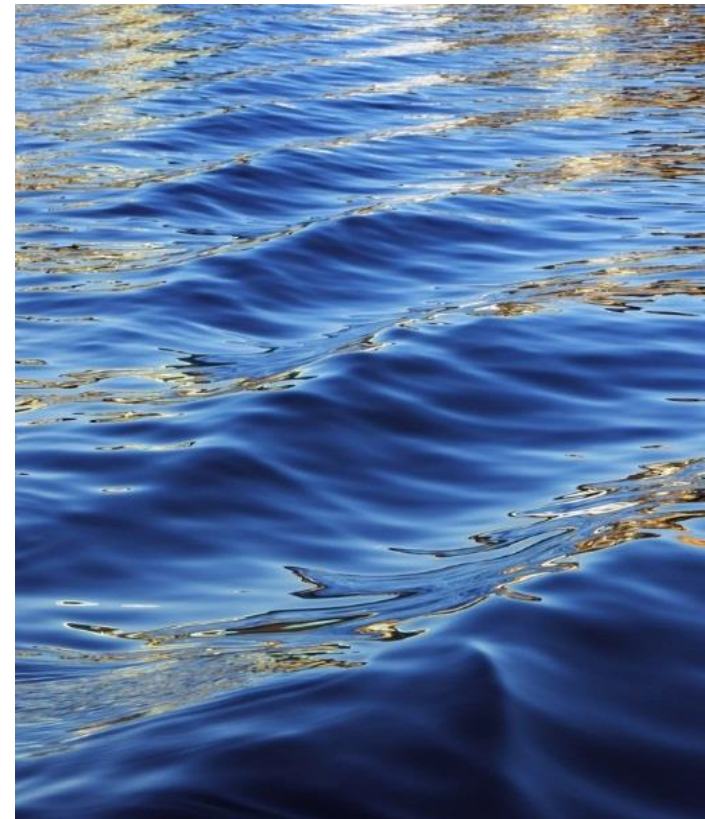




PFRP & BMP's for Compost Facilities managing organic waste streams...





Organic Waste – Feedstocks

What types of materials are you planning on managing?

- Leaves, grass, shrubs, trees or other wood fiber
- Site eradication of invasive plants or pests
- Foods or farm waste (bedding) and animal mortalities
- Manure or biosolids
- Human composting is now also an option in some areas

Could there be potential concerns with those materials?

- Jumping worms, E.coli from doggy doo, Herbicide/pesticide residuals
- EAB, Gypsy Moth
- Garlic Mustard, Buckthorn, palmer amaranth
- Salmonella, Aspergillus, or other Pathogens
Coronavirus or PFAS

How will you manage those materials?

- Active vs Passive (Hot or cold composting is also used to describe)
- In-vessel, Aerated Static pile, Windrow

What will you do with the product in the end?

- Bag or sell in bulk
- Mix with soils
- Give away for free
- Spread it on a field





Incoming Yard Waste Material

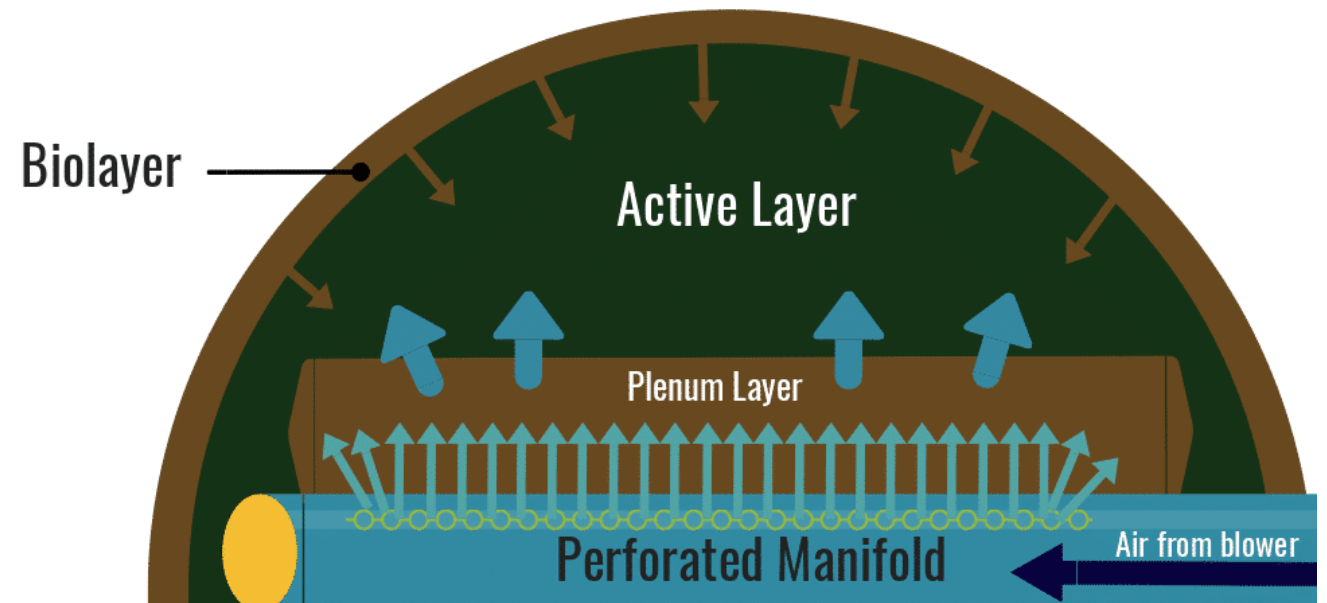
Incoming Wood Waste Material

Incoming Food Residuals

Finished Compost

Ideal Conditions for Composting

- C:N ratio of 25:1
- 40-60% Moisture Content
- Oxygen levels above 8%



1. Air exits perforations in manifold
2. Air slowed & diffused by plenum layer
3. Air promotes aerobic composting in active layer
4. Biofiltration layer traps heat and prevents odor escape

Mesophilic Phase

- Organisms that initiate the composting process begin to reproduce by breaking down carbon & nitrogen
- 75-105 degrees Fahrenheit as organic matter is formed into piles or rows and temps rise from activity in the pile
- If piles are mixed properly with sufficient volume and density temps increase within hours or days depending on moisture, oxygen and season.
- Beginning and ending phases of composting

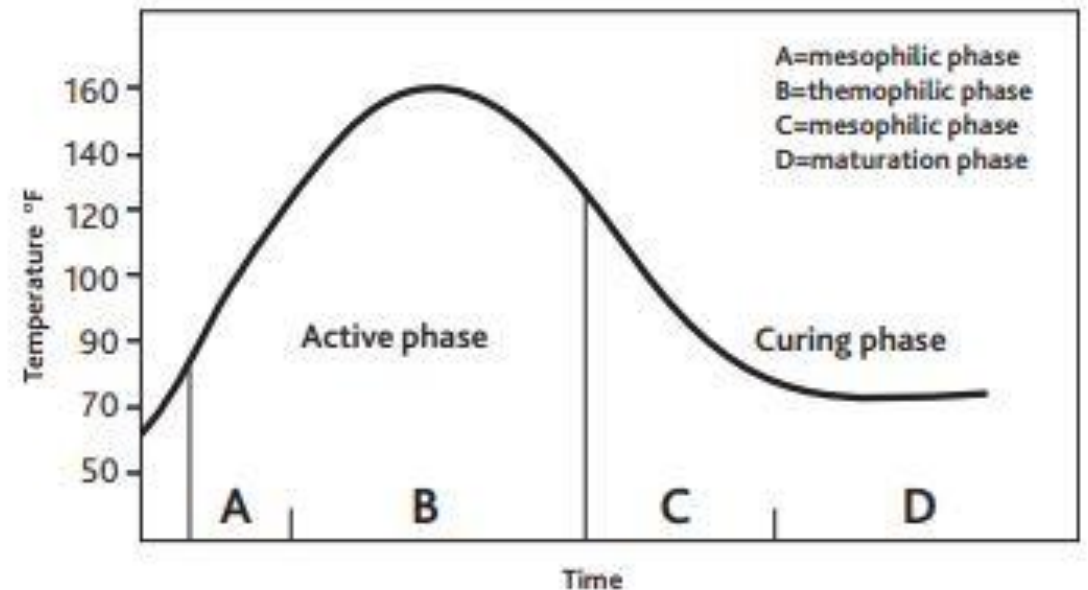


Figure 2. Temperature changes in an average compost pile. (Source: Cooperband, L. 2002. The Art and Science of Composting. Center for Integrated Systems, University of Wisconsin. <http://www.cias.wisc.edu/wpcontent/uploads/2008/07/artofcompost.pdf> [accessed November 6, 2010])



Thermophilic Phase (Sanitation Phase of composting)

- Ideal temperatures to breakdown organic materials is 105-160 degrees F and thermophilic organisms rapidly reproduce here
- Decomposition happens most rapidly as microorganisms break down more complex carbon like cellulose & lignin
- Excessive temps above >160 F for longer periods can also inhibit some microbial activity and could start to become a fire hazard
- Kills weed seeds, pathogens and phototoxic compounds at these temps
- Phase in which Oxygen needs to be replenished the most to keep piles from going anaerobic

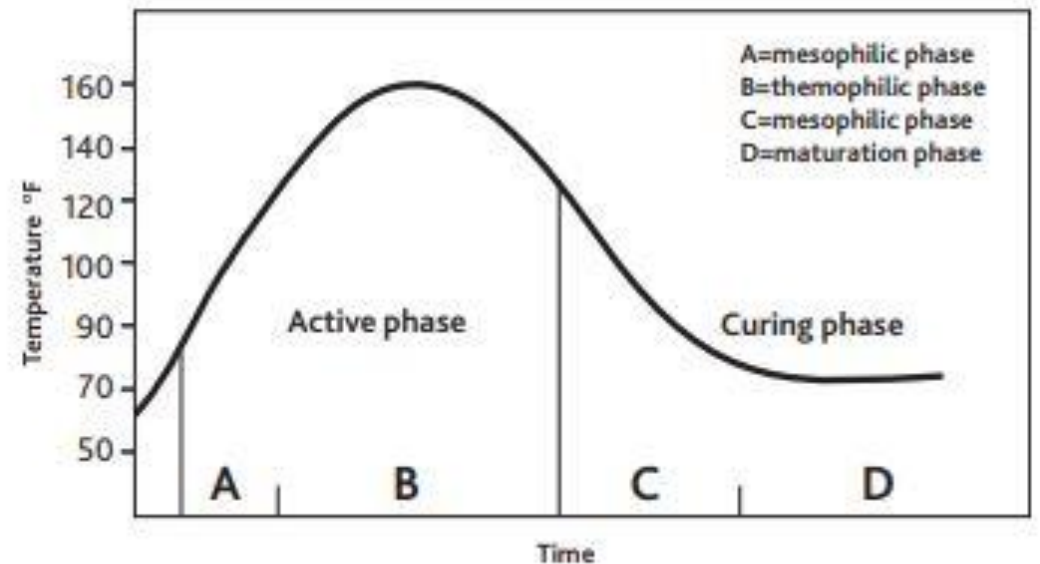


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PFRP

Process to Further Reduce Pathogens

- ASP system requires 131 degrees Fahrenheit or higher for 7 days.
- Compost PBR (Permit By Rule) yard waste sites do not have requirements to monitor temperatures. This does not mean you can't test and track for your own protection.

100 degrees F kills jumping worm cocoons

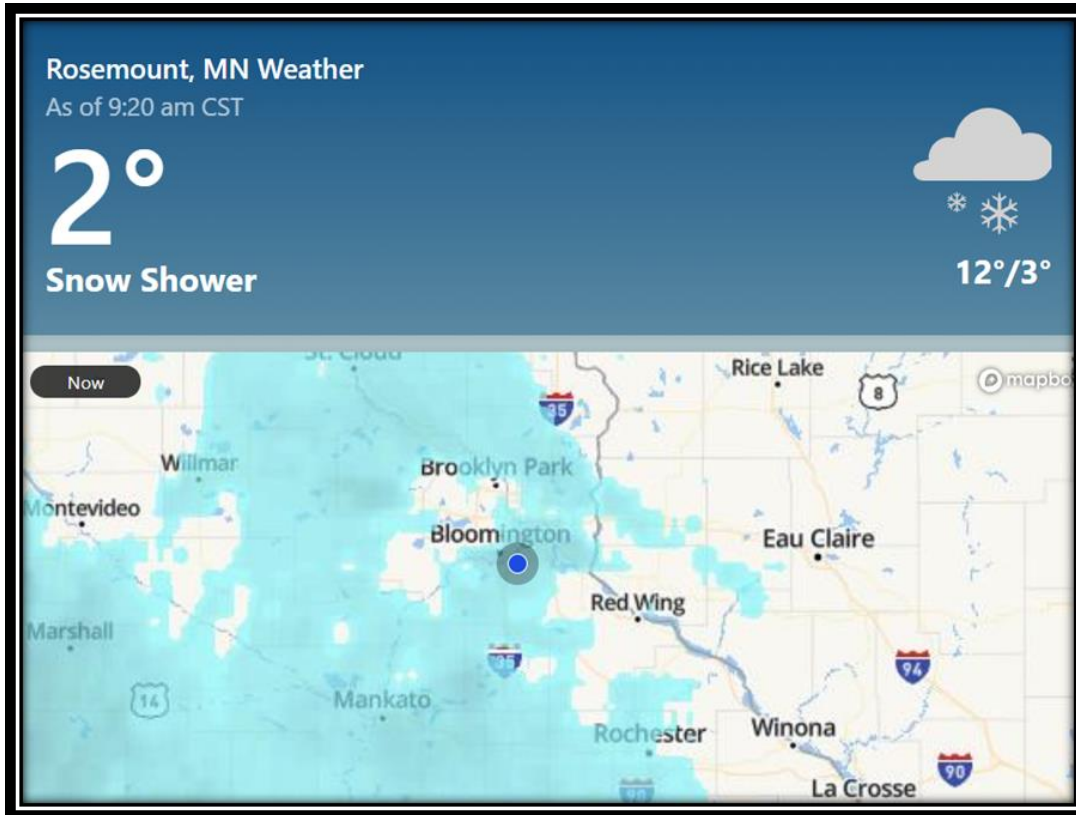
85 degrees F for 3 days will kill worms as well

131 degrees kills most weed seeds and pathogens

140 degrees F kills difficult weeds like palmer amaranth

160 will even kill some newer E.coli strains that have now been found

Constant monitoring and data tracking...





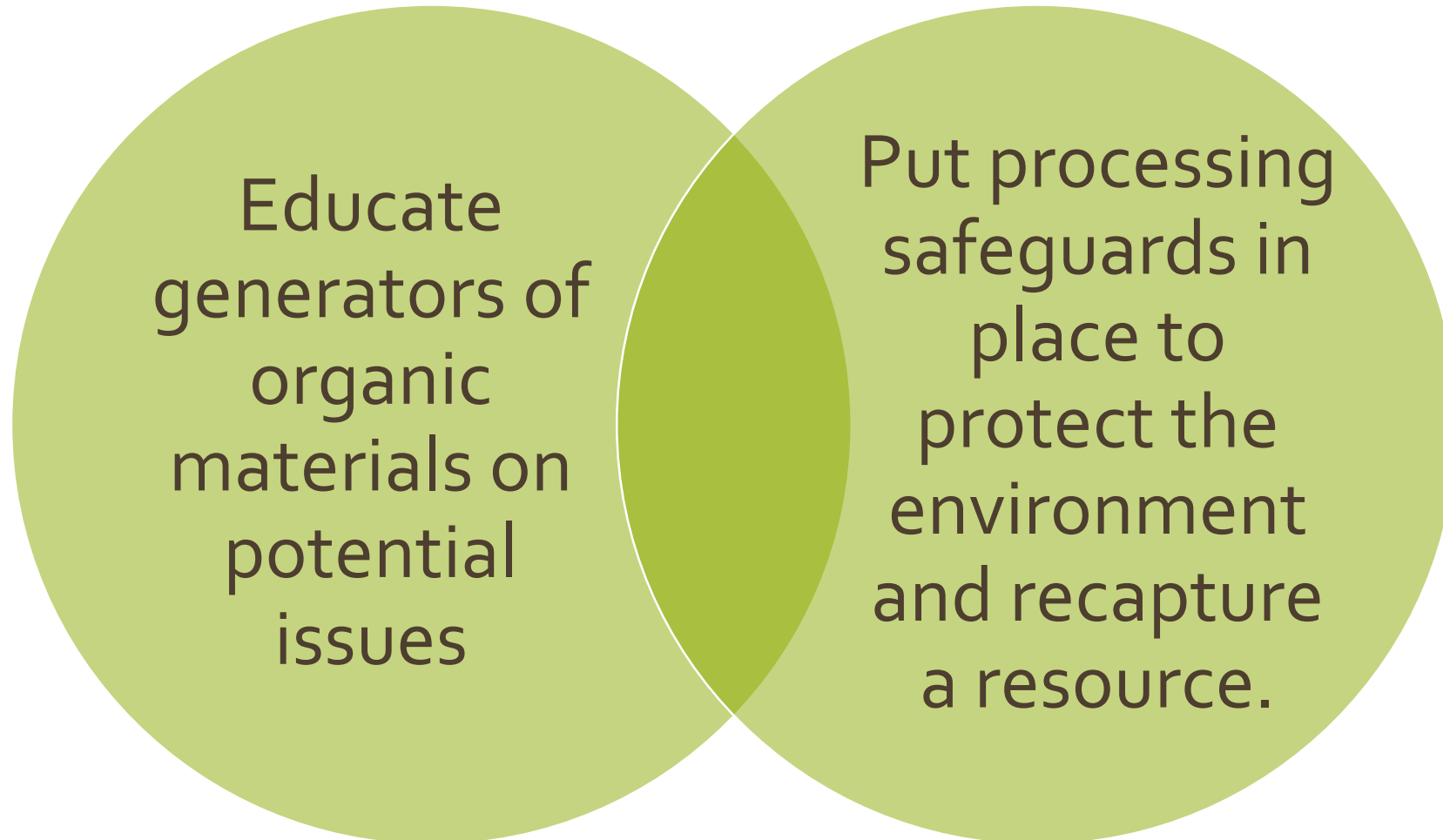
Windrow #	131 met	PFRP met	Avg. High Temp	Ind. High Temp	Additional Notes												
592	12/17/2019	1/10/2020	152.7	164													
593	1/2/2020	1/10/2020	152	160													
594	1/6/2020	1/15/2020	142.3	175													
595	1/8/2020	1/15/2020	151.7	165													
596	1/9/2020	1/17/2020	149	166													
597	1/13/2020	1/20/2020	150.7	167													
598	1/14/2020	1/21/2020	148.7	167													
599	1/15/2020	1/22/2020	143.7	159													
600	1/20/2020	1/30/2020	169.3	178													
601	1/30/2020	2/14/2020	142.7	155													
602			140.7	163	The middle section of the pile did not meet PFRP and was reprocessed in a new windrow												
603	2/14/2020	2/24/2020	146.7	170													
604	2/19/2020	2/26/2020	163	165													
605	2/13/2020	2/27/2020	149	154													
606	2/25/2020	3/9/2020	161	173													
607			125.7	133	Windrow failed to meet temperatures and was re-processed												
608	3/2/2020	3/10/2020	144.7	157													
609	3/16/2020	3/26/2020	155	166													
610	3/16/2020	3/26/2020	163.3	168													
611	3/19/2020	3/27/2020	161	176													
612	3/23/2020	4/1/2020	159	164													
613	3/23/2020	4/1/2020	154.3	158													
▶	Summary	634	633	632	631	630	629	628	627	626	625	624	623	622	621	620	.

2/24/2021	1	164						
	2	160						
	3	149	157.667					
2/26/2021	1	163						
	2	160						
	3	150	157.667					
3/2/2021	1	163						
	2	160						
	3	149	157.333					
3/3/2021	1	163						
	2	160						
	3	147	156.667					
3/4/2021	1	162						
	2	160						
	3	148	156.667					
mary	634	633	632	631	630	629	628	627

BMP's to REDUCE Potential Liabilities

- Be selective of materials to manage
- Have a site work plan for all phases of composting
- Blend materials properly and monitor regularly
- Make sure all areas of piles reach PFRP
- Test products regularly for assurance (STA recommended)
- Monitor and educate about herbicides / pesticides
- Don't let piles sit for years without moving
- Monitor/maintain "buffer" areas around site for weeds
- Clean buckets in-between uses
- Have fire prevention plans in place

Know your product is safe and beneficial



Define the terms...Mulch or compost, we are working on a better understanding to protect end users!





Know your product is safe!

Chuck Joswiak – cjoswiak@setinc.net

