ANUE WATER TECHNOLOGIES

AnueWater.com

BETTER FORCE MAINS, LOWER COST

If you are using nitrates, you are paying unnecessarily high operating costs, and will likely experience higher infrastructure damage from corrosion.

ANUE WATER TECHNOLOGIES has a best in class solution which provides:

- Better control of corrosion and odor from hydrogen sulfide (H2S)
- Protection for your staff from H2S exposure
- An improved environmental footprint
- Better operating results and much lower overall costs

HERE ARE THE FACTS ABOUT ANUE'S BETTER ALTERNATIVE FOR YOUR FORCE MAINS:

DANGER TO FORCE MAINS: HYDROGEN SULFIDE

According to the EPA, undetected corrosion caused by hydrogen sulfide can cause steady deterioration of your collection system. While these systems are built with a design life to last 50 years, corrosion damage can severely shorten the life of your system. Nationally (USA), the cost of repairing the corrosion damage due to H2S is in the billions of dollars, and many communities will spend millions in just the next few years. (EPA Report 832S91100)*

BACKGROUND ON HYDROGEN SULFIDE (H2S)

H2S is a very toxic gas. It is colorless and smells like rotten eggs. H2S is dangerous to humans and can be deadly even at low concentrations, halting the breathing center in the brain. Because it's heavier than air, it may settle in low spots and pose risks to workers when entering areas where the gas may be present or accumulate.

H2S burns and is combustible; when it burns it produces sulphur dioxide, another dangerous gas that is toxic, strong smelling, and irritating.

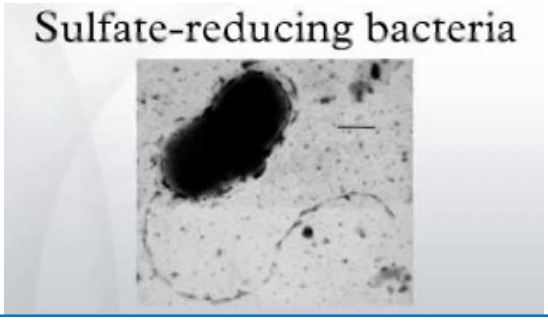
OSHA Worker Exposure Limits (Enforceable): General Industry: 29 CFR 1910.1000 TABLE Z-2, Toxic and hazardous substances. Exposures must not exceed 20 parts per million (ppm) (ceiling) with the following exception: if no other measurable exposure occurs during the 8-hour work shift, exposures may exceed 20 ppm, but not more than 50 ppm (peak), for a single time period of up to 10 minutes.

HYDROGEN SULFIDE GENERATION BY BACTERIA

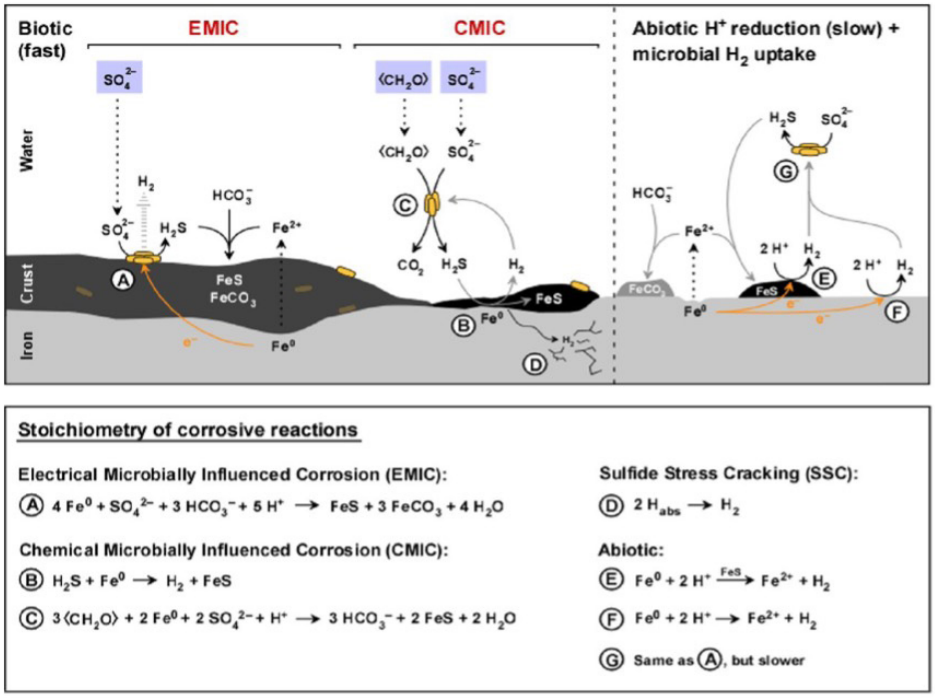
Hydrogen sulfide is generated by sulfate-reducing bacteria (SRB's), which are a microbiological group composed of naturally occurring bacteria. They are unique in that they don't need oxygen to live, in fact, they 'breathe' (or respire) sulfates and excrete hydrogen sulfide. They are called 'anaerobes' — meaning they live in zero oxygen environments, and oxygen is toxic to their existence.

SRB's are prevalent in the environment, and will easily colonize and prosper in environments where there is sulfate content but no oxygen. Of course, sewage has high sulfate content, and can form zero oxygen conditions due to the consumption of oxygen via chemical and biological oxygen demand. SRB's can start by colonizing under deposits on pipes as these areas can quickly become depleted of oxygen. Sewage systems are ready homes for these troublesome bacteria, causing rapid corrosion and deterioration of infrastructure.

SRB's generate hydrogen sulfide as a result of their living metabolic processes. Hydrogen sulfide in the presence of water forms sulfuric acid, which in turn creates low pH and very corrosive conditions. For a deeper understanding of the chemical process, to the right is a depiction from the journal 'Applied and Environment Microbiology', volume 80, number 4.



MicroGraph Of SRB



Chemical depiction of corrosion process

HOW TO CONTROL SRB'S: TWO PATHS

Old Technology: Use of Nitrates

Nitrates are essentially the same class of chemistry as fertilizers that are used in agriculture and domestic applications. This method controls SRB's by attempting to encourage growth of other bacterial strains that don't produce H2S. This is achieved through introduction of large amounts of nitrate 'food' to encourage growth of non-SRB bacteria.

Problems with this approach include:

- Sewage contains huge quantities of sulfates, hence adding enough nitrates to suppress SRB's can require very high amounts of nitrates, and will not eliminate the sulfate content already in sewage.
- SRB's can live under deposits where the general bulk fluid containing added nitrates cannot access, hence SRB's continue to live in anaerobic conditions under deposits and cause localized corrosion.
- Nitrate supply is subject to availability and market price trends. Since the bulk of nitrate usage is in agricultural fertilizer applications, a spike of demand and/or supply chain pinches can lead to supply disruption and overall higher market pricing.

The New Proven Path: On-site Generation of Oxygen and Ozone

Anue Water Technologies has patented and trade secret technology that enables on site generation of oxygen and ozone.

This elegant approach controls SRB's by creating a poisonous environment by adding oxygen and maintaining a continuous dissolved oxygen level. This is lethal to anaerobic SRB's, and with their elimination, ensures dramatic reduction in hydrogen sulfide levels. This is also a very green and sustainable, as it does not require the chemical production of fertilizer. It also de-risks end-users for the cost and availability of fertilizer.

This technology is successfully deployed in many applications already, with very strong results. You have the choice of whether you want to purchase the equipment, lease or rent to own — Anue offer's any of these options. Regardless, the change to Anue technology will save a tremendous amount of operational spend vs nitrates, and provide a very short payback period.

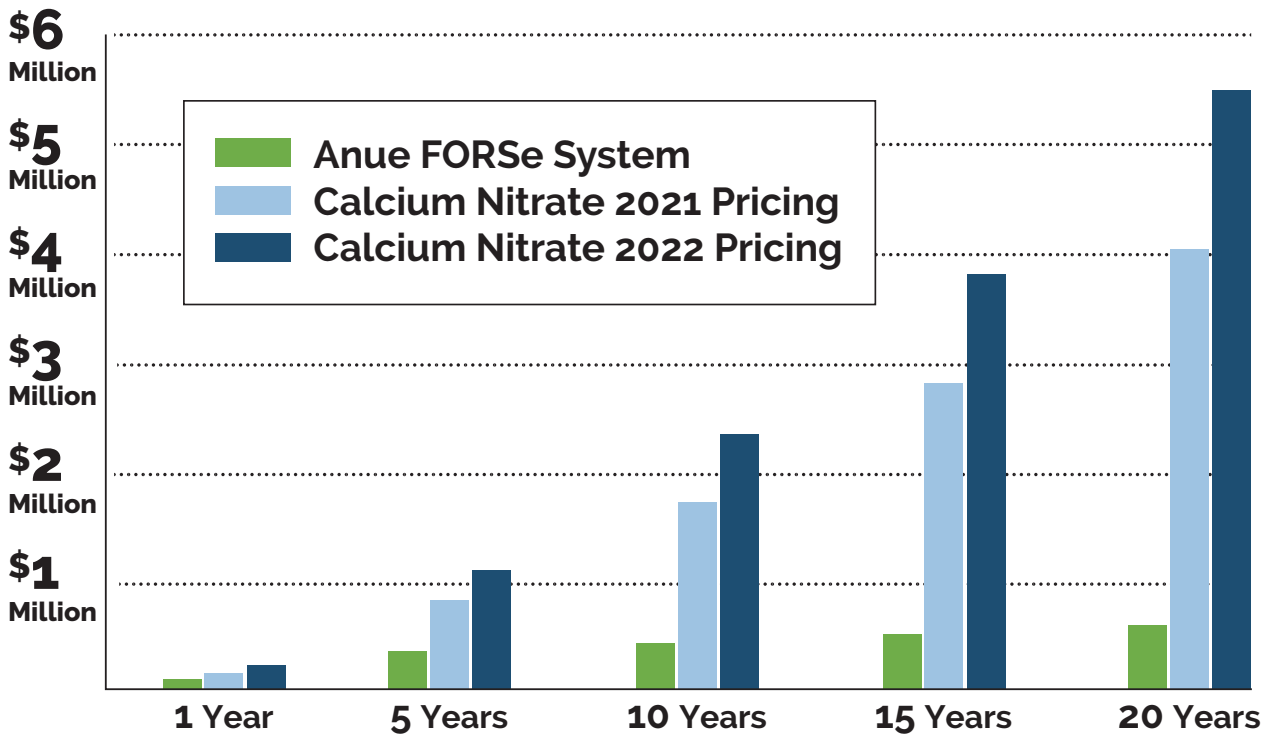
Anue has also built in, multi layered quality and safety assurances, as well as remote telemetry. A full service package is available to ensure continuous high treatment level operation.

Corrosion caused by hydrogen sulfide

CASE HISTORY

$5 Million in Savings • $3 Million NPV

ANUE FORSe® System Economics vs Calcium Nitrate



CONCLUSIONS/RECOMMENDATIONS:

- Anue Water Technologies' FORSe systems provide vastly superior technical, economic and environmental performance.
- Anue Water Technologies can prove real time operational results at your site with a mobile demonstration unit. Please contact us at sales@anuewater.com for more information.

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