



Presented by

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# Reducing Odor, FOG, H<sub>2</sub>S, Sludge & Flushable Wipes Nature's Way

NWWC 2022

# EXPLORING AND UNDERSTANDING YOUR CHOICES FOR SOLVING THE MOST COMMON AND BIGGEST PAIN POINTS IN TREATMENT PLANTS AND COLLECTION SYSTEMS

Two Schools of Thought

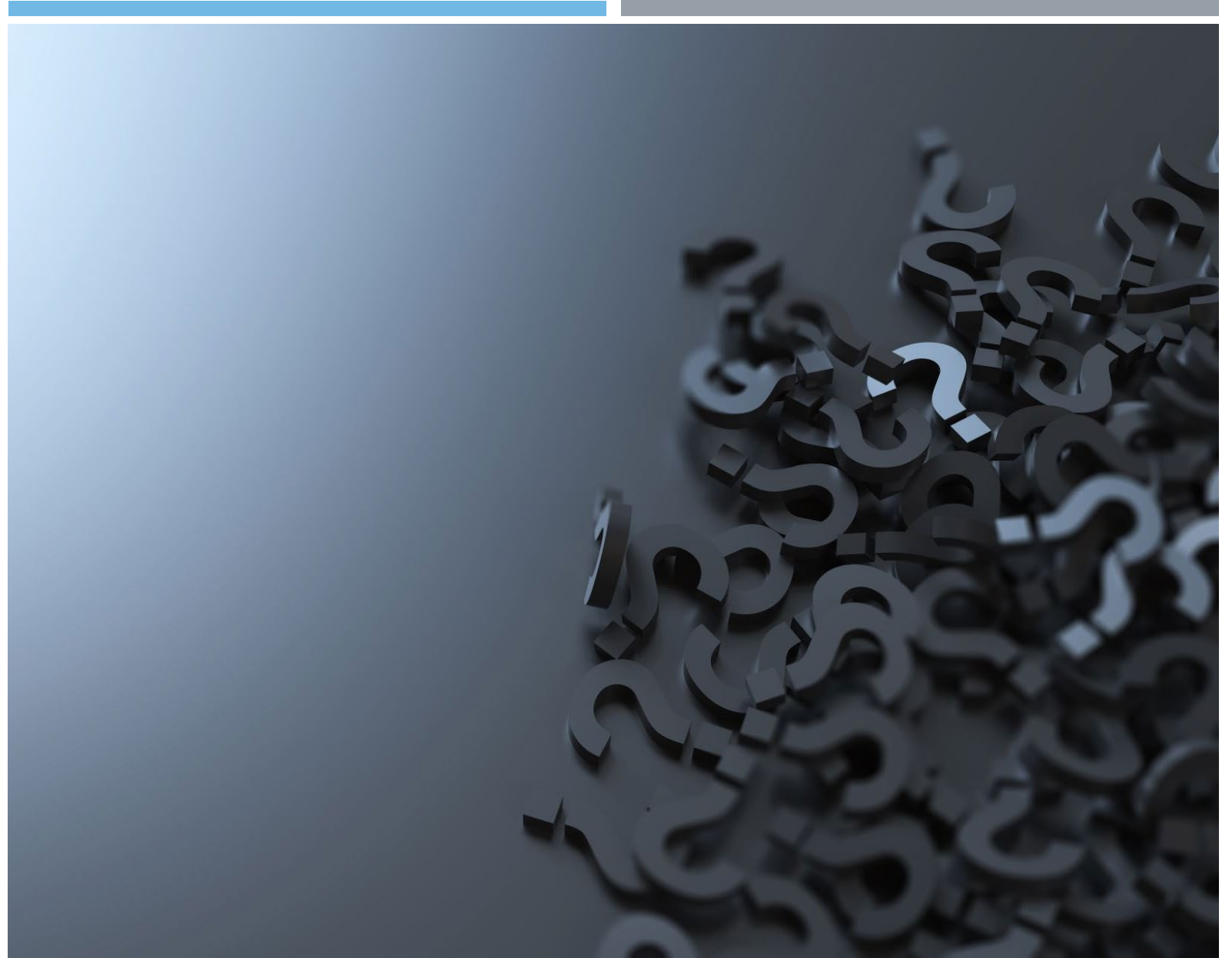
- Chemical
- Natural Biological





# THE ISSUES

- Capacity
- Compliance
- Sludge and Associated Removal/Disposal Costs
- Odor
- Treatment Energy Costs
- Flushable Wipes
- H<sub>2</sub>S Damage
- Corrosion
- FOG
- SSOs





## UNDERSTANDING THE CAUSES

So we can stop treating the symptoms and really eliminate the root of the problems





# HOW ARE ODORS FORMED AND WHY DOES FOG ACCUMULATE

The answer:

Microbiology  
or biofilm



Biofilm is created from fecal matter and other elements naturally found in a sewer





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## LIKE A FINGERPRINT

Every wastewater collection system is unique

Although there are common denominators, a solution that works in one system or plant may not work the same in another



**THERE IS NO ONE MAGIC  
SILVER BULLET TO SOLVE  
THEM ALL**

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OR COULD THERE BE?

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A background image showing a close-up of several glass test tubes arranged in rows. The tubes contain liquids of various colors: bright green, yellow, and reddish-brown. The lighting is bright, creating reflections on the glass surfaces and the liquid inside. The tubes are slightly out of focus in the foreground and background, emphasizing the middle rows.

# **CHEMICAL OR NATURAL?**

LET'S LOOK AT WHAT IS  
AVAILABLE AND THE BEST FIT  
FOR YOUR APPLICATION

# **CHEMICAL: SODIUM HYDROXIDE (CAUSTIC SODA)**

What It Is:

Basic chemical that elevates pH

Problems It Is Used to Solve:

- H<sub>2</sub>S Odor Control
- Remove FOG
- pH Adjustment

Where It Is Used:

Collection System

Chemical Odor Control Scrubbers

**Where is it deployed?**

Pump stations, manholes, headworks of WWTP

**By Who?**

Collection System Operators

**How does it get there and is stored?**

- Tanker trucks
- Stored in tanks equipped for hazardous material

**How much is needed to be effective?**

Varies by size of system

**Byproducts if any:**

Kills microbiology

**Effectiveness:**

Generally effective but costly to maintain desired levels

**Limitations:**

- Only addresses areas downstream of application
- Challenging to control the application amount needed and rate or speed of application



# CHEMICAL: BIOXIDE

## What It Is:

A mixture of sodium and calcium nitrate

## Problems It Is Used to Solve:

- H<sub>2</sub>S Odor Control

## Where It Is Used:

Collection System

## Where is it deployed?

Upstream in manhole or wet well of where odor issues are occurring

## By Who?

Collection System Operators

## How does it get there and is stored?

- Tanker trucks
- Storage tanks rated for hazardous material

## How much is needed to be effective?

In nearly all cases, an increasing amount will be needed

## Byproducts if any:

- Potential for sloughing
- Increase in H<sub>2</sub>S in areas downstream when nitrates are depleted
- Adding nitrogen to be removed at the WWTP

## Effectiveness:

Yes, but byproducts create bigger issues

## Limitations:

Confined to work in a limited distance downstream of application

# CHEMICAL: FERROUS (IRON SALT) OR SULFEOX

What It Is:

Different forms of iron containing compound

Problems It Is Used to Solve:

- H<sub>2</sub>S Removal
- H<sub>2</sub>S Odor

Where It Is Used:

Collection System

**Where is it deployed?**

Upstream in manhole or wet well of where odor issues are occurring

**By Who?**

Collection System Operators

**How does it get there and is stored?**

- Tanker trucks
- Stored in tanks rated for hazardous material

**How much is needed to be effective?**

Varies based on site need and conditions

**Byproducts if any:**

- Increases volume of biosolids which must be handled at WWTP
- Increases sludge removal costs
- Adding nitrogen to be removed at the WWTP

**Effectiveness:**

Yes

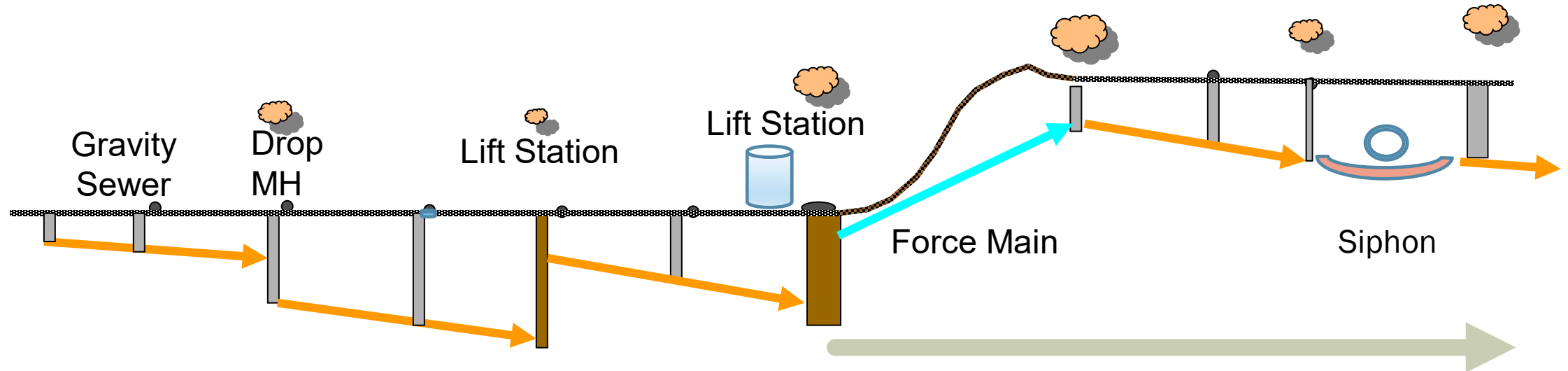
**Limitations:**

Only works downstream for a very short distance from deployment site



# CHEMICAL TREATMENT

ONLY WORK AT THE  
INSTALLATION LOCATION AND  
DOWNSTREAM FROM THE  
DOSING POINT



Each of these areas are susceptible to H2S release due to turbulence



# **CHEMICAL OR NATURAL?**

LET'S LOOK AT WHAT IS AVAILABLE AND IS THE BEST FIT FOR YOUR APPLICATION





## **COMMON PRACTICE**

All Wastewater Treatment Plants are utilizing microbes or “Mother Nature” in some capacity. It doesn’t work without it.

# UNDERSTANDING BACTERIA TYPES AND HOW/WHY THEY WORK

## Fecal or “Gut” Bacteria

- Hundreds of species
- Anaerobic or Facultative
- Eats organic material
- **Cellular division, slow – many hours**
- Consumes organics and nutrients
- Strengths
  - Can live with or without oxygen
  - Indigenous
  - Free
- Limitations
  - Aerobes die without oxygen
  - Anaerobes die from oxygen
  - **Replicates slowly**
  - **Must “wake up”**

## Soil Bacteria and Customized Consortia

- Genus Bacillus Facultative Anaerobe
- Spore State or Active
- Eats organic material
- **Cellular division, doubles every 20 to 120 minutes**
- Consumes organics and nutrients
- Strengths
  - Thrives with or without oxygen
  - **Already awake, hungry and ready to eat**
  - **Reproduces quickly**
  - Cannibalistic, dominates rapidly for quick results
- Limitations or Weaknesses
  - Requires bio-augmentation for application



# NATURAL: TYPICAL BIOAUGMENTATION

## What It Is:

Spore State Concentrate  
Bacillus

## Problems It Is Used to Solve:

- H<sub>2</sub>S Odors
- FOG
- SSOs
- H<sub>2</sub>S Damage

## Where It Is Used:

WWTP and/or Collection System

## Where is it deployed?

- WWTP in different locations
- Collection System in manholes or lift stations

## By Who?

Collection System Operators or Treatment Plant Operators

## How does it get there and is stored?

- Standard freight delivery
- 55 gallon drums or jugs

## How much is needed to be effective?

Varies with the system and the product/supplier used

## Byproducts if any:

None

## Effectiveness:

Yes, results can be unpredictable

## Limitations:

Effectiveness affected by deployment location, cost, system conditions and other factors beyond the control of the operators

# NATURAL: AUTOMATED BIOAUGMENTATION

## What It Is:

Remotely monitored and controlled dosing with Active Adapted Consortium of soil microbes via Automated Dosing Generator Technology

## Problems It Is Used to Solve:

- H2S Odor and Damage
- Odor from other sources
- Sludge Reduction
- High Aeration Costs
- Plant Capacity
- Permit Compliance
- FOG
- SSOs

## Where It Is Used:

WWTP and the Collection System

## Where is it deployed?

- WWTP in different locations
- Collection System in lift stations

## By Who?

Certified and Trained Licensed Installers as Service

## How does it get there and is stored?

- By standard freight
- No storage

## How much is needed to be effective?

- Technology is provided using a TaaS model (Treatment as a Service)
- Quantity determined by the system needs and results desired

## Byproducts if any:

None

## Effectiveness:

100% Performance Guaranteed

## Limitations:

None



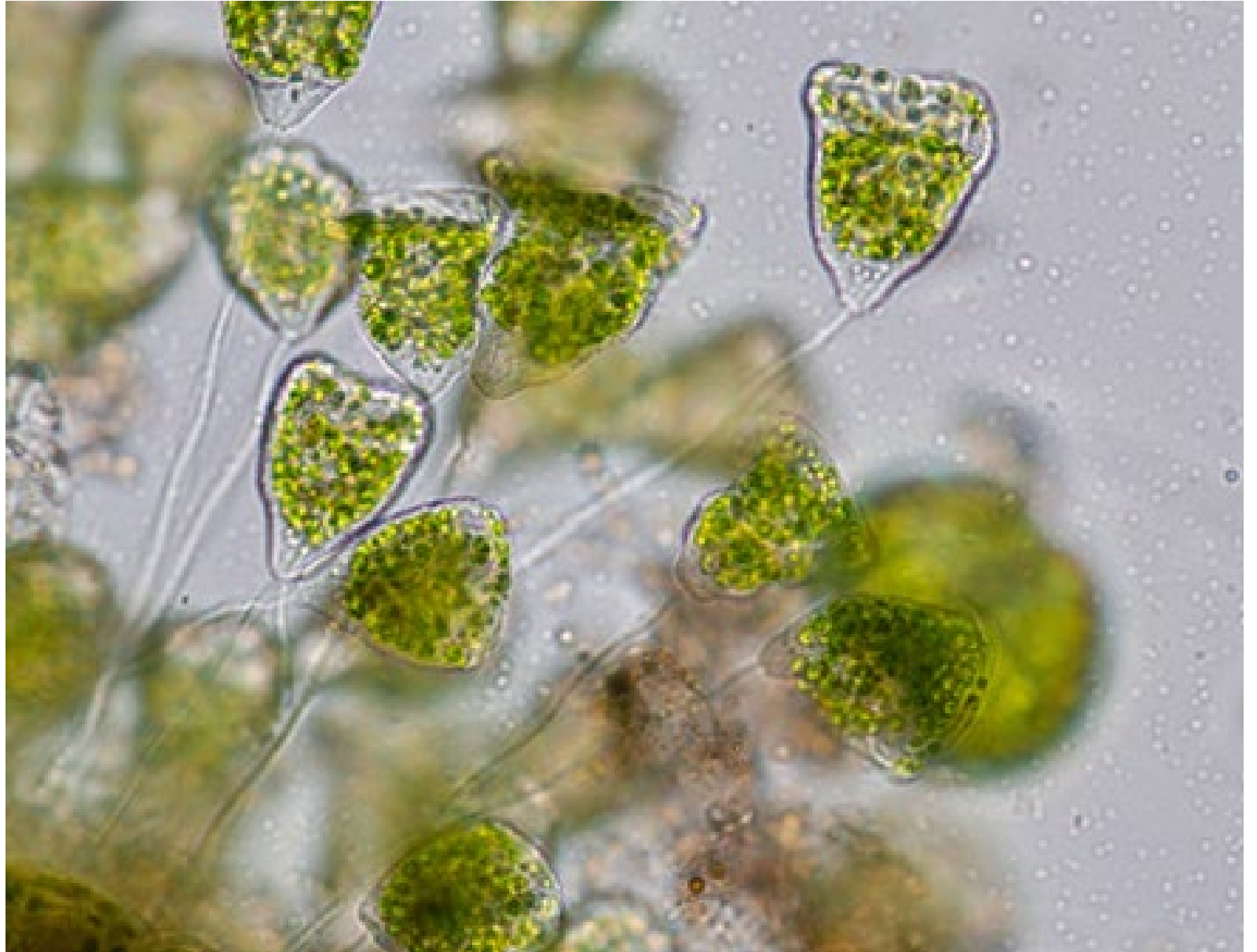
# INNOVATION AND ADVANCEMENTS IN BIOAUGMENTATION

- Autonomous bio-dosing via remote controlled generator
- Disruptive, patent-pending process
- Utilizes customized soil bacteria
- Typically installed at lift stations, lagoons and headworks
- Requires no CAPEX or additional OPEX for treatment plant
- TAAS gives asset owner a fixed monthly cost
- Performance guaranteed



## WHY A CUSTOMIZED SOIL BACTERIA CONSORTIUM?

- Tailored to the specific waste stream characteristics and the “food” available
- Self-regulating and adaptive, rapidly dominates the system
- Survives with or without oxygen
- Non-pathogenic
- Cannibalistic







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## LOCATION LOCATION LOCATION

- Typically installed at a lift station
- Further out in the collection system is preferred but an ideal placement is assessed by a technical team
- Microbes will travel both **upstream** and **downstream** from the discharge point in search of food
- Consumes and **replaces** existing biofilm
- **Destroys** the elements/conditions that create or produce harmful H<sub>2</sub>S
- Turns a collection system into a pre-treatment plant

# CASE STUDY

Jal, New Mexico

## PROBLEMS:

- Compliance
- Sludge
- Odor

| Jal Class B<br>Plant Performance               | BOD            | TSS                 | Total Nitrogen |
|--|----------------|---------------------|----------------|
| Class B 30-Day Avg.                            | 30 mg avg./max | 39 mg avg;45 mg max | 30 mg avg./max |
| 2018   | 45.2 avg.      | 59.3 avg.           | 33.7 avg.      |
| 2019   | 39.5 avg.      | 44.3 avg.           | 41.5 avg.      |
| 2020   | 20.2 avg.      | 48.5 avg.           | 29.5 avg.      |
| 2021 - End of June                             | 12.2 avg.      | 30.5 avg.           | 25.6 avg.      |
| After 3 months of treatment<br>with the EBS-Di | 5.5 avg.       | 5.2 avg.            | 10.9 avg.      |

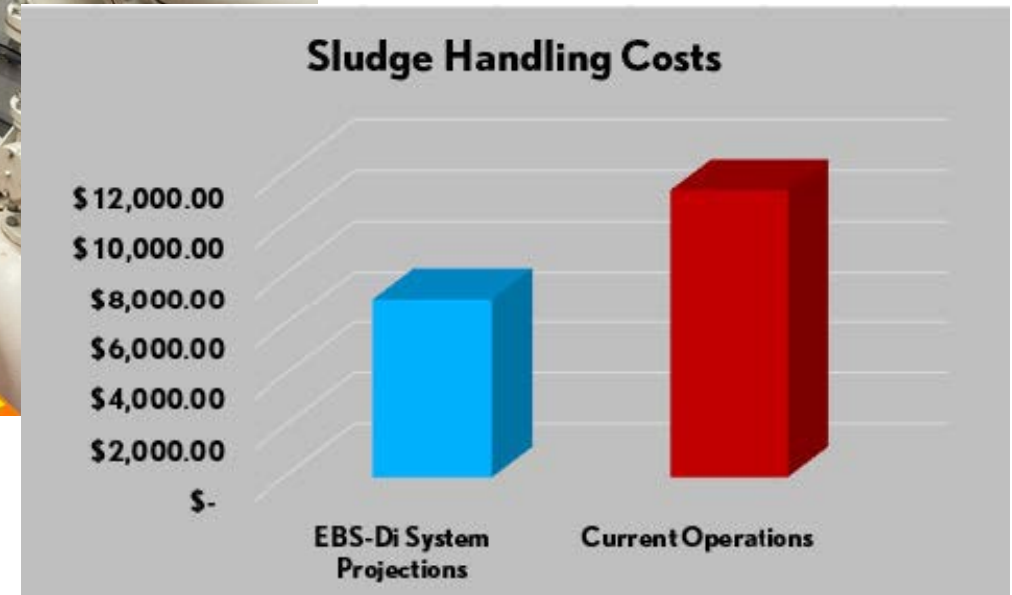
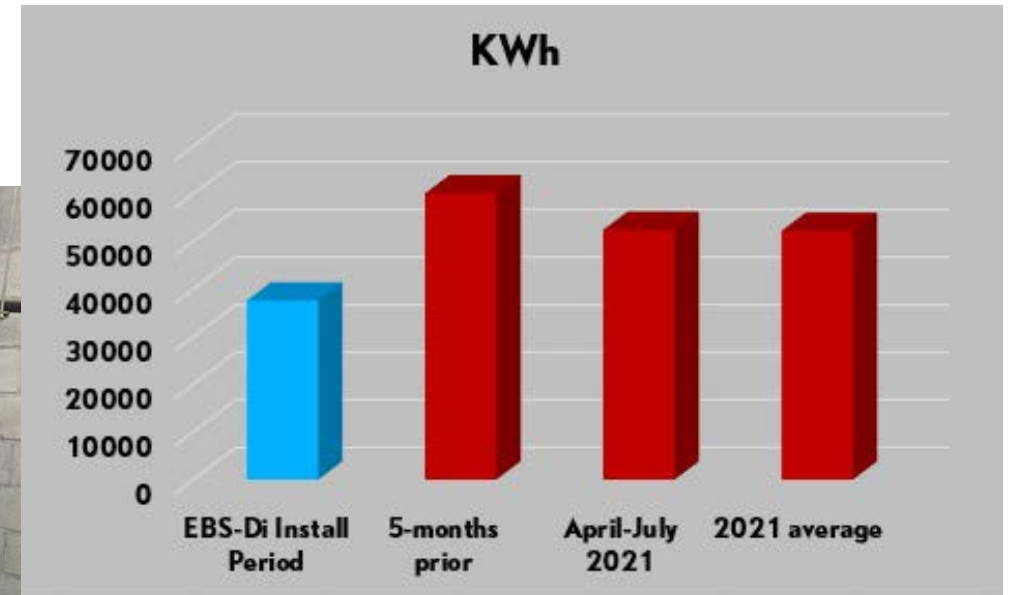


# CASE STUDY

Silver Spring, PA

## PROBLEMS:

- Capacity
- Sludge
- Odor





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## DOESN'T NATURAL ALWAYS COST MORE?

**No.** This is a misconception touted by many chemical or mechanical solution providers

Natural solutions are more effective, sustainable and do not have environmental concerns

**BUT even natural solutions are not equal**







## IN SUMMARY... WHEN CHOOSING A TREATMENT OPTION

- Know the “track record”
- Expectations for performance
- Limitations or drawbacks
- Byproducts
- Environmental hazards/implications
- Worker safety
- Transportation and storage
- Cost (initial and ongoing)
- Labor to apply and maintain
- How many issues can it resolve
- Is it multi-purpose
- Benefits to your collection system
- Savings



## **ASK THE EXPERT OPEN Q & A PANEL DISCUSSION**

An opportunity to ask and learn from Rodney Dickerson about wastewater treatment solutions, microbiology, advancements in bio-augmentation, and best practices for solving collection system and wastewater treatment plant's pain points.

Thanks for your time and being part of today's presentation





## CONNECT WITH YOUR PRESENTERS

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