Discharge Exceedances
Flow, Turbidity, and Metals

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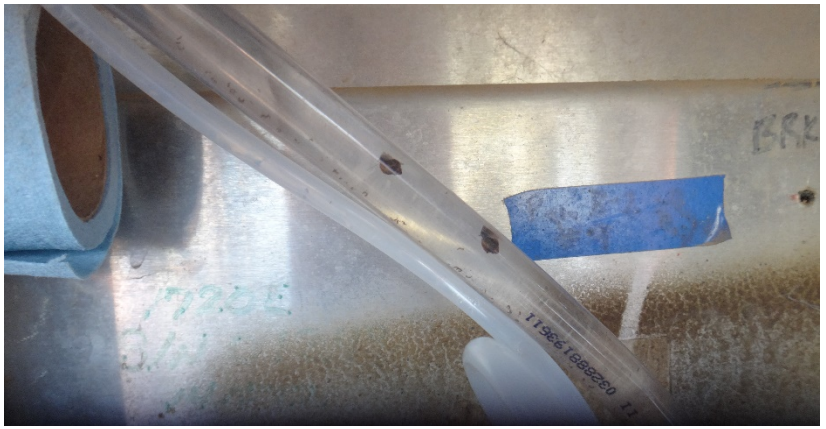
ADEQ
Arizona Department
of Environmental Quality

Flow and Turbidity Discharge Exceedances

What causes each?

Flow

Turbidity



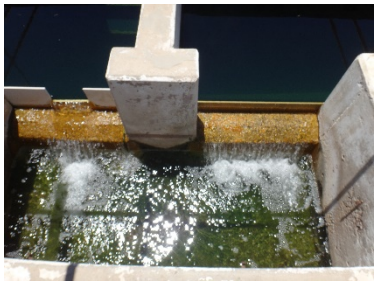
Flow Exceedances

Underwater?

Flow

- There are two types of plant flow.

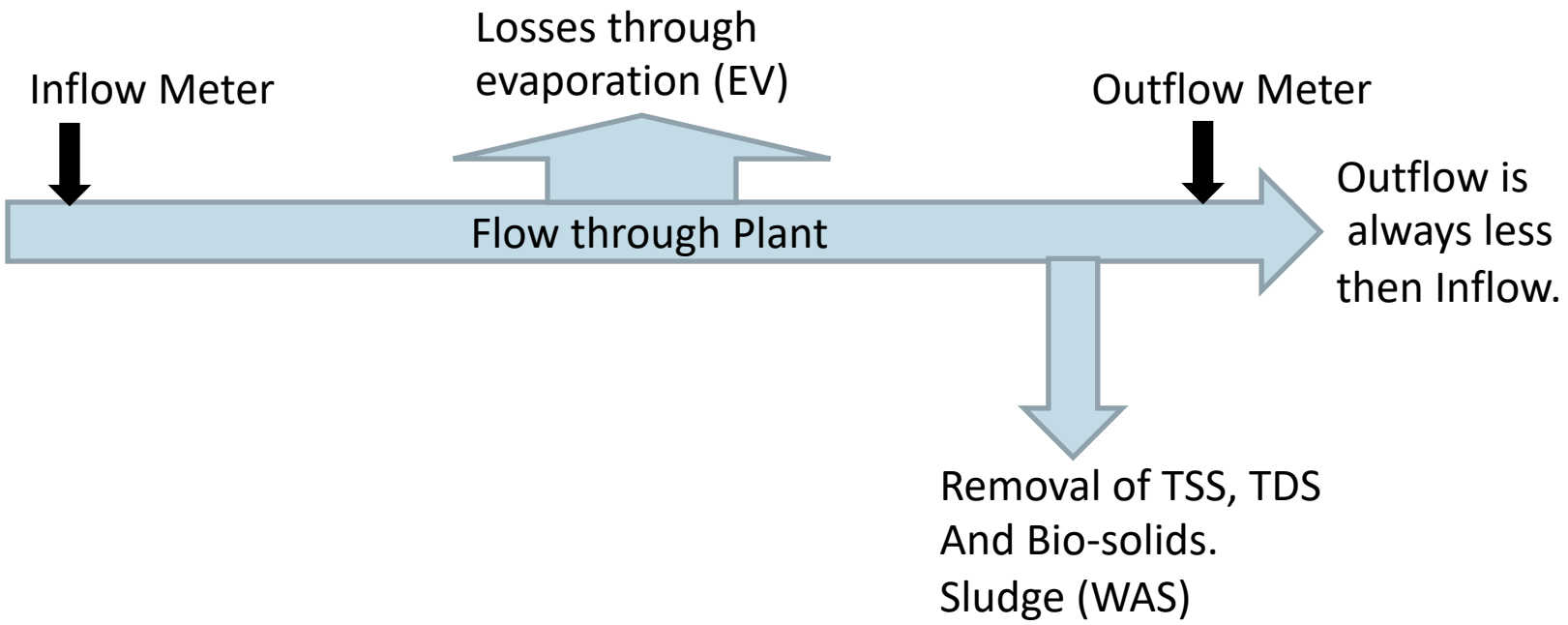
- Flows into the plant, Inflow.



- Flows leaving the plant, Outflow.
- Inflows must be metered by permit.
- Outflow only if called for in the permit (reuse).

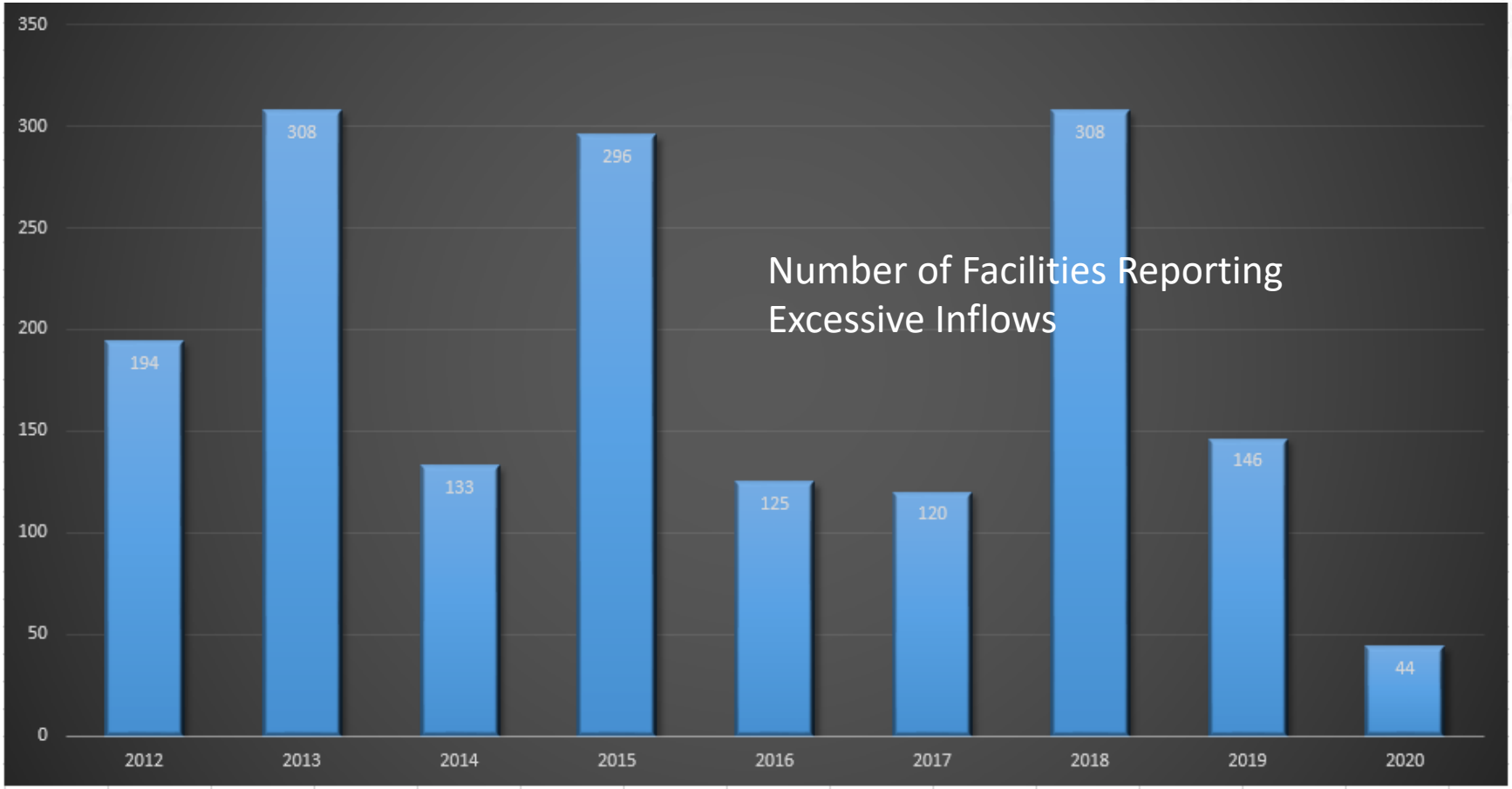
Flow – Meter Review

- All permits call for inflow meter.
  - Why?
  - To measure the total volume of wastewater being treated before the volume losses (Design Flows).



Flows Historical Data

Total Number of Flow Exceedances by Year

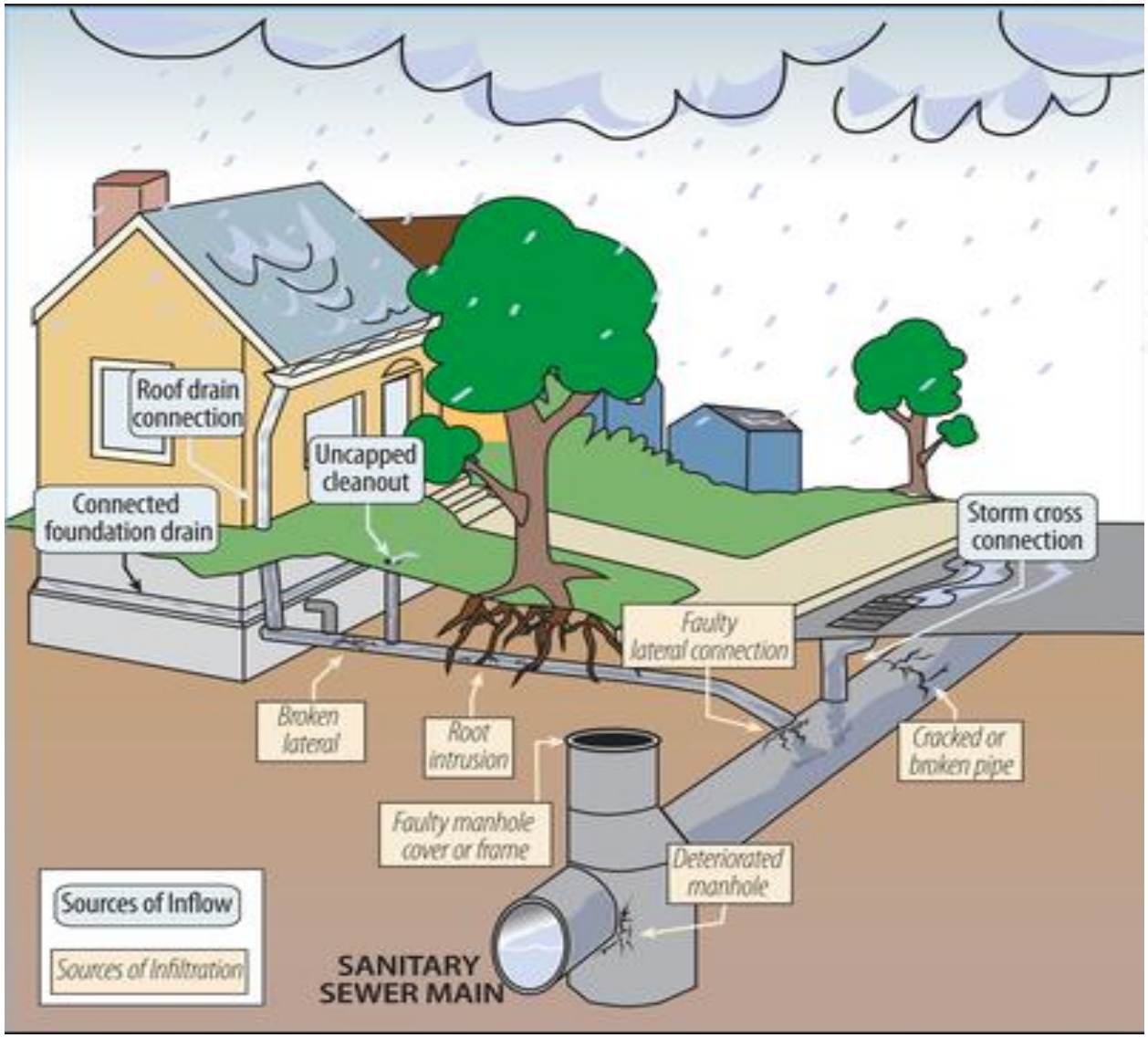


What could cause excessive inflows?

Besides the meter not being calibrated

Calibrate meters as per manufacture cycle

Flows – Review of the Collection System Issues



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Flows – Infiltration Example

Old waterline running through a manhole.

Flows – Infiltration Example

Signs of infiltration in an old manhole. (Black area around the bottom.)

Flows – Infiltration Example

No grout around a later added service line penetration (gold arrow).

Flows – Inflow Example

No manhole cover seal (gold arrow).

Flows – Inflow Example

Cross-section of the street and location of the manhole.

Flows – Inflow Example

Gold Arrows:
Open old service line on top and ground level hole in service line.

Flows – Inflow Example

Gold Arrow:
Loose ground level plug.

Flows

- Other sources of excessive Inflows
  - Actual flow commitments vs future
    - Are your service commitments over extended?
    - Never over comment to future customers
  - New subdivisions providing flows above the permit limit
    - Time for a new permit and increase to plant capacity

Flows - Review

- What can a facility do for flow?
  - Make sure your meter is calibrated.
  - Seal your collection system.
  - PM is Major to prevent I&I!
  - Never over extend service agreements without plant capacity.

Turbidity

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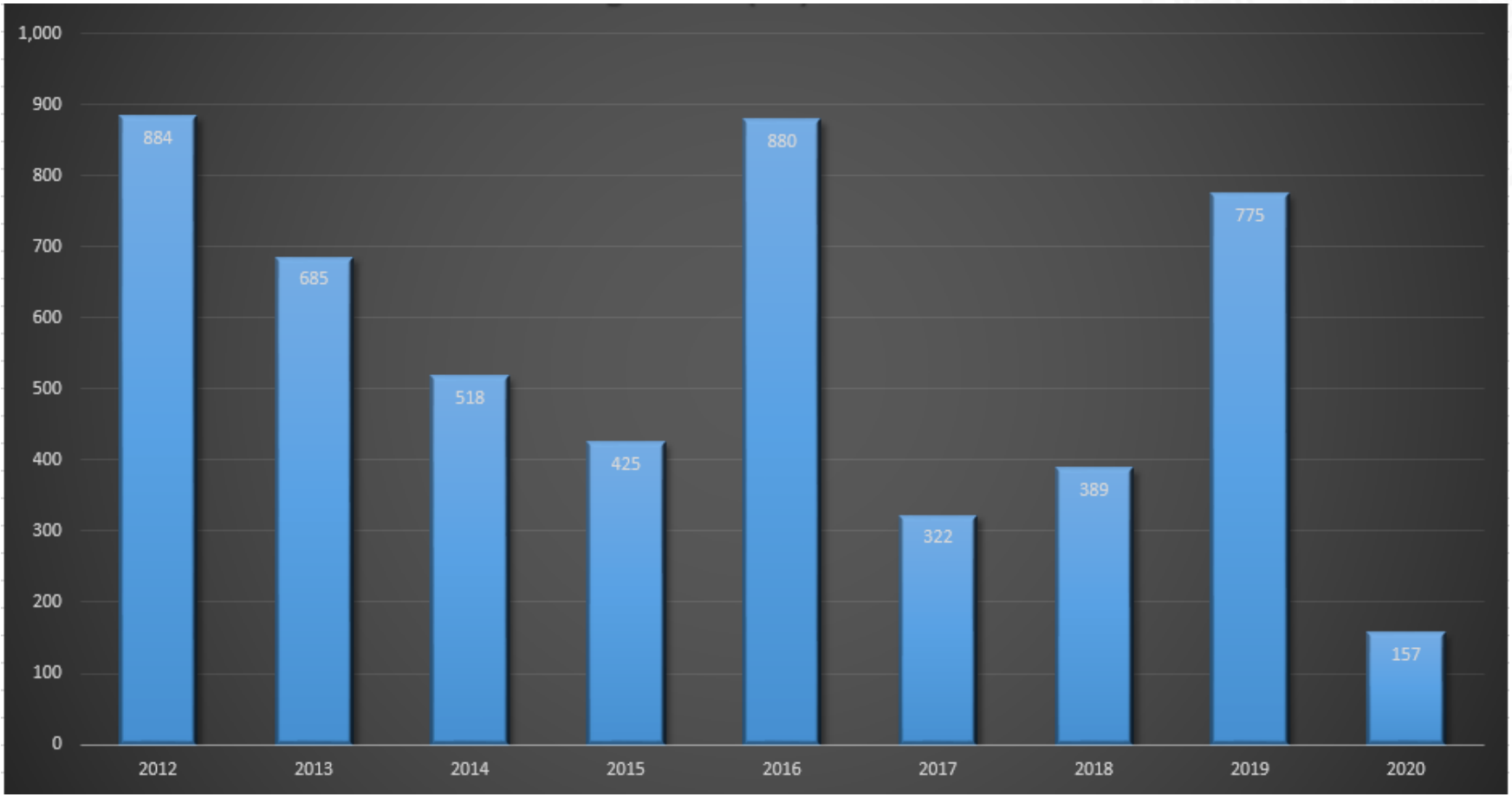
Next Turbidity Exceedances

Turbidity

- Causes of Turbidity
  - Old meter
  - Meter maintenance
  - Meter Reset
  - Heavy Inflows
  - Clarifier short-circuiting
  - Clarifier upsets
  - Chlorination serpentine not being maintained

Turbidity – Historical Data

Total Number of Turbidity Exceedances by Year



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What are some of the major causes of turbidity reporting?

Turbidity – Meter Maintenance Example

Escargot?

Turbidity – Solids over the Clarifier Weir

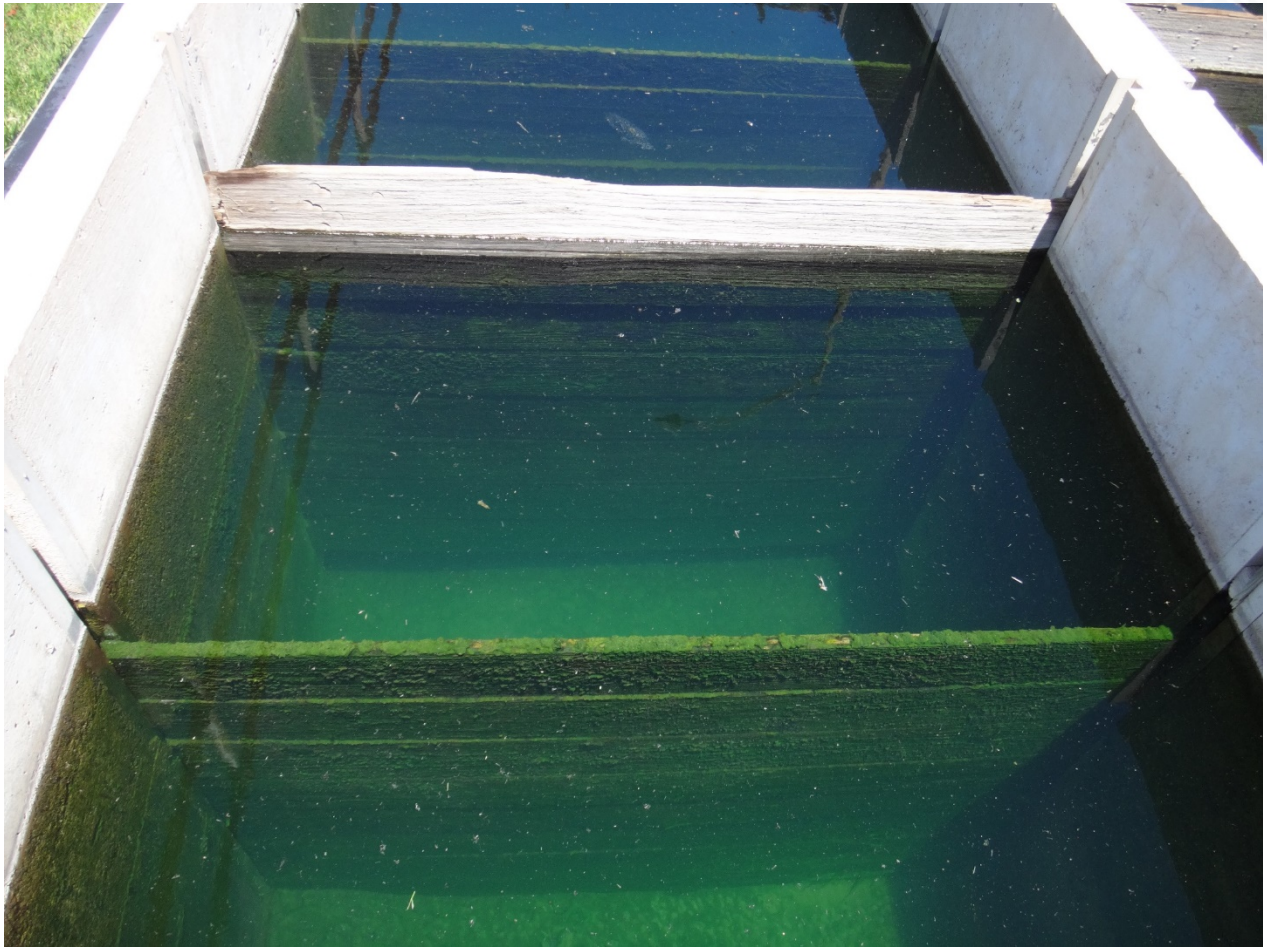
Turbidity Algae and Moss on the Clarifier Weir

Turbidity – Plant Maintenance

How about plant maintenance? The left tank is the clarifier.

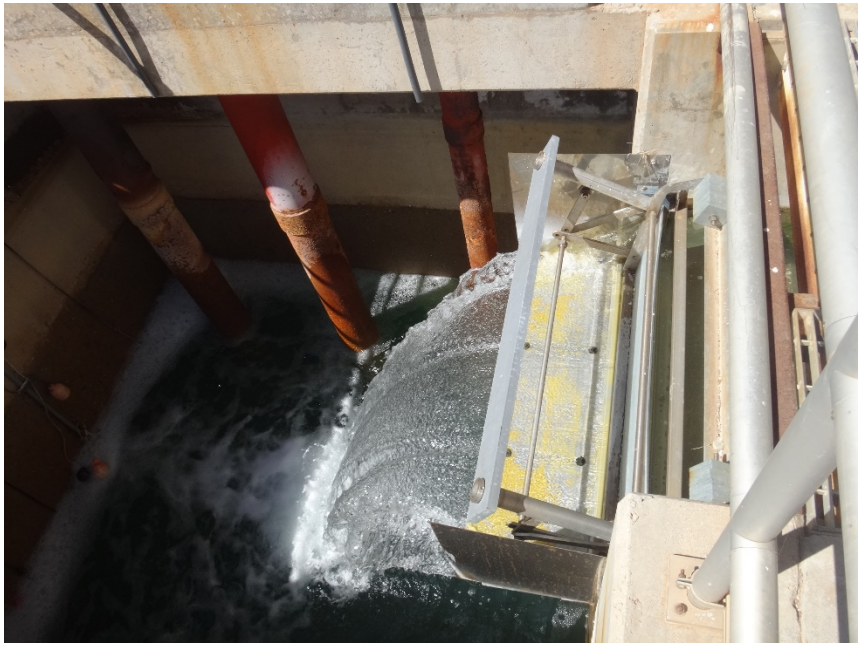
Turbidity – Chlorination Channels

Better, but watch the algae and moss on the sides



Turbidity – Sand Filter Reduction

A well kept sand filter can produce clear water.



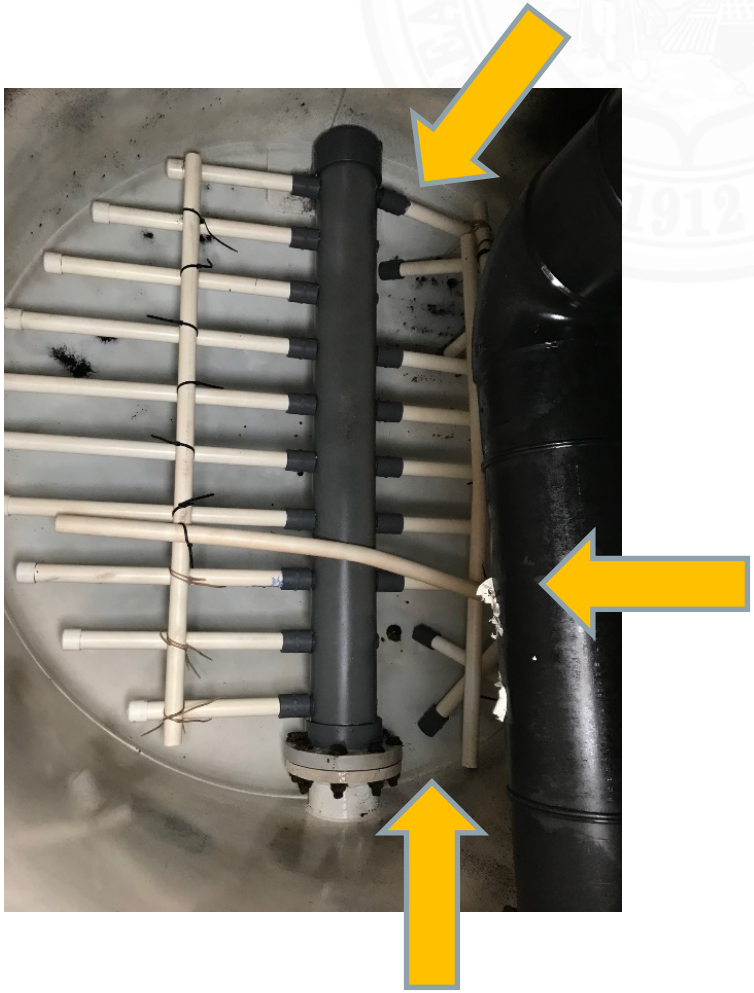
Turbidity – Sand Filter Maintenance

Be wary of enclosed sand filters.

What you don’t see…

Turbidity – Filter issues

…Can cause problems when it breaks.



Turbidity

- What has been a major reported cause of Turbidity?

- Operator Error
  - Turbidity spikes reported right after the operator has either preformed turbidity meter maintenance, or having not let the filter settle right after back flushing.
  - Read your permit fully!

Turbidity

- A common cause is failure of the operator to read and follow permit footnotes.

- All APP permits since at least 2012 on, there is this footnote in the turbidity footnote:
  - Occasional spikes due to back-flushing or instrument malfunction shall not be considered an exceedance.

Turbidity

- So, what is an operator to do?
- Meters
- 1) Keep them clean.
- 2) Don’t report the spike after the turbidity meter has been cleaned. Reset the meter and give it five minutes to settle. Even if continuous readings are required.
- 3) If you don’t have a reset on the meter, it may be time to get a new meter.

Turbidity

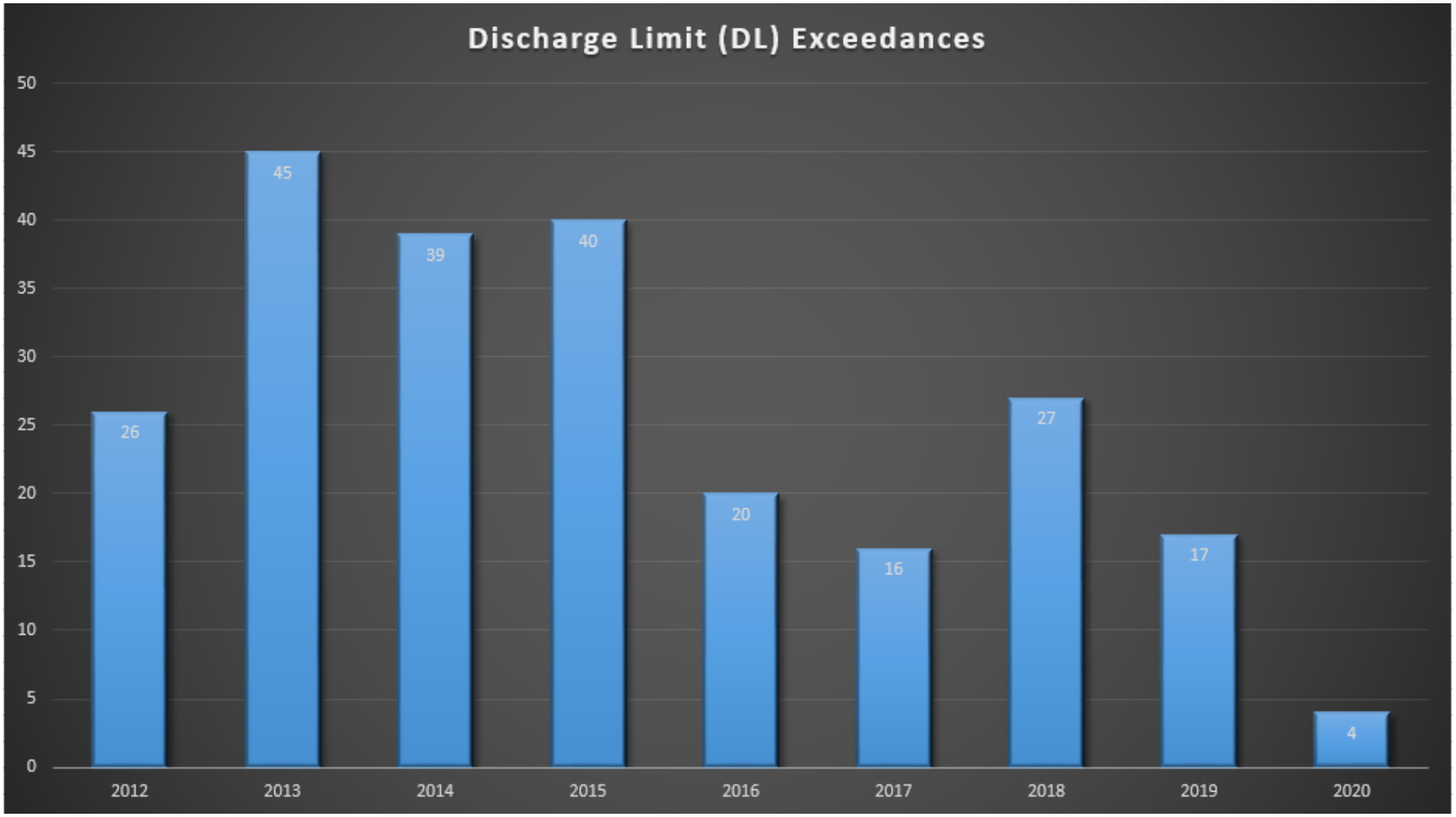
- Filters

- 1) Run all flush water to the headworks.
- 2) Let the filter settle for up to 30 minutes before resuming discharge and recording/reporting turbidity.

Turbidity - Review

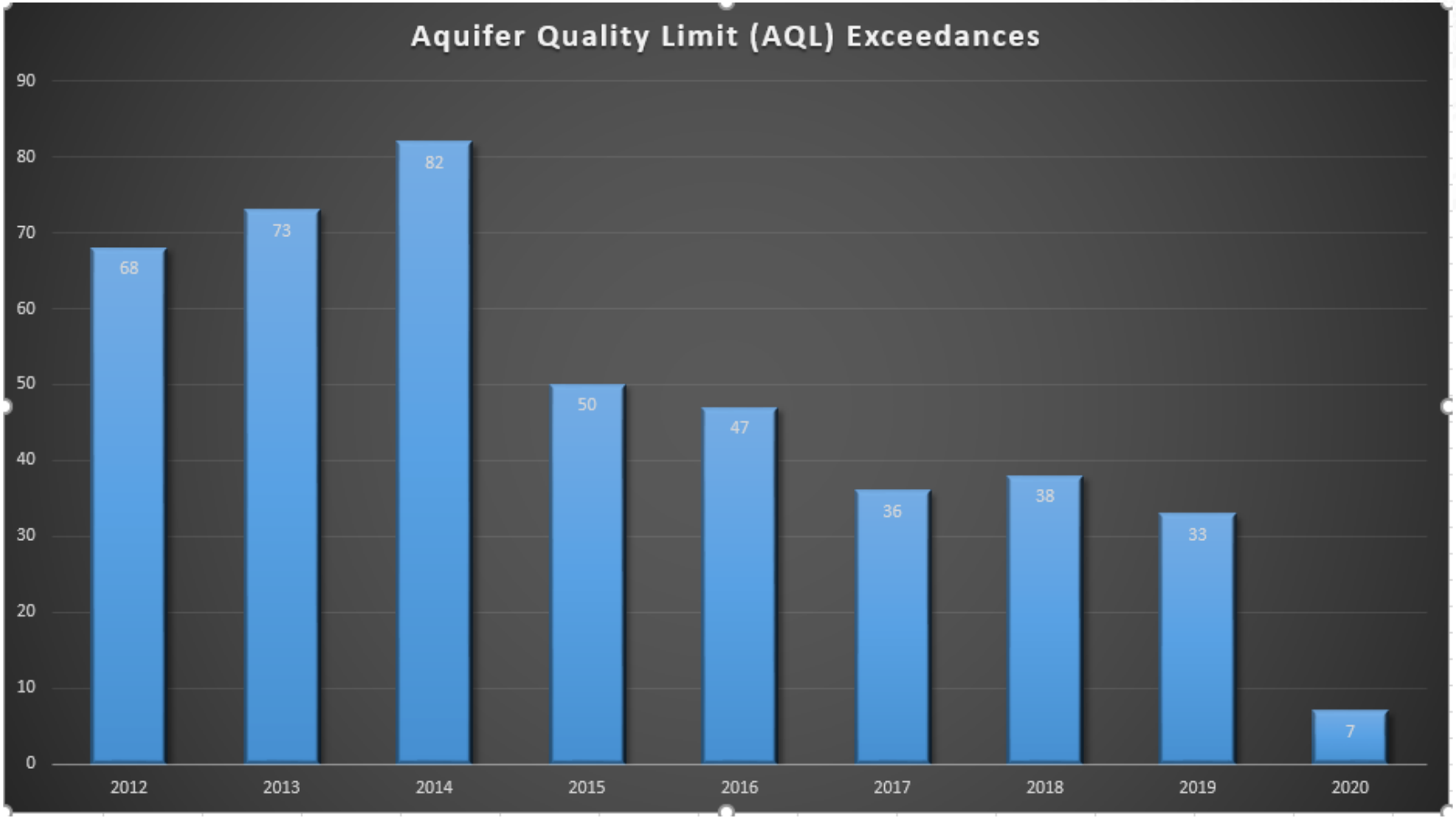
- It is up to the operator to report correctly.
- Read you permit all the way through and include the footnotes. There's gold in them!
- Keep the meters clean, including the supporting tubing.
- Make sure filters are well maintained.

Total Number of Metal Exceedances by Year



Metals

Total Number of Metal Exceedances by Year



Metals

- Overall, the plant discharges are looking good.

- Remember
  - Precipitate out as much of the metals.
  - Get metals to a non-dissolvable state and into the sludge.
  - Out of the water and into the landfill not into the aquifer.

Close

Keep your eyes open for problems.

Make sure your equipment is maintained.

Seal the collection system so only wastewater in the sewers.

Know your customers and what they put in the collection system.

Flow, Turbidity and Metals

15 Minute Break

Back at 10:10 am

15

Minutes Left

15 Minute Break

Back at 10:10 am

14

Minutes Left

15 Minute Break

Back at 10:10 am

13

Minutes Left

15 Minute Break

Back at 10:10 am

12

Minutes Left

15 Minute Break

Back at 10:10 am

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15 Minute Break

Back at 10:10 am

3

Minutes Left

15 Minute Break

Back at 10:10 am

2

Minutes Left

15 Minute Break

Back at 10:10 am

1

Minutes Left

15 Minute Break

Back at 10:10 am

Time is Up!

Get Ready