

Waste Water Treatment Review

Jim Collins

Business Development Manager-Brenntag Mid-South, Inc.

Efforts to comply with environmental regulations has never been better

- ▶ Commitment from senior management
- ▶ Continuous operator training
- ▶ Willingness to purchase/install quality equipment
- ▶ ISO 15000 is coming!!



Despite tremendous
efforts, problems still
occur!

City of Chicago vs. U.S. Steel - Portageville, IN

- ▶ **Alleged violation of the Clean Water Act**
- ▶ **Alleged violation of the NPDES Permit in place**



View of Indiana steel mills from Promontory Point in Chicago's Hyde Park during subzero temperatures on January 2, 2018.



U.S. Steel's Portage, Indiana, plant released 56.7 pounds of chromium on Oct. 25.
That's nearly double the plant's allowable daily release of the potentially cancer-causing chemical.



What is another problem for
Lake Michigan?

A large, detailed image of an Asian carp swimming in clear water. The fish is dark brown with a lighter underbelly. In the background, other smaller Asian carp are visible. The text 'asian carp' is overlaid in a large, white, sans-serif font. Below it, the words 'asian carp' are repeated in a smaller, green, sans-serif font.

asian carp

asian carp asian carp asian carp
asian carp

Asian Carp

Huge fear

Really
destroys
fish

Some
have been
found

You can't
take him
to court!!

Questions? & Answers.

Q1



“Any organic that has an affinity for minerals and/or soluble metals present in a solution.”

Chelant or Sequestration Agent

A1

Q2



“Any organic that participates in a photochemical reaction while emitting into the atmosphere”

Volatile Organic Compound

A2

Q3



The measure of a solution's ability to neutralize both total and buffered normality.

Total Alkalinity

A3

Q4



What is an example of a buffer in a normal solution?

Boric Acid

A4

Q5



The measure of a solution's ability to neutralize both total and buffered alkalinity.


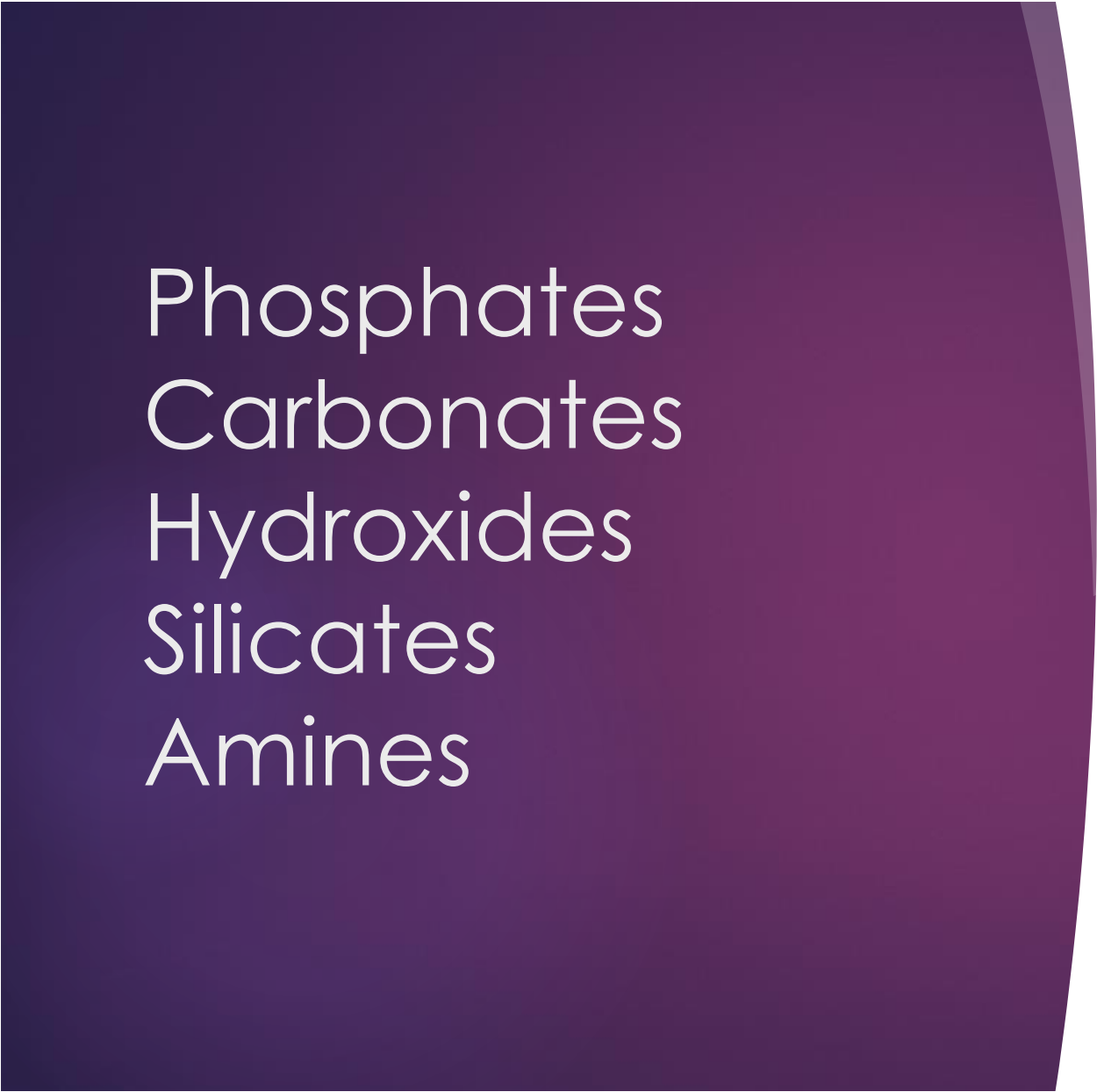
Total Normality

A5

Q6



Give example(s) of buffers present in an alkaline solution.



Phosphates
Carbonates
Hydroxides
Silicates
Amines

A6

Q7



The measure of hydrogen relative to the presence of free hydroxide present in a solution.

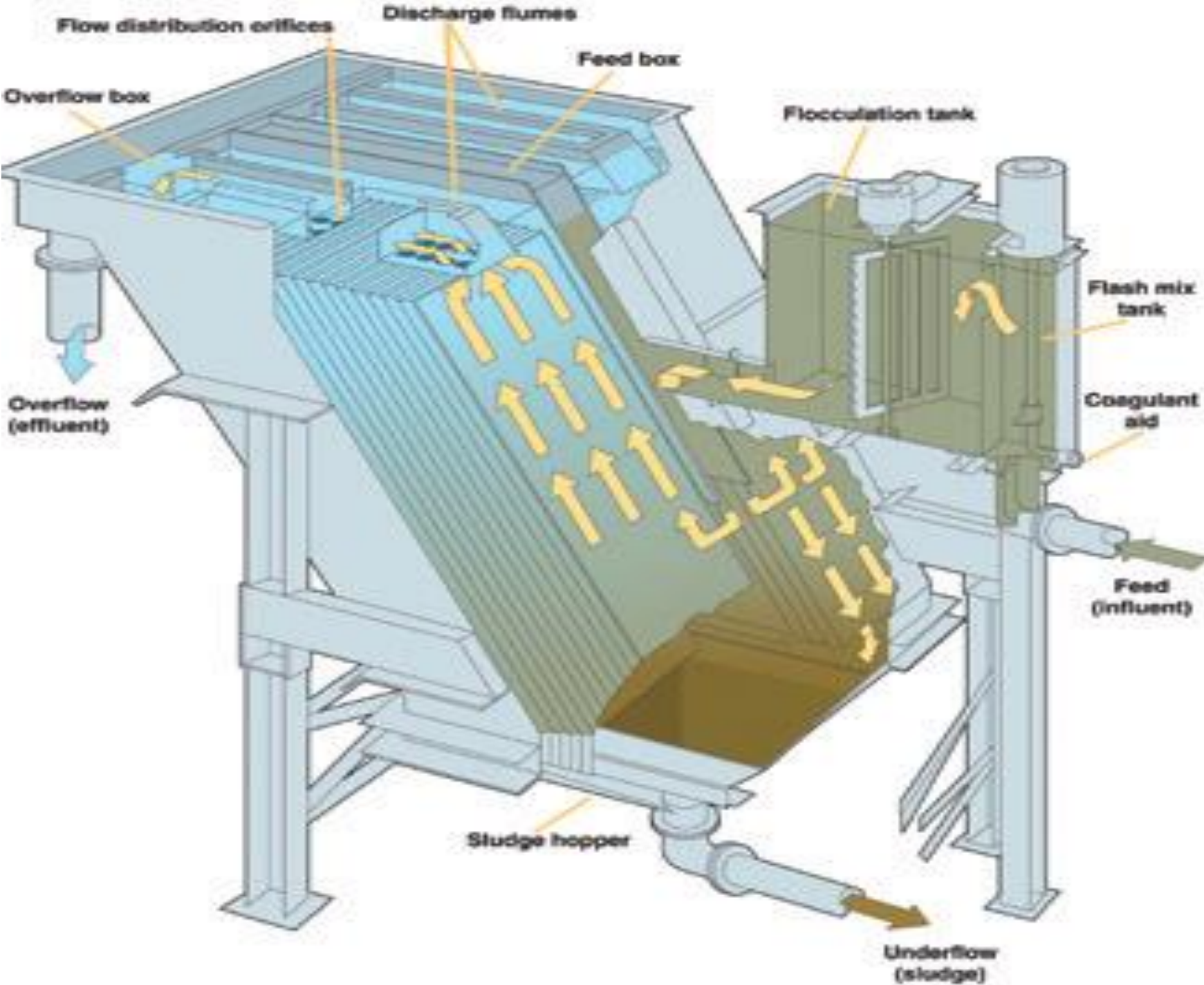
pH

A7

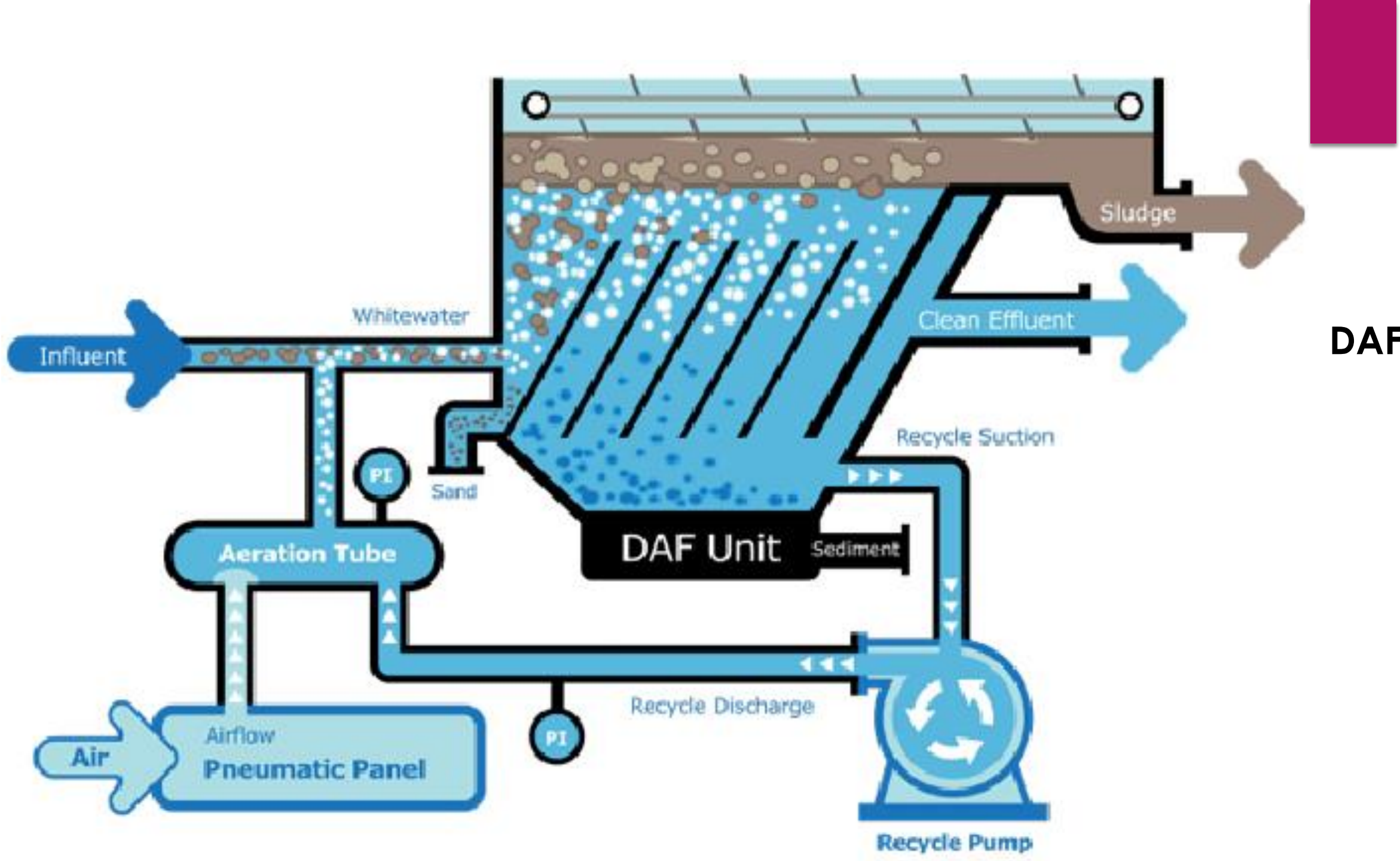
Essential Issues

Essential Issues

- ▶ Clarifier: “I’m passing solids out of the top, over the weir.”
- ▶ DAF: “I have floaties in my effluent to the city.”



Clarifier





**Serpentine
Mixer**

Essential Issues

- ▶ Pin floc can be considered total suspended solids.
- ▶ Total suspended solids could cause a violation.

Investigating

Investigating

- ▶ Has the plant changed a process?
- ▶ Is the process sending you more influent?
- ▶ Is your system the correct size for current plant production?

Investigating

- ▶ **Where is my sludge blanket level?**
 - ▶ Sludge within the ports?
 - ▶ Sludge transfer pump accurate?
 - ▶ Sludge judge accurate?



Sludge Judge



Fact

- ▶ Maintaining a proper sludge blanket is the most inexpensive filtration system available today.

Investigating

- Do I need a strainer?

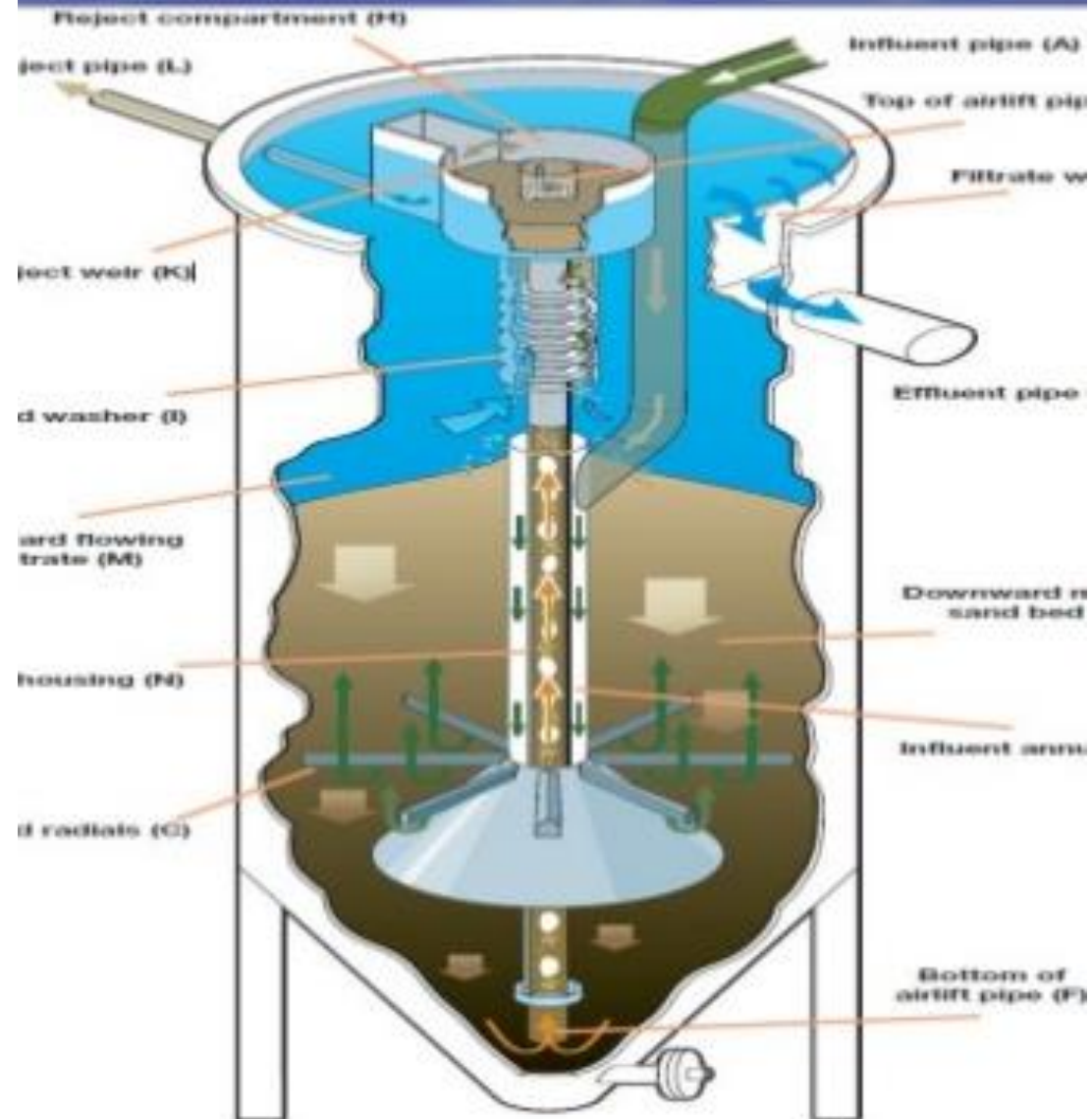


Investigating

Do I need simplex or duplex bag filters?

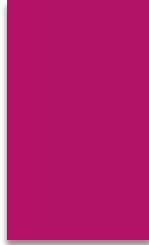


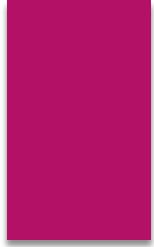
DynaSand Filter

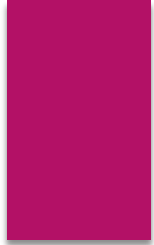


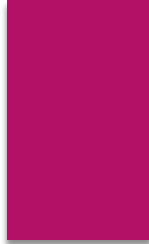
Do I need a sand filter?

Dissolved Air Flotation Systems









Dissolved Air Flotation

- ▶ Air to solids ratio proper?
- ▶ Rake speed accurate?
- ▶ We cannot have plugged diffusers!

Dissolved Air Flotation

- ▶ Jar test must float
- ▶ Coagulation – Flocculation – Alka Seltzer
- ▶ Determine feed rates!



Fact

- ▶ Coagulation – pH – Flocculation must be correct in all forms of water treatment.
- ▶ Do not use Lime on DAF!!

Dissolved Air Flotation

- ▶ So what can this carry over be?
 - ▶ Good or Bad?

Dissolved Air Flotation

- ▶ Capture pin floc
- ▶ Digest the sample (Nitric)
- ▶ Analyze on AA/ICP
- ▶ Metals? Inert?

Investigate Further

Investigate Further

- ▶ Run jar test – always helpful
- ▶ Right coagulant, pH, flocculant?
- ▶ Charge density/molecular weight

Investigate Further

- ▶ Too much polymer?
- ▶ Oil within the flocculated solid?
- ▶ Biological colony present in the system?

Investigate Further

- ▶ Is there a pump leaking air?

Investigate Further

- ▶ Is your clarifier/DAF level?
 - ▶ It must be level!

The End

