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OUTAGE PREPARATION

There are two types of outages, scheduled and unplanned. Scheduled outages are annual affairs at roughly the same time each year and are used to conduct maintenance or other work that cannot be performed while the plant/mill is in full operation. These outages may involve a shutdown of some or all the production and ancillary operating equipment. Sometimes a plant/mill will have a cold shutdown, meaning all power or steam-generating equipment will also be down for a portion of the outage. Planned outages are heavily monitored, controlled, and scheduled. Despite the best planning, accidental losses during shutdown and restart can create issues and cause permit violations. The outage duration is crucial, as biomass activity and viability decrease the longer it goes without biochemical oxygen demand (BOD) loading. EBS has found that replacing about 10 – 20% of the typical BOD loading for 3 to 5 days before restarting helps reduce the potential for upsets.

The second type of outage is the unplanned shutdown due to an operational or equipment problem within the plant/mill. Unplanned outages can devastate the wastewater system, increasing the risk of system upsets and effluent permit violations. Unplanned outages are extremely time-sensitive, and this is where the EBS Core Value “Respond at the Speed of Sound” is showcased. Depending on site location, EBS can often have resources on-site within 24 hours to assist.

The key to minimizing the risks associated with either outage is to be prepared by developing and implementing action plans for all scenarios. Our “Simple, yet Profound” Core Value leads us to focus on the critical few and create a straightforward, cost-effective, and technically sound strategy to address scheduled and unplanned outages. If you would like assistance planning for a scheduled outage or responding to an unplanned one, EBS can help.

How EBS can help:

- Provide support through increased system monitoring and testing.
- Provide essential nutrients and appropriate dosage recommendations to maintain the growth and development of a healthy biomass.
- Provide a supplemental source of BOD, such as EBS MicroCarb, during extended outages.
- Provide a multi-step plan to help before, during, and after an outage in emergency and planned situations.
- Provide bioaugmentation to help bolster the local bacterial population
- Provide total and live cell counts before, during and after the outages to determine how the bacterial population has responded to the event.

Commeral Drone

TITLE HERE:

I EBS is commonly known for data analysis and wastewater consulting on land or by boat, collecting data directly from the treatment system itself. Recently, we have expanded our capabilities to capture valuable data from the sky. Introducing the DJI Matrice 300 commercial drone: capable of photographing and recording isometric data using its thermal camera that captures high-resolution imagery and video and remotely collects wastewater samples safely from the shoreline. Now, with a drone sampling device, EBS can safely and efficiently collect samples in potentially hazardous conditions.

Capabilities:

- 20-megapixel photo/video
- 640 x 512 thermal imaging
- Advanced water sampling

Benefits:

- Capture potential flow breakthroughs using Thermal imaging.
- Aerial photos of your entire treatment system
- Safer and quicker sample collection

For more information and pricing contact:

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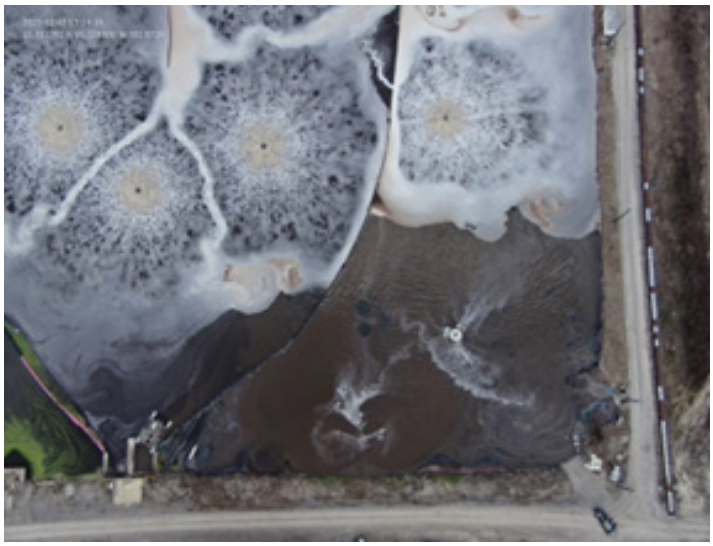

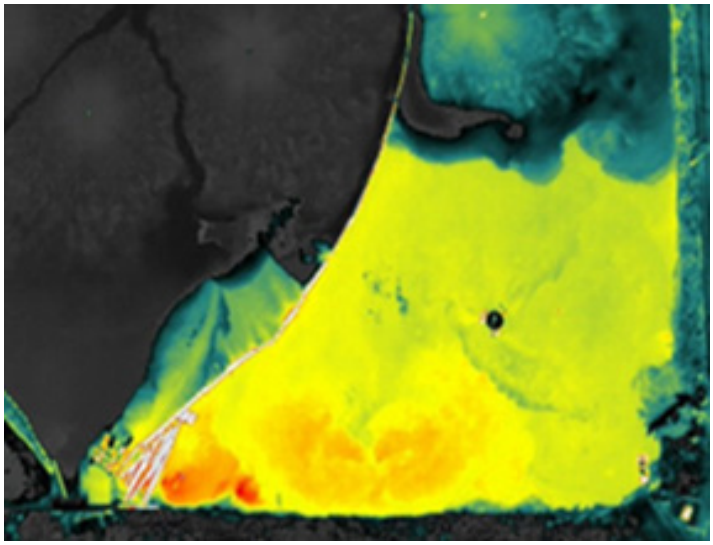

Technology Corner

Optimizing Bioaugmentation (Dry bugs vs. BAC vs. BAC 2)

"I don't need to grow up the bacteria first. Once they get into the aeration basin, they will grow plenty." While this is a common response from the people selling and applying dry bacteria for direct addition, science and thirty years of experience tell another story. While it makes sense on the surface that throwing the bags into the basin (ASB or AST) will accomplish the same end result, there are a couple of realities that must be considered and understood. The first is that most bacteria strains used in dry formulations are bacillus spores. These spores take 4-6 hours to germinate even under ideal conditions. The second flaw in the dry addition logic is more profound. For the addition of 25 pounds of bacteria to impact a 10 MGD flow, the dry product must experience log phase growth. However, the growth rate of the added bacteria will be limited by the growth pressures of the system to which it is added. In other words, the new bacteria will grow at the same rate as the bacteria already in the system. So the impact in small, just based on simple arithmetic.
In the EBS BAC and BAC2 systems, the dry bacteria are cultivated under conditions of adequate oxygen, soluble BOD, and nutrients, resulting in extraordinary reproduction rates. These technologies provide an inoculation-level dosage, defined as the starting bacterial concentration that will support and sustain a viable population under acceptable conditions. In this case, we supplement the system with a concentration of bacteria that would theoretically be adequate to start up and maintain the system from scratch. The practical fact is that we are also adding at a level to meet the needs of the indigenous population under the always varying loading conditions.

By continuously adding a nominal amount of bacteria, the operator is staying ahead of the game instead of adding bacteria a day or two after the upset event occurs. Bioaugmentation is often used as a reactive response to an upset, but throwing in pounds of dry bacteria can be either inefficient or ineffective. Inoculation levels capable of shifting the dominant population can be achieved at seeding levels not financially viable via applying dry bacteria.
At EBS we have two patented designs that facilitate inoculation rate dosing. The Bacteria Acceleration ChamberTM (BAC unit) and the two-stage BAC2 unit are designed to acclimate and grow 10 – 100 times the bacterial population that is in the dry product for the BAC unit and 100 – 1000 times the bacterial population that is in the dry product for the BAC2. To achieve this growth rate, EBS developed special product formulations that provide additional nutrients and food for optimum bacterial growth.

The figure below shows the differences in bioaugmentation applications.

Time Frame	Application Method	Growth Factor	Product details	Bacteria applied per $
1980 – 1995	Dry product addition – Throwing bags and crop dusting	1	1 - 5 billion cfu/gram Inert carrier	2.3×10^{10} cfu/$
1995– 2005	Simple Grow up tanks or "Bug Farms"	5 – 10x	5 billion cfu/gram Slightly bioavailable carrier	1.1×10^{12} cfu/$
2005 – 2012	High rate grow up systems (BAC unit)	50 – 100x	1 - 5 billion cfu/gram Formulated substrate	8.5×10^{12} cfu/$
2012 – present	Two-stage Grow up systems (BAC^2)	500 – 1000x	1 billion cfu/gram Formulated substrate Second stage carbon and nutrient source	2.2×10^{13} cfu/$

The EBS BAC units are used in several ways. Once through lagoons (ASBs) are a prime application for this technology due to the lack of biomass return. Systems with low retention times can benefit from the higher population of bacteria and aggressive bioaugmentation has been shown to reduce nutrient requirements. BAC units are also helpful in convention activated sludge treatment (AST) systems where the bacterial population is stressed due to high loading or bioaccumulation of toxic compounds in the biomass.
The EBS BAC units come in several sizes for varying system capacities and needs (45-gal, 85-gal, 300-gal, 500-gal). Several units can be run in automatic mode where only the dry bacteria are added to the chamber once per day, but the unit grows up multiple batches in a 24-hour period. This provides a very hands-off approach with minimal oversite needed to succeed.

For more information on the EBS BAC Unit, BAC2 unit, and bacterial formulations contact us at:
info@ebsbiowizard.com or call 985-674-0660

Ask the Biowizard

When do I need to add a supplemental food source?

When:?
For ASBs the only times we utilize supplement a BOD source is after an extended outage due to major event and the biomass is essentially depleted to below 104 CFU/ml. Examples include floods, extended outages of more than a month, or other extreme situation. In activated sludge systems, the biomass needs a constant loading source to sustain their population. Periods of little or very low loading will shift the system to endogenous respiration (digestion mode) resulting in biomass losses of 35% per day. In these cases, supplemental BOD addition is often appropriate if the period of minimal loading is more than 5-7 days.

What Product should I use?:
Traditionally, plants used methanol, molasses, and even dog food as BOB supplements. Each of these has its limitations, flammable, viscous, and low BOD content, respectively. EBS MicroCarb™ is a non-hazardous and non-flammable source of BOD used to establish, re-establish, and/or sustain a healthy biomass during an outage or system start-up. It is available in totes and bulk and provides about five pounds of BOD per gallon of product.

What is the Required Dosage?:
Our many years of experience with outages of varying duration has provided us with considerable empirical information. Depending on the situation, duration, and urgency to start up, we typically supplement with 10 – 15% of the normal BOD loading, which will support biomass sufficient to respond appropriate to the increasing loading and the system comes back on line.

We want to hear from you! For more information regarding upcoming training programs, operational issues at your facility, request a specific article topic, or want to participate in our “Ask the BioWizard” questions, please contact us by phone, email info@ebsbiowizard.com or through our Contact Us form located on our website.

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