

# Eastex Environmental Lab

December 2016 Newsletter

## Never underestimate the power of alkalinity

With so many variables to watch and monitor during the wastewater treatment process attention to the alkalinity can easily be overlooked. Historically alkalinity was only thought of and monitored as a water quality analysis relating to the “hardness or buffering capacity” of water. In wastewater the availability of alkalinity is key in the reduction of ammonia nitrogen to meet effluent compliance requirements.

**What is alkalinity?** Alkalinity measurement is not a direct analyte measurement. There is no element called alkalinity and you cannot specifically measure it. It is a measure of the water's ability to neutralize acid. The primary components of interest are carbonates, bicarbonates and hydroxides. The more of any of these in the solution, the higher the alkalinity.

**Where and why is alkalinity critical?** The alkalinity must be available for the Nitrification process to work. Bacteria present in the aeration converts influent ammonia to nitrate. This provides a low ammonia in the effluent but acid is produced as a byproduct. Aeration basins without sufficient alkalinity will see one of two things happen:

- 1 – The acid produced will lower the pH of the effluent. If the discharge operates close to its lower pH limit this could cause a facility to go below permit range and cause a violation.
- 2 – Without an alkalinity to absorb the acid produced, the Nitrification cycle will stop and ammonia will not be converted to nitrate. This will cause an increase in the effluent ammonia and possible permit violation.

**So how do you ensure there is enough alkalinity to accompany the Nitrification Cycle?** Monitoring the effluent and influent for alkalinity will give you the data needed to make adjustments for changes in alkalinity. A good alkalinity residual in the effluent of 50 mg/L or more indicates that the process has enough alkalinity available. Every mg/L of ammonia removed and converted to nitrate consumes about 7 mg/L of available alkalinity. To estimate the alkalinity that will be used, multiply your influent alkalinity by 7. For example, an influent with a

30 alkalinity converted to 0.2 ammonia will reduce the alkalinity by  $30 \times 7 = 210$  mg/L. If the influent alkalinity is less than 210 there will not be enough to maintain an alkalinity residual in the effluent.

## How can you increase the alkalinity to maintain a buffer?

The alkalinity can be increased by adding chemical to the influent. Typically a chemical feed pump is used to dose the influent with Potassium Hydroxide, Sodium Hydroxide, Magnesium Hydroxide or an equivalent. Each has its own safety concerns and efficiency rates. The effluent can then be monitored to determine how to change the chemical feed rate. Preferably dose the influent after solids have been removed to prevent the solids from consuming portions of it.

**What cause changes in the influent alkalinity?** Alkalinity in raw wastewater primarily changes with changes in the drinking water supply. Water supplies that are primarily ground water tend to have higher alkalinities due to the increased levels of dissolved carbonate and bicarbonates in ground water and are usually “harder” water. Surface water is normally “softer” and has a lower alkalinity due in part to the surface water treatment process. With drinking water systems reducing their use of groundwater and others blending groundwater with surface water the wastewater operator may notice significant changes in the incoming alkalinity value at the treatment plant. Infiltration from storm water or other causes of hydraulic overload / dilution can also lower the alkalinity in raw wastewater.

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# Merry Christmas and Happy New Year!

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It is always good to know the source of your water so that proper treatment can be implemented. Knowing the characteristics of surface and ground water is helpful.

Characteristic	Surface Water	Ground Water
Temperature	varies with season	relatively constant
Turbidity, SS	Level variable, sometimes high	Low or nil (except in karst soil)
Colour	Due mainly to SS (clays, algae) except in very soft or acidic waters (humic acids)	Due above all to dissolved solids
Mineral content	Varies with soil, rainfall, effluents, etc.	Largely constant, generally appreciably higher than in surface water from the same area
Divalent Fe and Mn in solution	Usually none, except at the bottom of lakes and ponds in the process of eutrophication	Usually present
Aggressive CO <sub>2</sub>	Usually none	Often present
Dissolved O <sub>2</sub>	Often near saturation level, absent in very polluted water	Usually none
H <sub>2</sub> S	Usually none	Often present
NH <sub>4</sub>	Found only in polluted water	Often found
Nitrates	Level generally low	Level sometimes high
Silica	Usually moderate proportions	Level often high
Mineral and organic micro-pollutants	Can be present but liable to disappear rapidly once the source is removed	Usually none but any accidental pollution lasts a very long time
Living organisms	Bacteria, viruses, plankton	Iron bacteria frequently found
Chlorinated solvents	Rarely present	Often present
Eutrophic nature	Often. Increased by high temperatures	None

## 6M1 Cycle begins Jan 1st 2017

Last day for sampling is June 30th 2017

All sites and alternative sites must be approved by TCEQ before sampling.

Check to see if you are required by visiting Texas Drinking Watch website.

Form 20467 to get sites approved.

Form TCEQ 20683 – to be submitted to the laboratory with the sample.

### Why Use Eastex Lab?

Help ensure samples submitted are compliant with TCEQ requirements. Help prevent violations due to improper samples.

At Eastex Environmental Laboratory, we compare data against MCL limits for earlier notification.

Receive guidance with paperwork, reporting to the State, and understanding the process.

We send data to TCEQ electronically and then verify that TCEQ has received your data.

We provide you with sample bottles. We will pick up your samples from the Houston, Beaumont, Nacogdoches and surrounding areas.

Get your results fast! View your results online from anywhere with internet connection.

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### Our Mission:

Participate in the protection of the environment and public health by delivering reliable, quality analytical data and environmental compliance services in a friendly, personal, professional manner while growing our employees in experience and skill.

Did you fail a lead and copper sample? Do you have corrosive water? The State has new requirements if you are a PWS over 50000, a new PWS or if your results are over action levels. You are required to do Corrosion tests. Contact Eastex to find out more.

Visit Texas Drinking Water Watch to see your LCR and WQP schedules.

Get Your Results **FAST** with Element ClientConnect

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