CITY OF
WADSWORTH
SINCE 1814
WASTEWATER TREATMENT

KRISTI BABCOCK, SUPERINTENDENT

- Began my career in wastewater in October 2007 as an Operator for the City of Defiance WWTP.
- Moved up to Chief Operator in June 2011.
- Moved up to Assistant Superintendent in August 2011.
- Became Superintendent of Wadsworth WWTP in January 2018.

- I earned my Class I & II license as an Operator.
  - Shout out to Neil Pry for encouraging to start getting my license.
  - Another shout out to Mike Maringer for teaching advanced wastewater classes and being a great mentor.
- I earned by Class III & IV while being Assistant Superintendent.
  - Another shout out to Kim Riddell (Furry) and Mike Maringer for encouraging me to write my Class IV. I wouldn't be where I am at today without them!!!

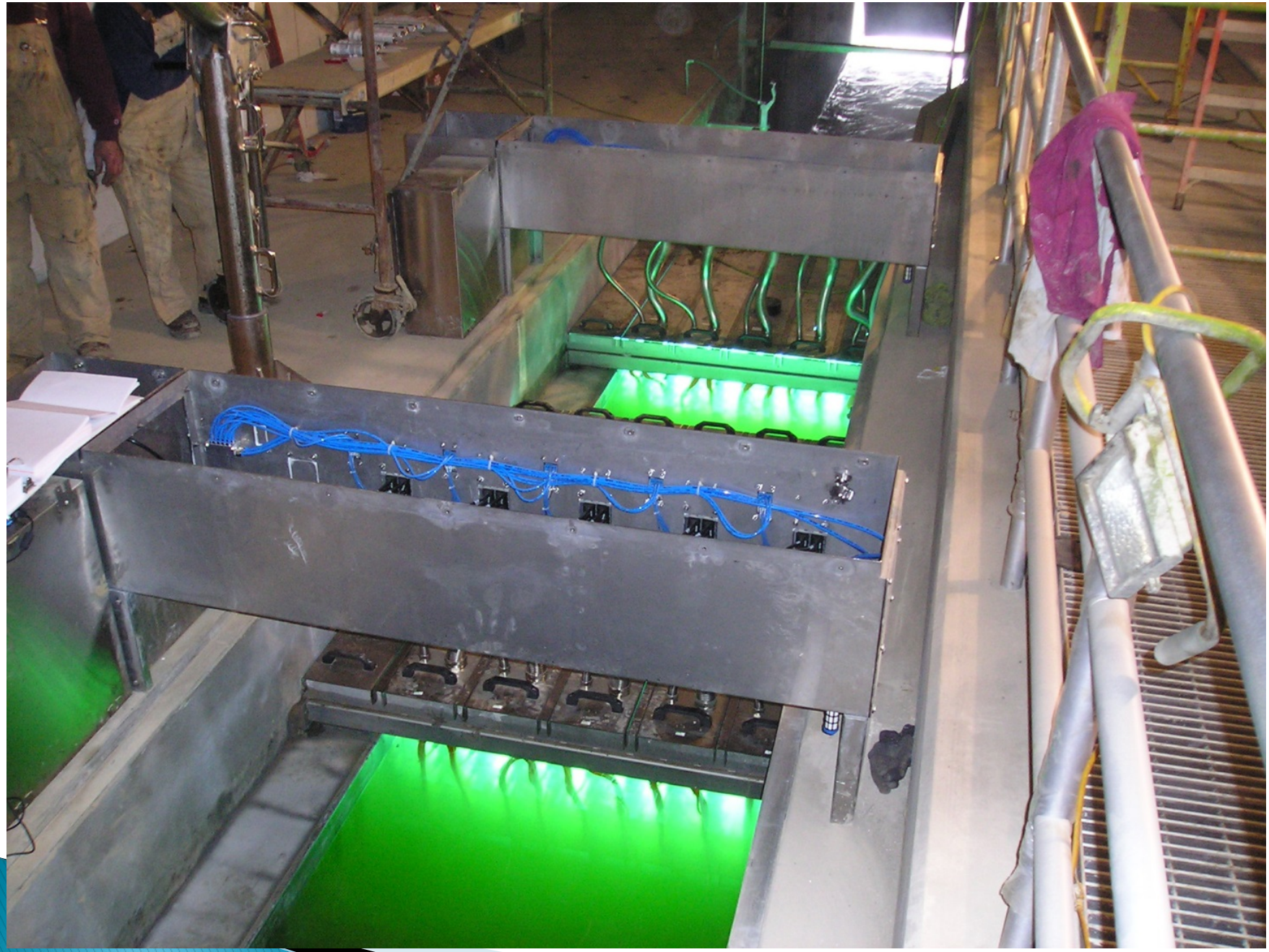
A few facts about Wadsworth:

- The city of Wadsworth has a population of approximately 23,000 residents.
- The tag line of “A Community Unmatched” comes from the Blue Tip Match Co. which was founded in Wadsworth.
- The City is unique that it provides many of it’s own services such as:
  - Water/Wastewater
  - Electric
  - Internet service (just rolled out 500 mps)
  - Cable TV (Citylink)
  - Sanitation
  - Parks
  - Streets
  - Cemetery
  - Airport

CITY OF WADSWORTH
SINCE 1814
A COMMUNITY UNMATCHED

A few facts about the WWTP:

- Class IV facility
- Serves not only Wadsworth City but a community to the north totaling approximately 25,000 residents.
- Designed for:
  - Average influent flow of 5 MGD
  - Peak daily flow of 10 MGD
  - Peak hourly flow of 15 MGD
- Actual average flow in 2017 was 3.3 MGD
- Last major construction of the plant was 2008.



Treatment process

- Preliminary
- Primary
- Secondary
- Tertiary
- Disinfection
- Solids Handling

Preliminary Treatment

- Flows are received by gravity from the collection system.
- Andritz mechanical bar screen with 6mm openings.
- Rags and debris are then removed and compacted through a dual compactor/washer.
- Wastewater flows are pumped through four 75 hp Chicago pumps to the grit removal system.
- Grit removal is a Smith & Loveless 16’ diameter vortex system.


ANDRITZ
11/20/2014 11:42


EXIT
CAUTION

Primary Treatment

- Primary clarifiers:
  - 2 Envirodyne tanks
  - Each is 70’ in diameter with 12’ side water depth
  - Total capacity is 15 MGD
  - Designed to remove 50% TSS and 35% CBOD.
- Primary Sludge Pumps
  - 2 Moyno 2-stage pumps
  - Rated for 100 gpm.
  - There are Moyno grinders before the pumps.
  - Operated through SCADA.

Secondary Treatment

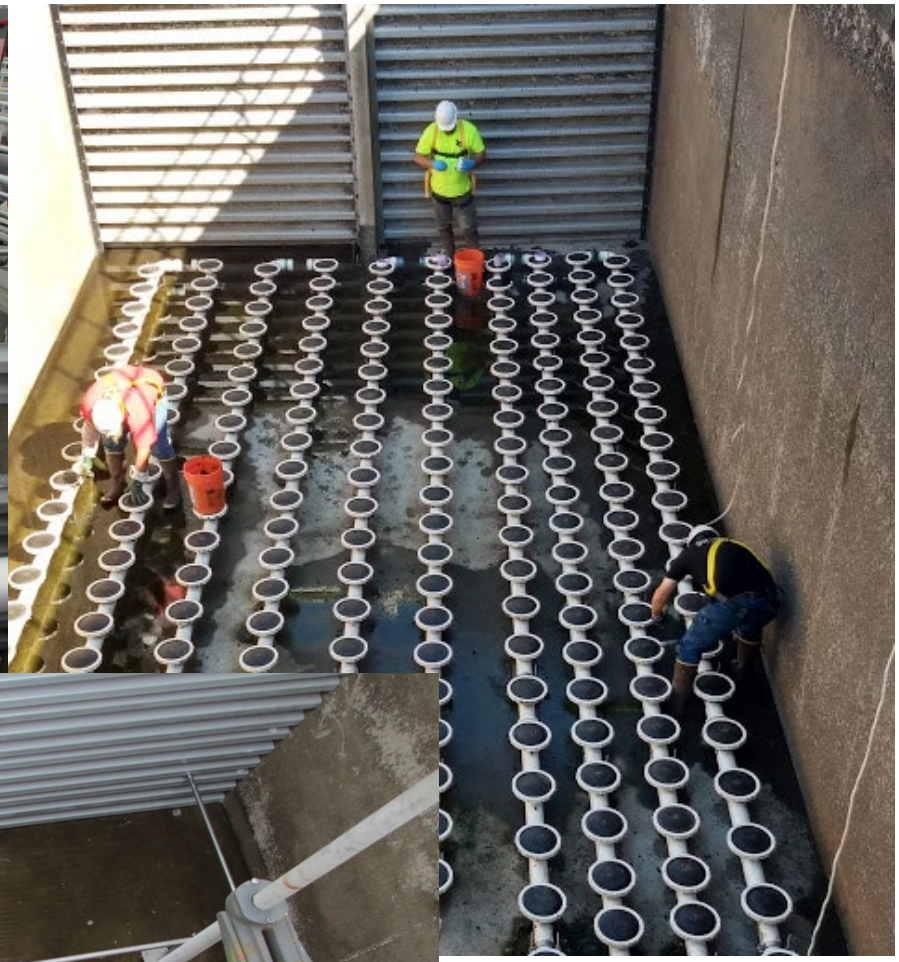
- Flow splitter box:
  - Automatically diverts flows away from aeration influent.
  - Is controlled by a pressure transducer and using ultrasonic level control.
  - The SCADA system will divert flow to tertiary treatment if aeration can not handle the flows during a wet weather event. Usually set at 10 MGD.
  - Return activated sludge is discharged into this box for complete mixing with Primary effluent.
  - Sodium Aluminate is added for Phosphorus removal.

Secondary Treatment (cont)

- Aeration tanks
  - Four trains with a design of processing 10 MGD.
  - There are three tanks per train.
  - The first tank in each train has been retrofitted to include a BNR Enviromix system. This was done in 2015.
  - There are Sanitaire fine bubble floor diffusers.
  - Air is supplied by one 150 hp Neuros high efficiency turbo blower.
  - There are also three 150 hp Hoffman centrifugal blowers.

Secondary Treatment (cont)

- Enviromix BNR system
  - Installed during 2015 as part of a Honeywell project for cost reduction. The Neuros blower was installed at the same time.
  - It consists of course bubble diffusers for mixing.
  - It has three chambers that allows the wastewater to serpentine for detention time.
  - Detention time is between 70 to 100 minutes with flows ranging from 2.8 MGD to 4 MGD.
  - Designed to remove 4 mg/l in 90 minutes.



Problem areas:

- Due to low F/M ratio that is not accomplished. (F/M=0.05)
- Sludge age was 48 days when I arrived in January. Microbiology consisted of rotifers, water bears and worms.
- Since then, the sludge age is down to 28 days with a good mix of microbiology.
- Draining of the aeration and final tanks is pumped back to the head of the aeration tanks.
- On press and GBT days, sodium aluminate is still being fed.

Secondary Treatment (cont)

- Final Clarifiers
  - Two 84’ tanks with a side water depth of 14’.
  - Envirodyne system with a suction header type sludge collector mechanism.
  - RAS pumps are Wemco centrifugal pumps on a VFD. Return rates are based on a percentage of the influent flow.
  - WAS pumps are Wemco constant speed pumps. Wasting is done three times per day.

Tertiary Treatment

- 5 – Flygt vertical can submersible pumps
  - Pumps final clarifier effluent to the tertiary filters
  - Each pump is on a VFD.
- Tertiary Filters
  - US Filter/Davco traveling bridge units
  - Three tanks that are designed to process 5 MGD each, totaling 15 MGD.
  - Designed to have an effluent value of:
    - TSS <= 5 mg/l
    - CBOD <= 5 mg/l
    - Nh3 <= 0.5 mg/l

Disinfection

- Wedeco UV system
  - Two banks with each containing 60 bulbs.
  - Has a 15 MGD capacity
  - Online May 1st through October 31st.
  - Only one bank runs at 50% during normal flows.
  - Banks need to be pulled mid season to clean bulbs.

Step Aeration

- Flows discharge down step aeration to gain DO before being discharged into River Styx.


REX

Solids Handling

- Two waste tanks for final clarifier solids
  - Each tank holds 155,000 gallons
  - There are two Hoffman/Gardner Denver centrifugal blowers to course bubble diffusers.
  - The tanks are mixed once per day for approximately ½ hour.

Solids Handling (cont)

- Solids from the waste tanks are sent through an Ashbrook Gravity Belt Thickener (GBT).
- Polymer is added to aid in thickening. (Currently use Tidewater)
- Thickened sludge is stored in a blended sludge tank.
- A portion of thickened sludge is transferred daily to the Primary Anaerobic Digester.


EXIT

Solids Handling (cont)

- 4-Anaerobic Digesters (Mesophilic)
  - 2 - Primary Digesters
    - #1 = 451,000 gallons
    - #2 = 235,000 gallons
  - 2 - Secondary Digesters
    - 255,000 gallons each
  - Only one primary and one secondary digester are used.
  - Primary digester is mixed once per day using a Wemco centrifugal pump.
  - Methane gas is used in the US Filter/Envirex boiler to heat the sludge.
  - Sludge is transferred twice per week from the primary to the secondary digester.

Solids Handling (cont)

- Digested sludge from the secondary digester is processed through an Ashbrook belt filter press once per week.
- Polymer is added to increase solids content.
- Solids are pressed to approximately 18%–20%.


ASHBROOK CORPORATION
HOUSTON, TEXAS

Solids Handling (cont)

- Class B biosolids are stored in a 50'x100' pole building until it can be applied to farm fields for disposal.
- This is contracted out. Currently Agri-Sludge has the contract.

Effluent Limits

- NPDES Permit Effluent limits and Averages for 2017.

Parameter	NPDES Limit	Average
CBOD	16 mg/l – Weekly 11 mg/l – monthly	0.23 mg/l
TSS	22 mg/l – Weekly (winter) 19 mg/l – Weekly (summer) 14 mg/l – Monthly (winter) 13 mg/l – Monthly (summer)	4.47 mg/l
Ammonia	6.5 mg/l – Weekly (winter) 1.7 mg/l – Weekly (summer) 4.0 mg/l – Monthly (winter) 1.0 mg/l – Weekly (summer)	0.11 mg/l
Phosphorus, T	1.5 mg/l – Weekly 1.0 mg/l – Monthly	0.35 mg/l
eColi	362#/100 ml – Weekly 161#/100 ml – Monthly	<1.0/100 ml

Other Parameters:

- Other parameters of interest:

Parameter	Average effluent values
Oil & Grease	<5.0 mg/l
TKN	0.80 mg/l
Nitrite + Nitrate	13.6 mg/l
Dissolved Orthophosphate (as P)	0.26 mg/l
Total Filterable Residue	660 mg/l

Pretreatment

- 2% of the influent flow is from industrial users.
- Four industries on the pretreatment program.
- One is categorical and the other three are significant non-categorical.
- Working towards implementing a FOG program.
- Working on educating the public on what to flush and what not to flush.

June 22nd & June 25th Primary tanks

Laboratory

- The city employs one full time Lab Chemist.
- Tests run in-house include:
  - CBOD
  - Nh3
  - Phosphorus, T
  - Total Suspended Solids
  - Total Dissolved Solids
  - eColi
- Penny has passed all of her DMRQA's since she started 7 years ago! Way to go Penny!

Personnel: Years of service

- Chief Operator – 43 years (rehire–Class III)
- Plant Operator – 32 years (Class I)
- Plant Operator – 23 years (Class I)
- Plant Operator – 14 years (Class II)
- Lab Chemist – 7 years (Class III & Class III Lab)
- Plant Operator – 4 years (Class III)
- Plant Operator – 4 years (Class III)
- Maintenance Mechanic – 3 years (Class III)

Will have three retirements in 2019 and one in 2020!

Any Questions???


JAMES E LIPFORD JR
PFC
US ARMY
WORLD WAR II
NOV 6 1925
MAY 29 2016
LOVING HUSBAND
FATHER AND
GRANDFATHER
FREDA TOLLIVER MILES
CHARLES GARDNER
ARTIS LEE SMITH
PVT
US ARMY
VIETNAM
JAN 24 1950
MAY 23 2017
MARSHALL L TURNER
SR
US NAVY
FEB 12 1950
MAR 28 2017
A FATHER
BROTHER FRIEND
NEVER FORGOTTEN
JOHN J
SAND JR
DeWITT CHAPMAN JR
JAMES L WHITFIELD
SGT
US ARMY
APR 7 1924
MAY 30 2017
LOVING HUSBAND
FATHER AND
GRANDFATHER


Ohio Western Reserve National Cemetery

Tallest married couple!

- Seville OH is the resting place of the world's tallest couple.
- Anna Bates was 7'11" and 413 lbs.
- Captain Bates was 7'9" and 470 lbs.
- Their infant son (which only lived 11 hours) was 30" long and weighed 23 ¾ lbs.