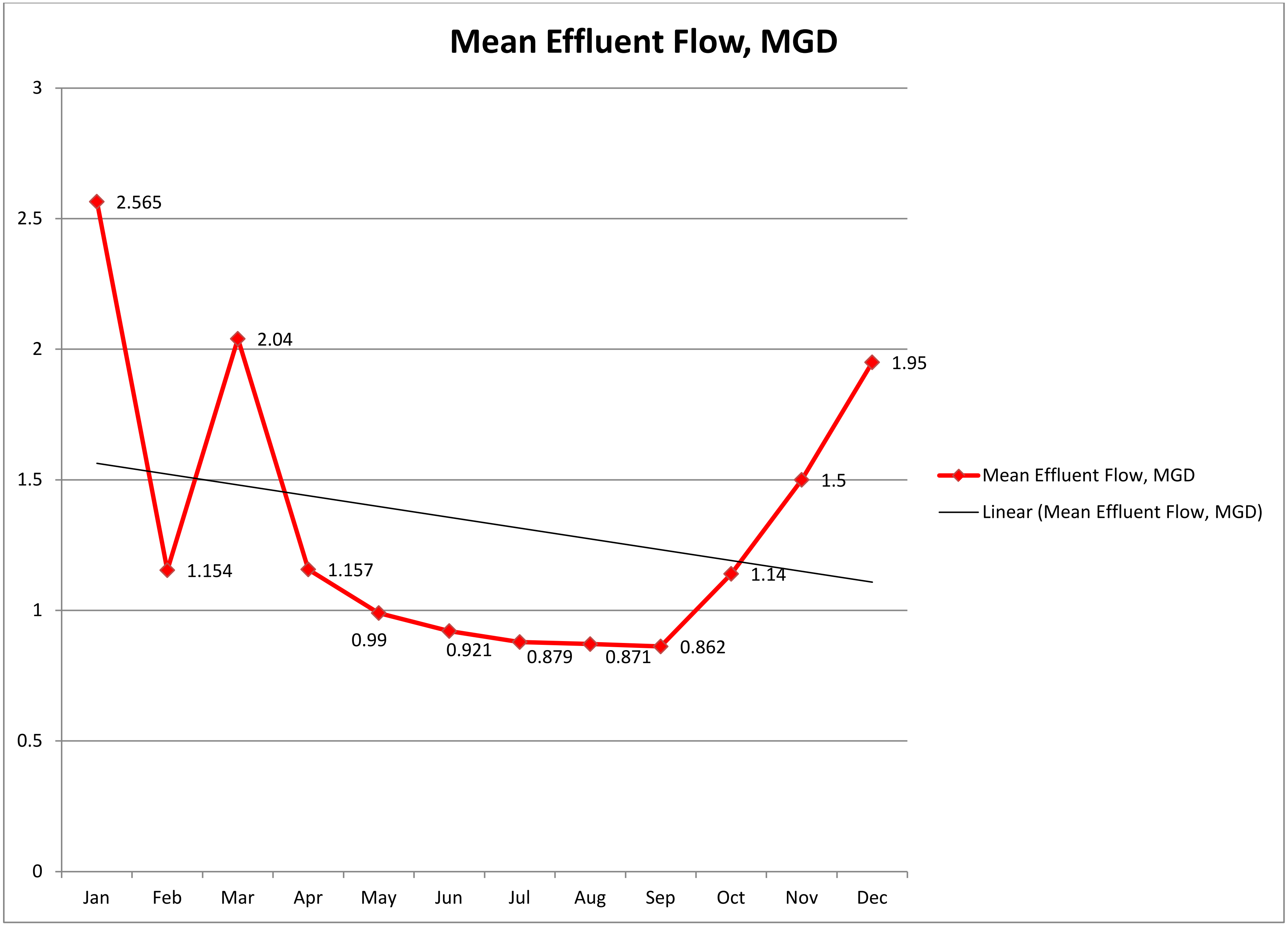

Mean Effluent BOD, mg/L.
8
7
6
5
4
3
2
1
0
5.4
5.3
4.2
3.8
5.4
5.3
7.4
6.4
6.8
5.8
4.1
5.5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Mean Effluent BOD, mg/L.
Linear (Mean Effluent BOD, mg/L.)

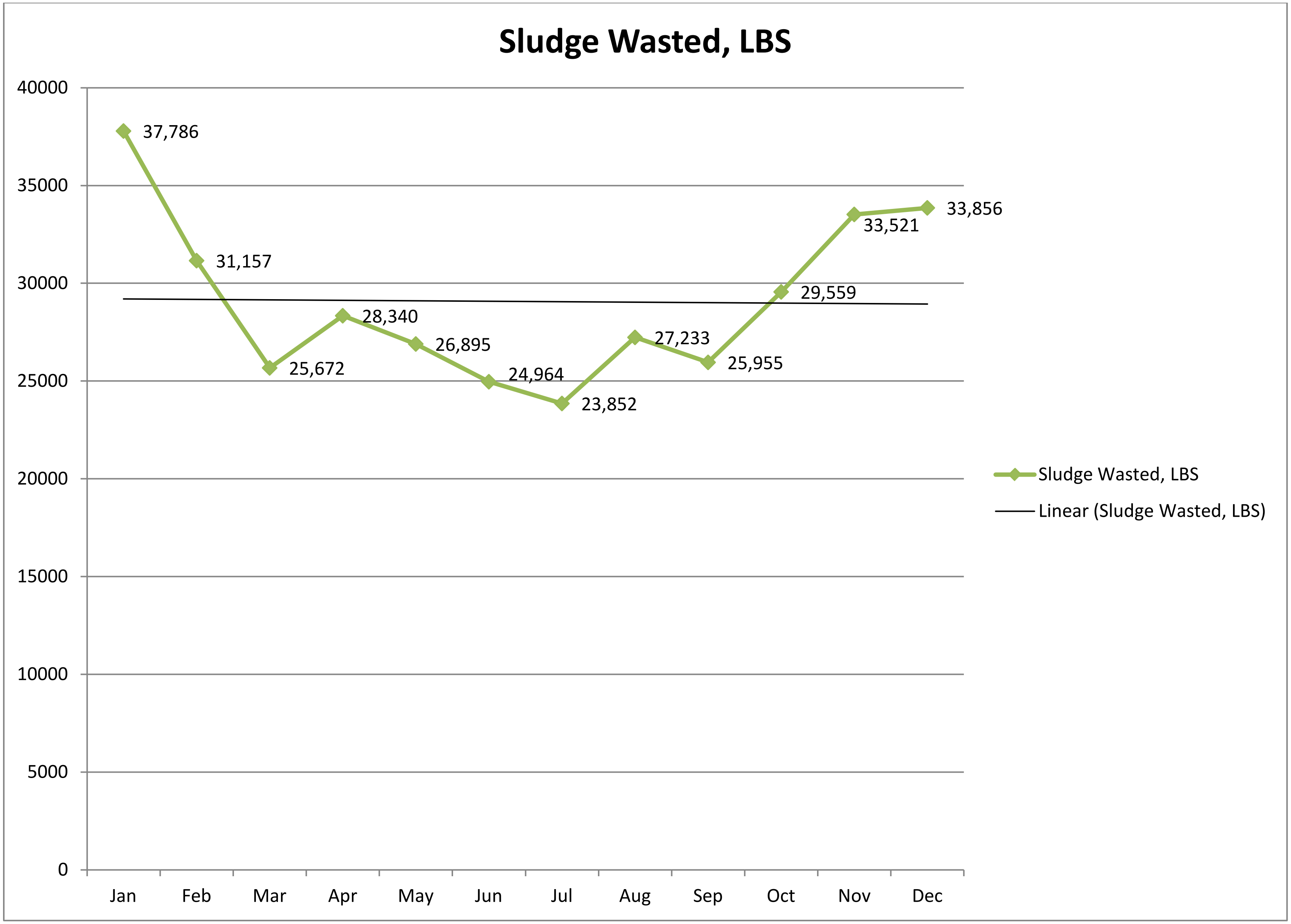

Mean Effluent TSS, mg/L
8
7
6
5
4
3
2
1
0
5.9
4.8
2.9
3.1
6.6
5.5
7.2
4.5
7
4.9
4.9
4.2
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Mean Effluent TSS, mg/L
Linear (Mean Effluent TSS, mg/L)


Mean Influent Flow, MGD
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2.277
1.252
1.805
0.961
0.83
0.745
0.73
0.729
0.727
0.981
2.65
3.12
Mean Influent Flow, MGD
Linear (Mean Influent Flow, MGD)

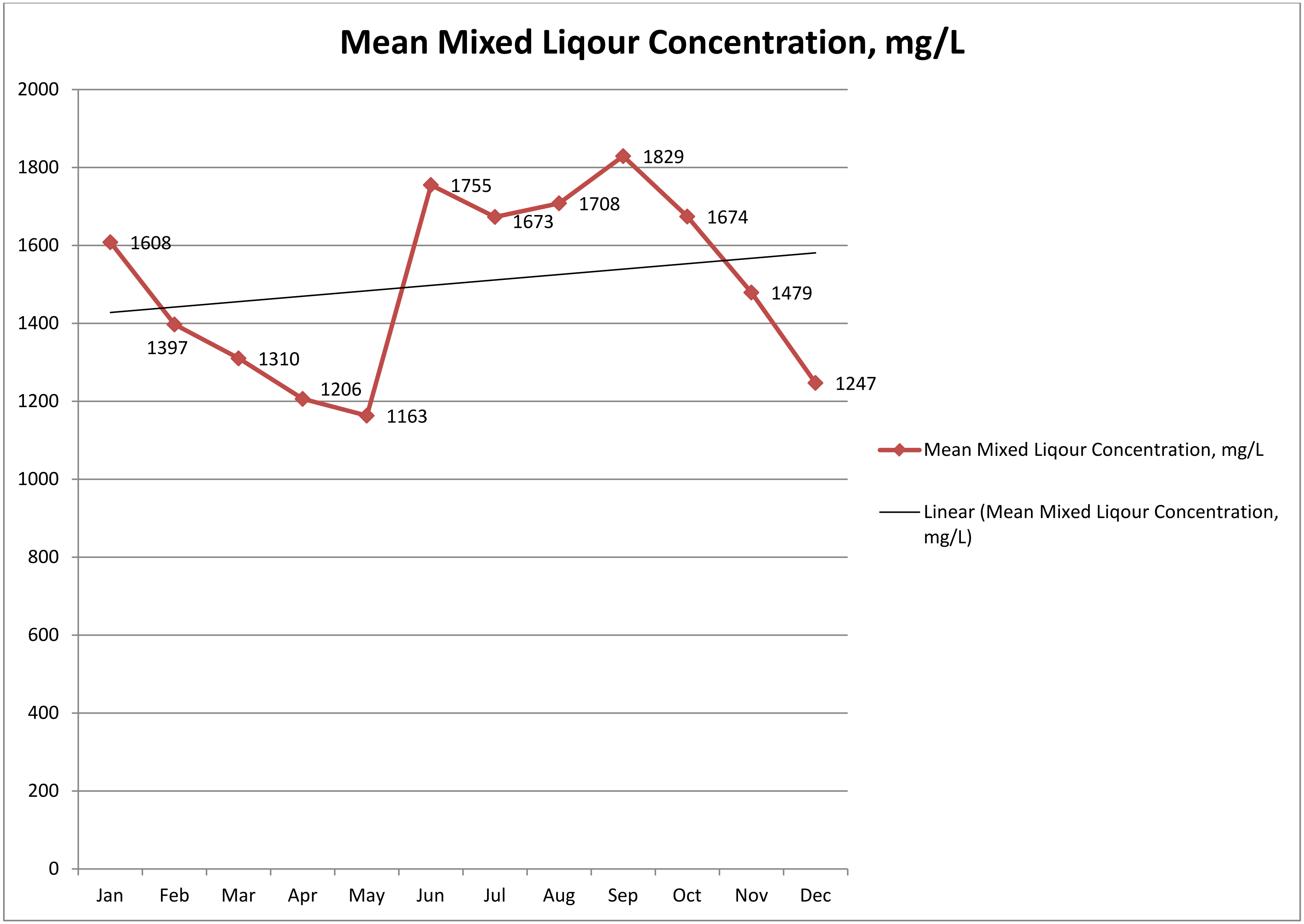

Median Coliform, MPN
7
6
5
4
3
2
1
0
6.5
2
2
1.9
1.9
1.9
1.8
2
1.8
0
2
3.3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Median Coliform, MPN
Linear (Median Coliform, MPN)

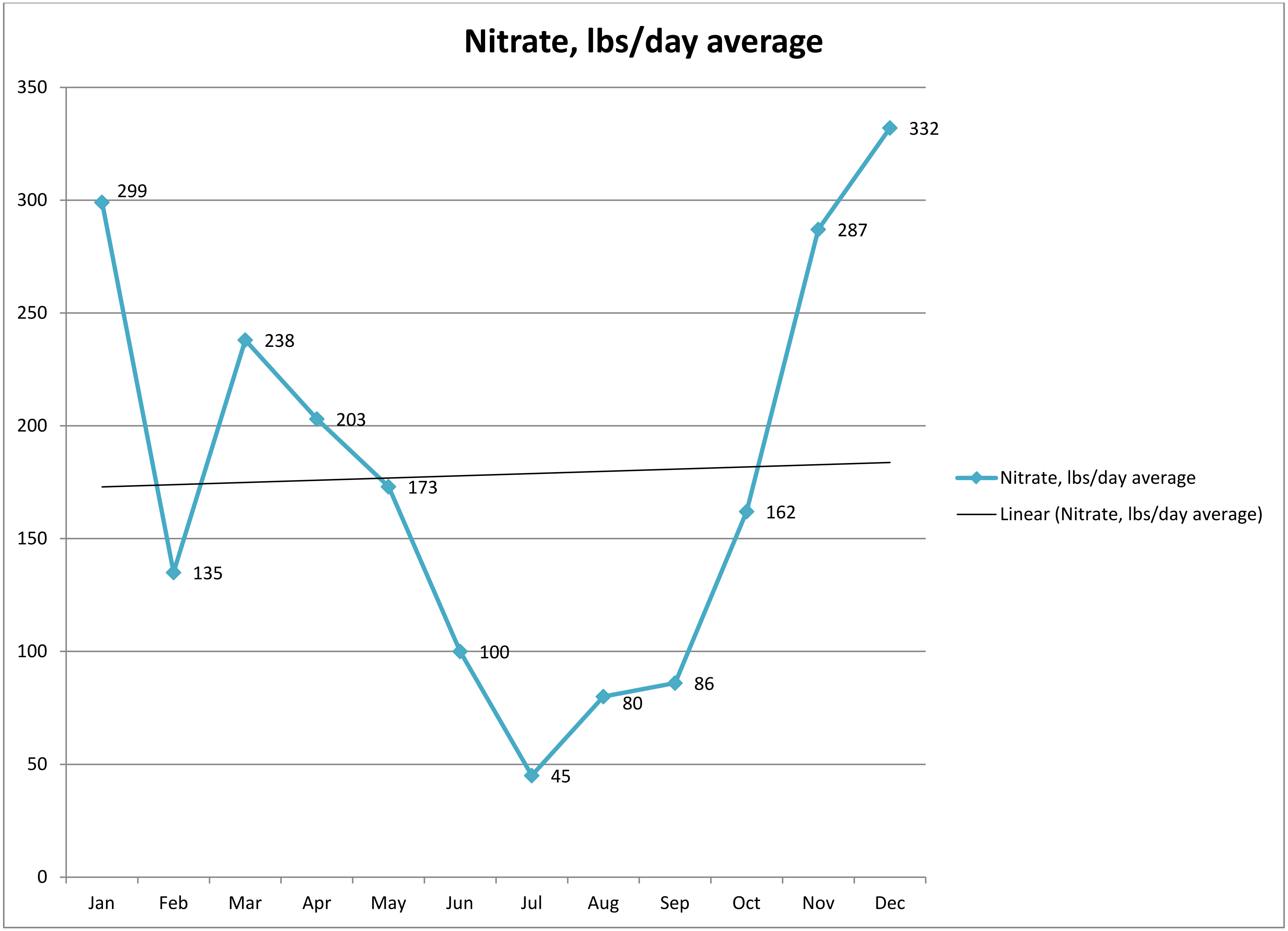

Mean Chlorine Risidual @ Contact Basin, mg/L
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
3.4
3.1
3.8
3.8
2.5
2.3
2.2
2.3
2.5
3.6
3
2.9
Mean Chlorine Risidual @ Contact Basin, mg/L
Linear (Mean Chlorine Risidual @ Contact Basin, mg/L)

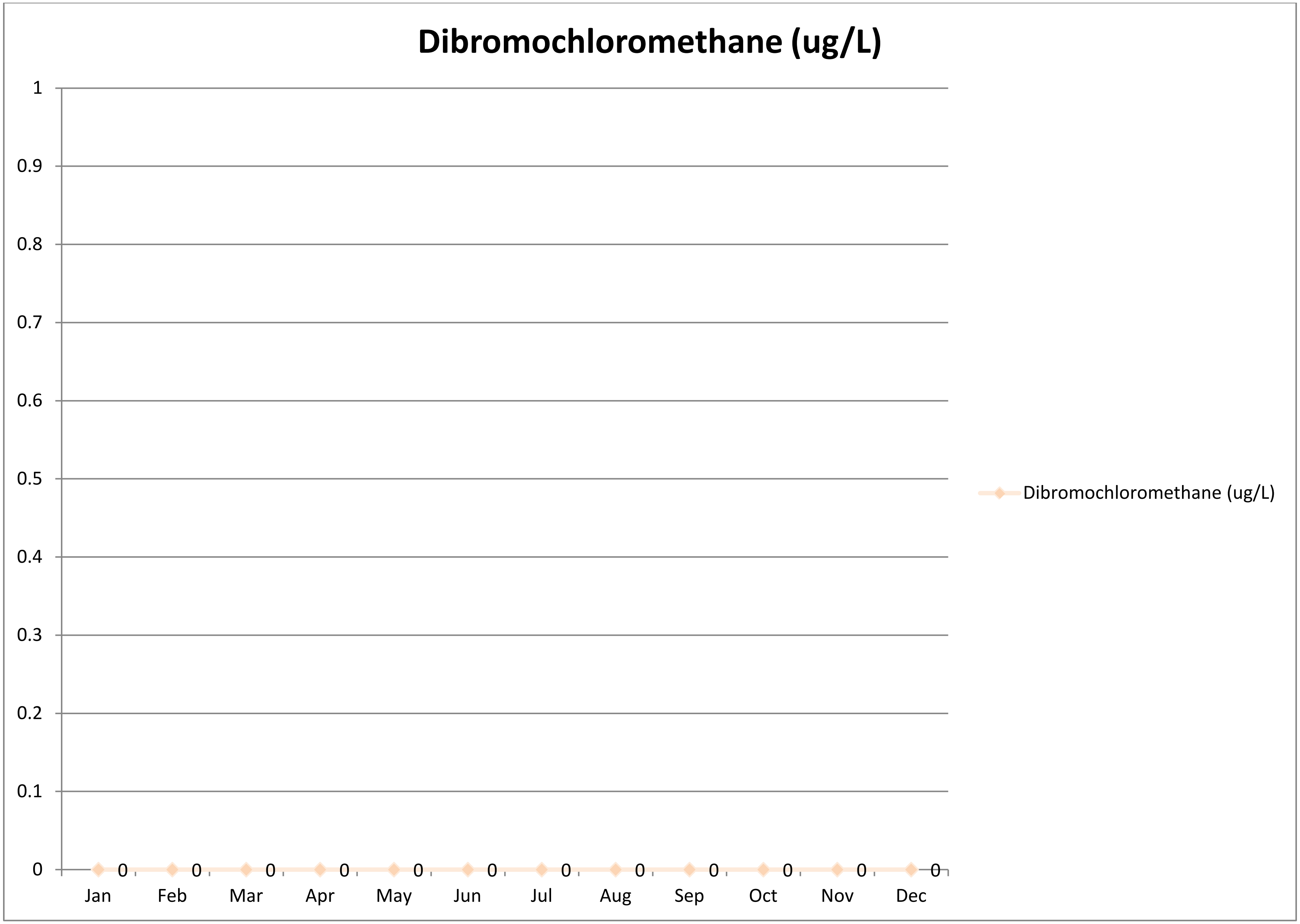

Mean Effluent Flow, MGD
3
2.5
2
1.5
1
0.5
0
2.565
1.154
2.04
1.157
0.99
0.921
0.879
0.871
0.862
1.14
1.5
1.95
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Mean Effluent Flow, MGD
Linear (Mean Effluent Flow, MGD)

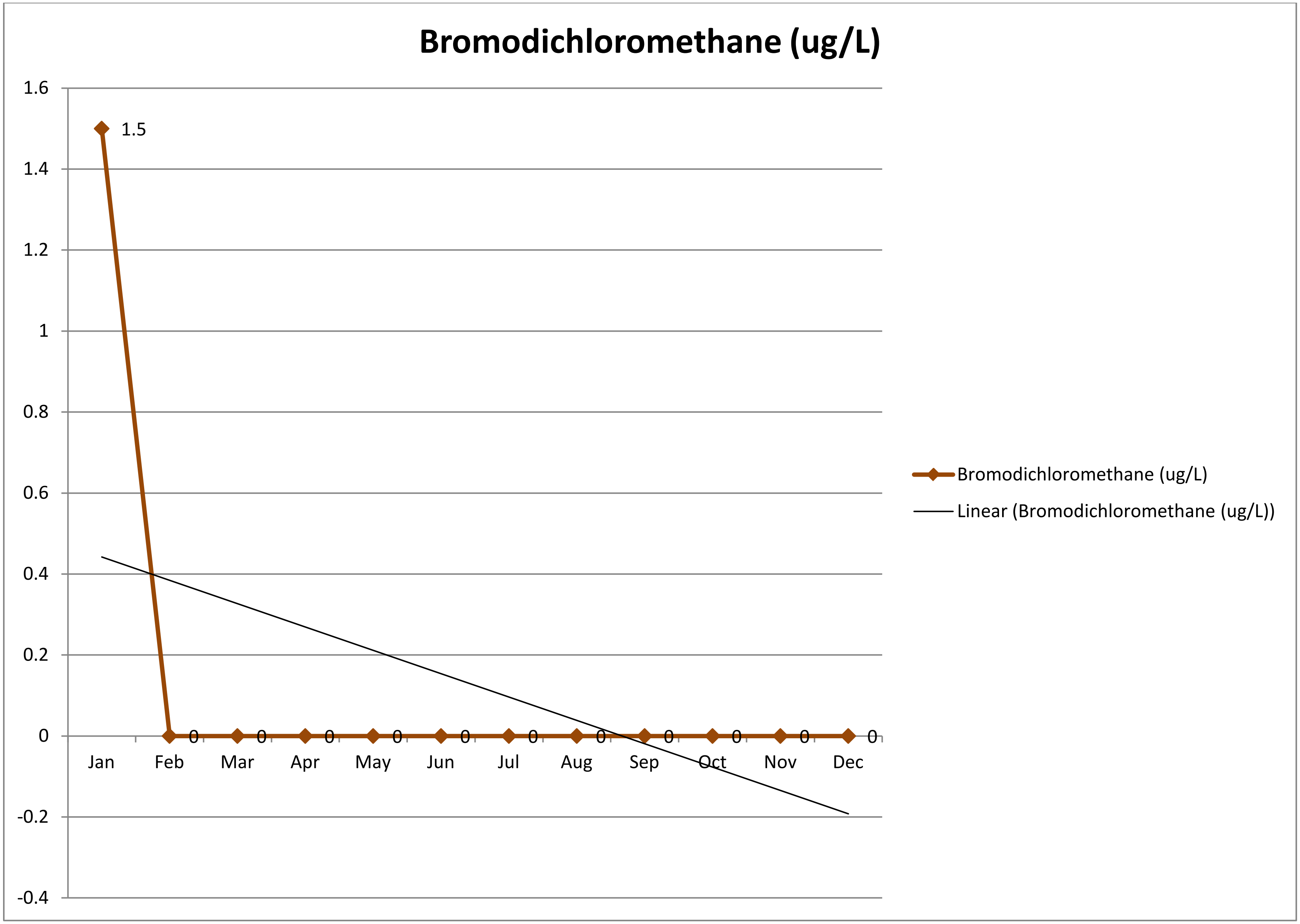


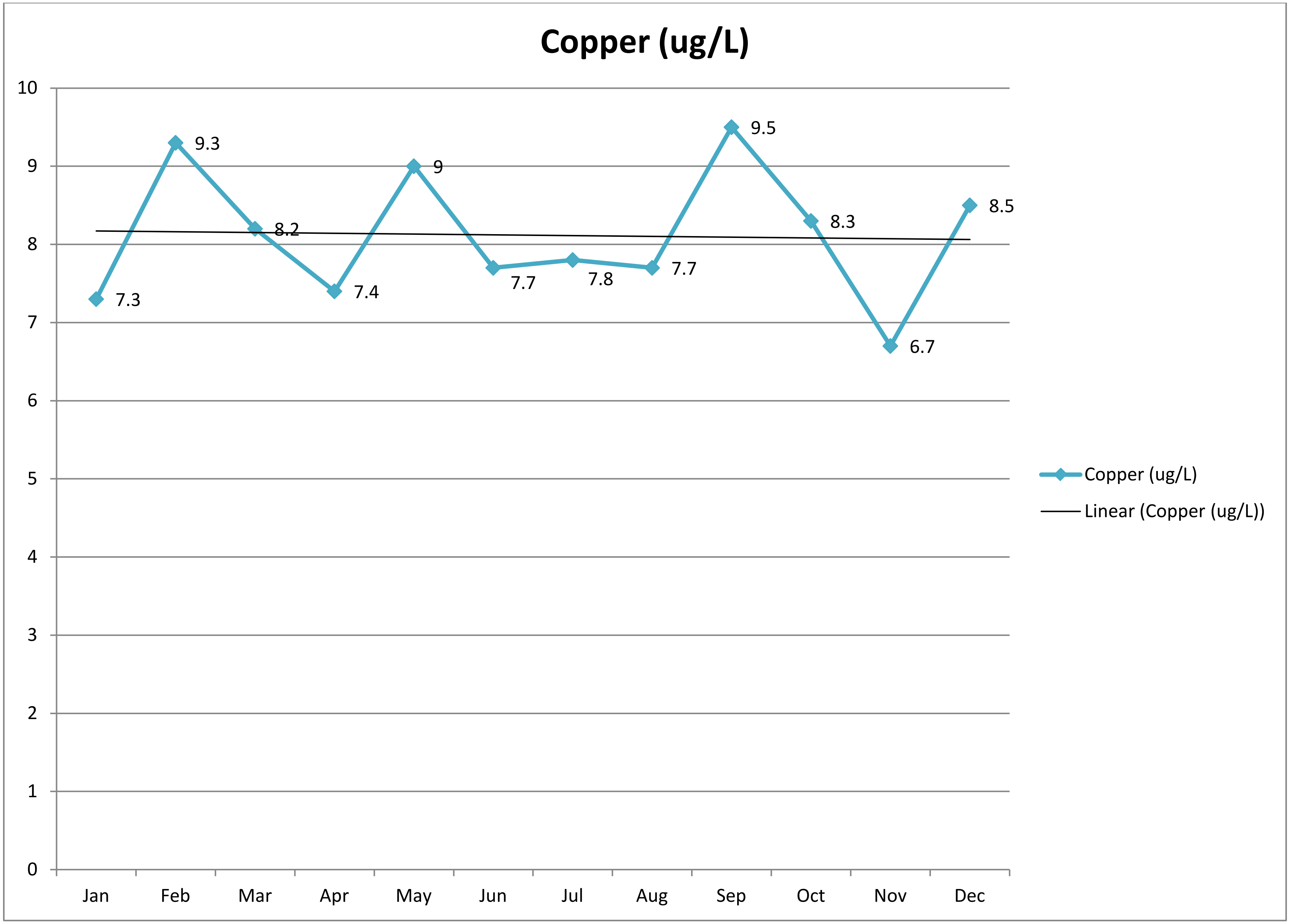
Sludge Wasted, LBS
40000
35000
30000
25000
20000
15000
10000
5000
0
37,786
31,157
25,672
28,340
26,895
24,964
23,852
27,233
25,955
29,559
33,521
33,856
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sludge Wasted, LBS
Linear (Sludge Wasted, LBS)

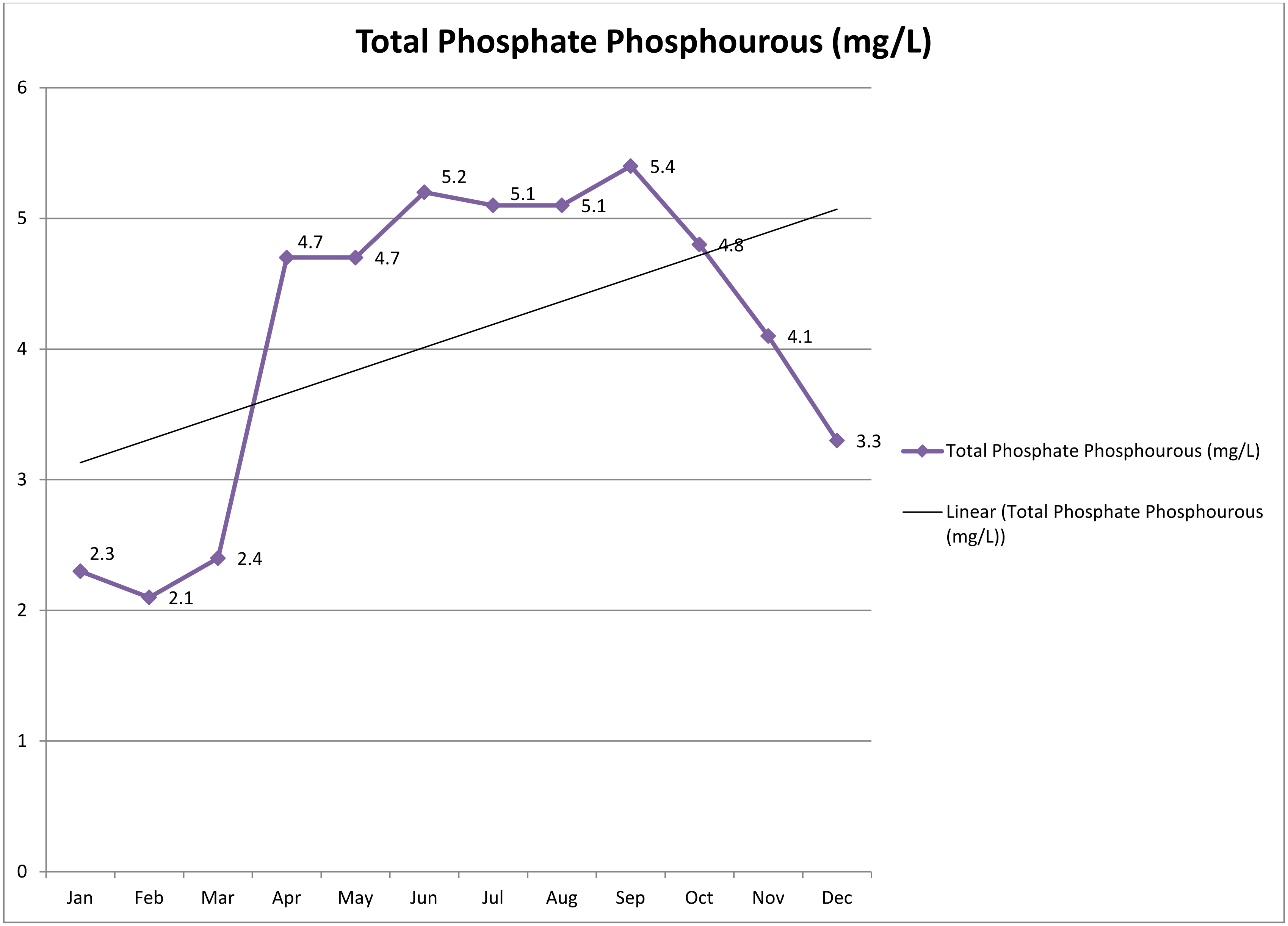

Mean Mixed Liqour Concentration, mg/L
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1608
1397
1310
1206
1163
1755
1673
1708
1829
1674
1479
1247
Mean Mixed Liqour Concentration, mg/L
Linear (Mean Mixed Liqour Concentration, mg/L)

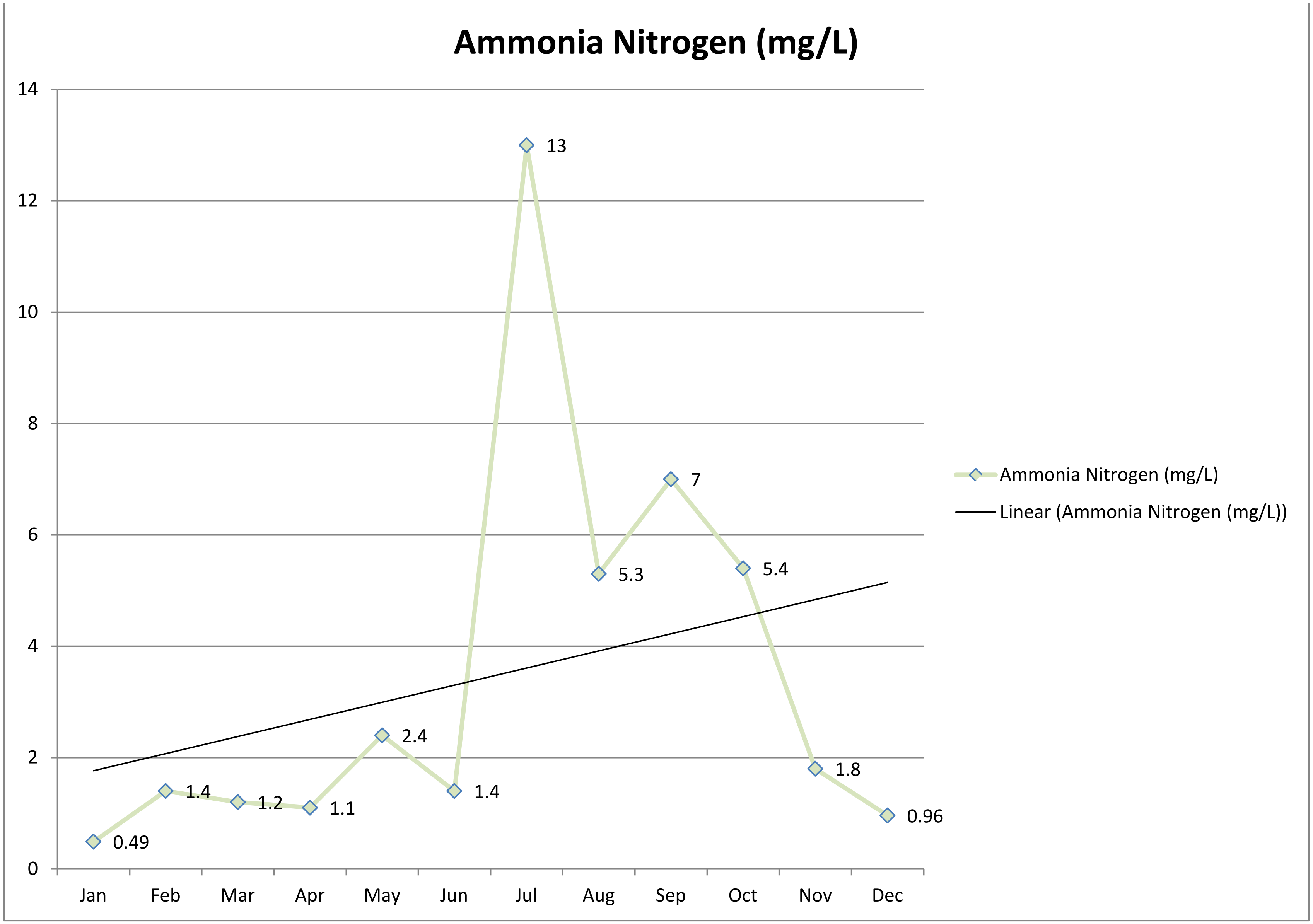

Nitrate, lbs/day average
350
300
250
200
150
100
50
0
299
135
238
203
173
100
45
80
86
162
287
332
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Nitrate, lbs/day average
Linear (Nitrate, lbs/day average)


Dibromochloromethane (ug/L)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 0 0 0 0 0 0 0 0 0 0 0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Dibromochloromethane (ug/L)


Bromodichloromethane (ug/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
1.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Bromodichloromethane (ug/L)
Linear (Bromodichloromethane (ug/L))


Copper (ug/L)
10
9
8
7
6
5
4
3
2
1
0
9.3
9
9.5
8.2
8.3
8.5
7.3
7.4
7.7
7.8
7.7
6.7
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Copper (ug/L)
Linear (Copper (ug/L))


Total Phosphate Phosphourous (mg/L)
6
5
4
3
2
1
0
2.3
2.1
2.4
4.7
4.7
5.2
5.1
5.1
5.4
4.8
4.1
3.3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Total Phosphate Phosphourous (mg/L)
Linear (Total Phosphate Phosphourous (mg/L))


Ammonia Nitrogen (mg/L)
14
12
10
8
6
4
2
0
13
7
5.3
5.4
2.4
1.4
1.2
1.1
1.4
0.49
1.8
0.96
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Ammonia Nitrogen (mg/L)
Linear (Ammonia Nitrogen (mg/L))