

Odor Management & Prevention

Process Overview For Operators

ABC West Coast Operator Training 2019
San Francisco CA
February 26-28

Craig Frear, PhD



Odor Realities

“The one commonality that you can find among all these odor management stories in organics recycling is we now live in a society that cannot tolerate inconvenience.”—Coker

“IF YOU CAN SEE IT—YOU CAN SMELL IT”

“Go take it head on. Engage it. Own it. Accept the fact that you’ve become a problem on these other folks and come up with a plan to fix it.”—Sheff



Iterative Process

Several steps involved in avoiding, managing, and responding to odor concerns at anaerobic digestion facilities

- **Begins as early as site selection**
- **Continues through design, modeling, engineering, and technology selection**
- **Requires responsiveness to concerns with both technology and operations adjustments**
- **Involves on-going monitoring and public outreach**



Areas of Concern

As with compost operations, studies have been completed to identify areas/actions of odor-causing concern across the physical/temporal actions of the facility. Key areas/actions of concern important to AD facilities include:

- **Transport/Manipulation/Storage of Feedstocks into the Facility**
- **Choice of Feedstocks Processed at Facility**
- **Quality of the Digestion Process**
- **Processing/Storage/Transport of Digestate**
- **Biogas Treatment/Upgrade**
- **Unique Upset/Clean-Out Event**



Inflow of Feedstocks to Site

Technology—

- Berms, landscaping, trees, etc.
- Negative-air tipping buildings, closed receiving areas, hatches/doors, etc.
- Scrubbing towers, carbon filters, air biofilters
- Odor neutralizer systems, surfactants, organic acids, esters
- Wash-down stations, effective drainage, etc.



Inflow of Feedstocks to Site

Operations—

- Keep facility clean at all times
- Receiving trucks covered, clean, and hatches closed
- Immediate wash-down of receiving site, closing of receiving stations
- Odor-control checklist



Feedstock Choice

- **Not all substrates are equal**, some are received already putrescent, particularly concentrated in sulfurs, ammonias, etc.
- **Should be assessed** for digestion concerns, production, odor, variability, **not just \$**.
- **Impact on all aspects** of AD facility—pre, digestion, post, etc.

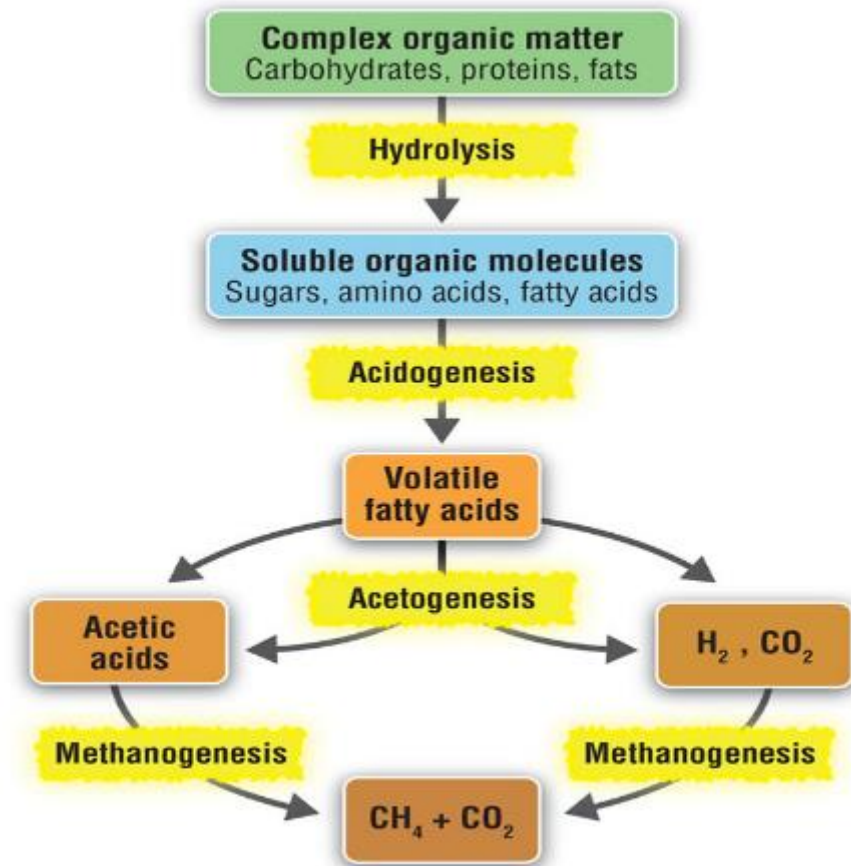
TABLE 2: FEEDSTOCK ODOR AUDIT

Odorous Feedstocks	P1	P2	P3	P4	P5	P6
Food Waste (HOP-00100)					X	
Food Waste (FRS-00300)		X			X	
Food Waste (ANB-00400)					X	X
Food Waste (COW-00600)					X	
Food Waste (HOP-00200)	X					
Food Waste (NIS-00700)		X				
Wash Water (HOP-00200)	X					
Biosolids (BAR-00500)					X	
Biosolids (T-001)			X			
FOG (HAI-00800)				X		
FOG (WAS-00200)					X	

Quality of Digestion

Improperly feed biological organism—upsets—incomplete digestion—odors

- **Proper design**
 - Organic Loading Rate (OLR), Hydraulic/Solids Retention Time (HRT/SRT), mixing, temperature
- **Scum Control**—particularly with FOG, seeds, etc.
- **Steady Feed**—avoid large deviations in feedstock, federate, dilution, etc.



Post-Digestion Handling

- **Most likely solid/liquid separation—coarse and/or fine**
 - Keep clean, move material, remove solids from anaerobic to aerobic setting
- **Additional control technologies—**driers, pyrolysis, composting, covered tanks, etc.
- **Directly related to upstream operations—**better job upstream, less odor on products.



Biogas Treatment

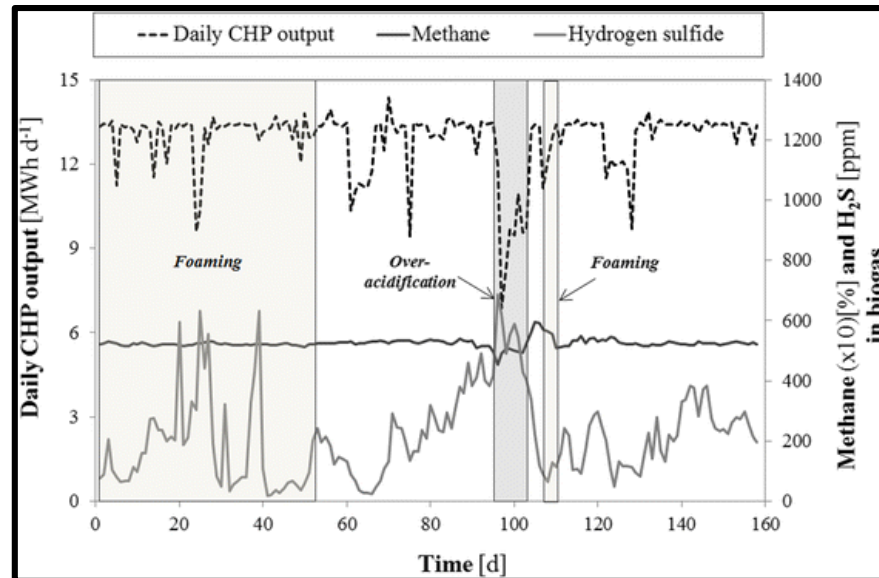
- **Avoid gas leakage**—small level of leakage unavoidable, but minimize with design, good operations
- **Properly operating flares**—good operating condition, backup power, proper design
- **Effective H₂S control**—Proper operation of H₂S equipment
- **Properly working gas-use equipment**—engines/scrubbers



Unique Upsets/Events

Potential exists for unique, unexpected situations, such as biological upset, freezing weather, catastrophic loss of equipment, clean-outs, loss of power, etc.

- **Hard to anticipate, but important to have experience and effective responsiveness to such situations.**



Odor Monitoring/Communication

Some suggestions/ideas from the field:

1. **Surveillance** readings

- Establish a protocol for odor collection at the facility perimeter using a meter
- Some localized H₂S monitoring at various points (tanks, biofilter, etc.)

2. **Recording daily weather** including wind speed and direction

3. **Odor Complaint Handling**

- Odor complaint registration - in person, over the phone, or on the company website
- Complaint response – documentation and testing
- Take corrective actions as necessary
- Document and communicate findings and results

Final Thoughts

Odor issues (whether perceived or real) can and should be addressed

- ✓ **Put in place best-in-class technology and processes** – then use them!
 - ✓ Focus on known spots of concern
- ✓ **Engage with the community** – early and often!
 - ✓ Before, during, and after construction, and through on-going operations engage with the community and key stakeholders
 - ✓ Continue outreach and ease of accessibility for questions or concerns
- ✓ **Collect and monitor data** – document readings, weather, steps taken, etc.