SWANA Old Dominion Regulatory Training

Organics Management

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What are organics feedstocks?

- Source-separated organics, or SSO
- MWMRF-processed organics fraction
- Compostable/digestable – suitable for managed decay
- Separated - segregated from other wastes at the source of generation or in processing facility
- Organics – essentially what was once alive or came from something that is alive

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Examples of organics feedstocks

- Yard trimmings
- Vegetative land-clearing debris
- Food scraps
- Food-soiled paper
- Organic fraction of MSW processed in MWMRF
- Woody wastes (no PT, stained, painted or coated)
- Off-spec products from industrial food, paper and biodegradable manufacturing
- Grease trap wastes
- Agricultural residuals (cotton gin trash, corn stover, hay, straw)
- Industrial process sludges (non-sanitary)
- Residuals from animal processing (paunch manures, offal, mortalities)
- Animal manures (cattle, poultry, horse & livestock, swine) and bedding
- Sewage sludges and septic tank wastes

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How are these organics managed?

- Composting
  - 4,000 – 5,000 composting facilities in U.S. today
  - Windrow, aerated static pile, in-vessel
- Anaerobic digestion (AD)
  - Stand-alone solid waste AD – 21 on-line, 14-16 in development
  - Landfill gas-to-energy – 645 operational projects
  - Livestock AD – 247 operational
    - > 60 co-digestion with food scraps
  - Sludge AD at WWTPs – 1,238 operational
    - 12-15 are co-digesting food scraps, more in development
- Gasification
  - 3 operational at commercial scale; several in development

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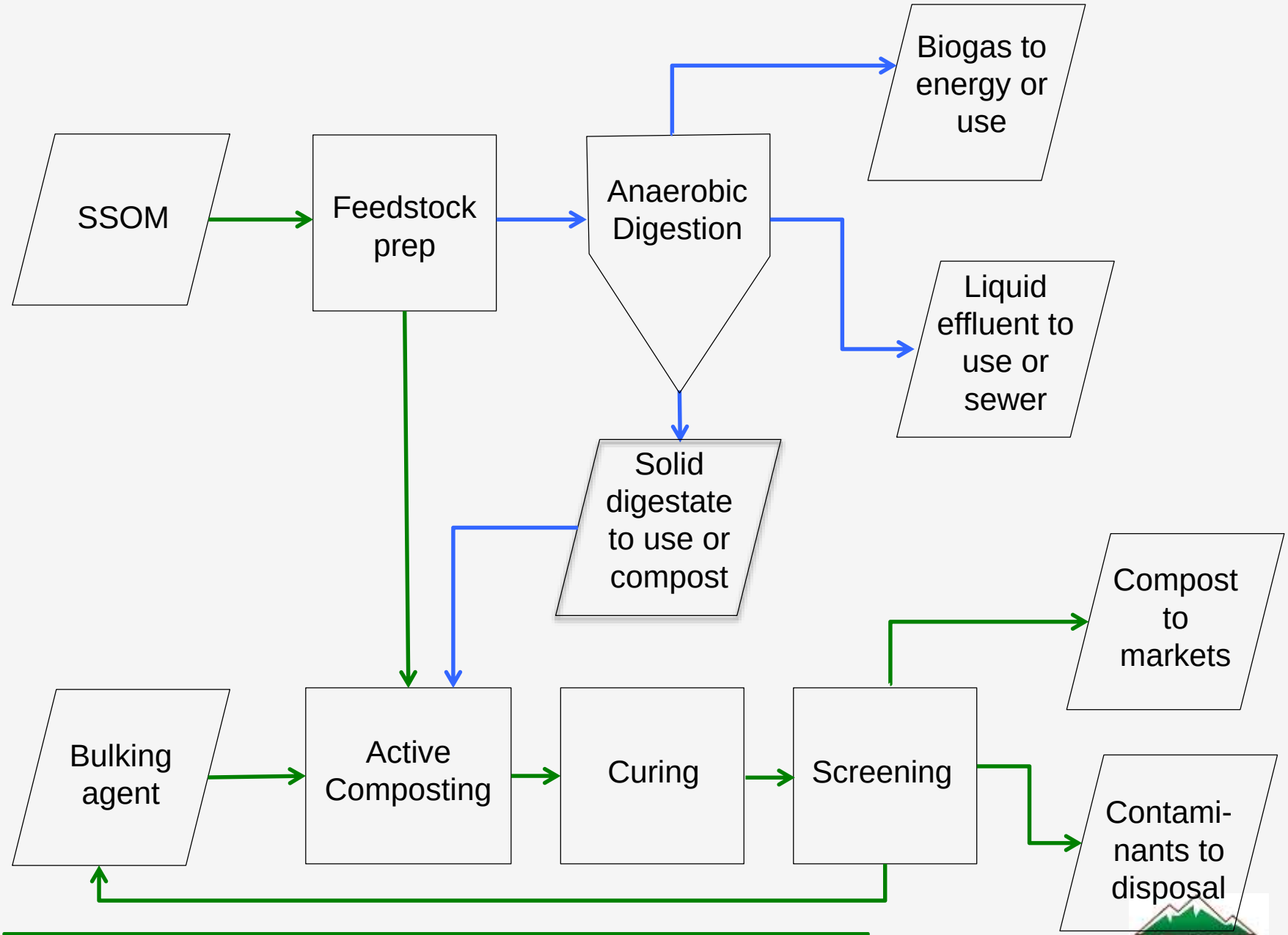

Processing Source-Separated Organics

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Organics management in Virginia

- Composting
  - 25 operational composting facilities in Virginia
    - 7 food scraps
    - 8 yard trimmings
    - 4 sewage sludge
    - 6 manure/agricultural residuals
  - 3 new facilities in development (2 municipal yard trimmings, 1 university food scraps)
- Digestion
  - 18 WWTP AD facilities (no co-digestion)
  - 1 livestock AD facility operational (no co-digestion)
  - 1 solid waste AD facility in development (municipal food scraps)
- Gasification
  - 1 50 TPD demonstration plant operational

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Blackbear Composting

Spotsylvania County (old site)

Royal Oak Farm

Newport News

Prince William County

Commonwealth Composting

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National trends in organics management

- Composting
  - Various state programs regarding organics
    - CT, VT, MA – new bans on landfilling food scraps
    - IA – reversed ban on landfilling yard trimmings
    - FL, MN – adopted 75% recycle goals by 2020
  - Several high-profile shutdowns recently
    - Odors, contamination, storm water quality major issues
  - Growing interest in small-scale community facilities linked to community-supported agriculture

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National trends in organics management

- Digestion
  - Markets for AD biogas competing with fracked gas
    - Power utilities not interested in distributed generation
      - More willing to accept net metering – of great interest to WWTPs
    - CNG for fleet vehicles most robust market today
  - Digestate management
    - No accepted end usage standards yet
    - Additional processing (i.e. composting) needed
  - Growing interest in European dry fermentation systems
    - Four on-line, > dozen in development

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Solid Waste Digesters

- Also known as dry fermenters
- Solids content greater than 50% T.S.
- Batch reactors filled with loaders
- 28-day biogas generation period
- Digestate removed & composted

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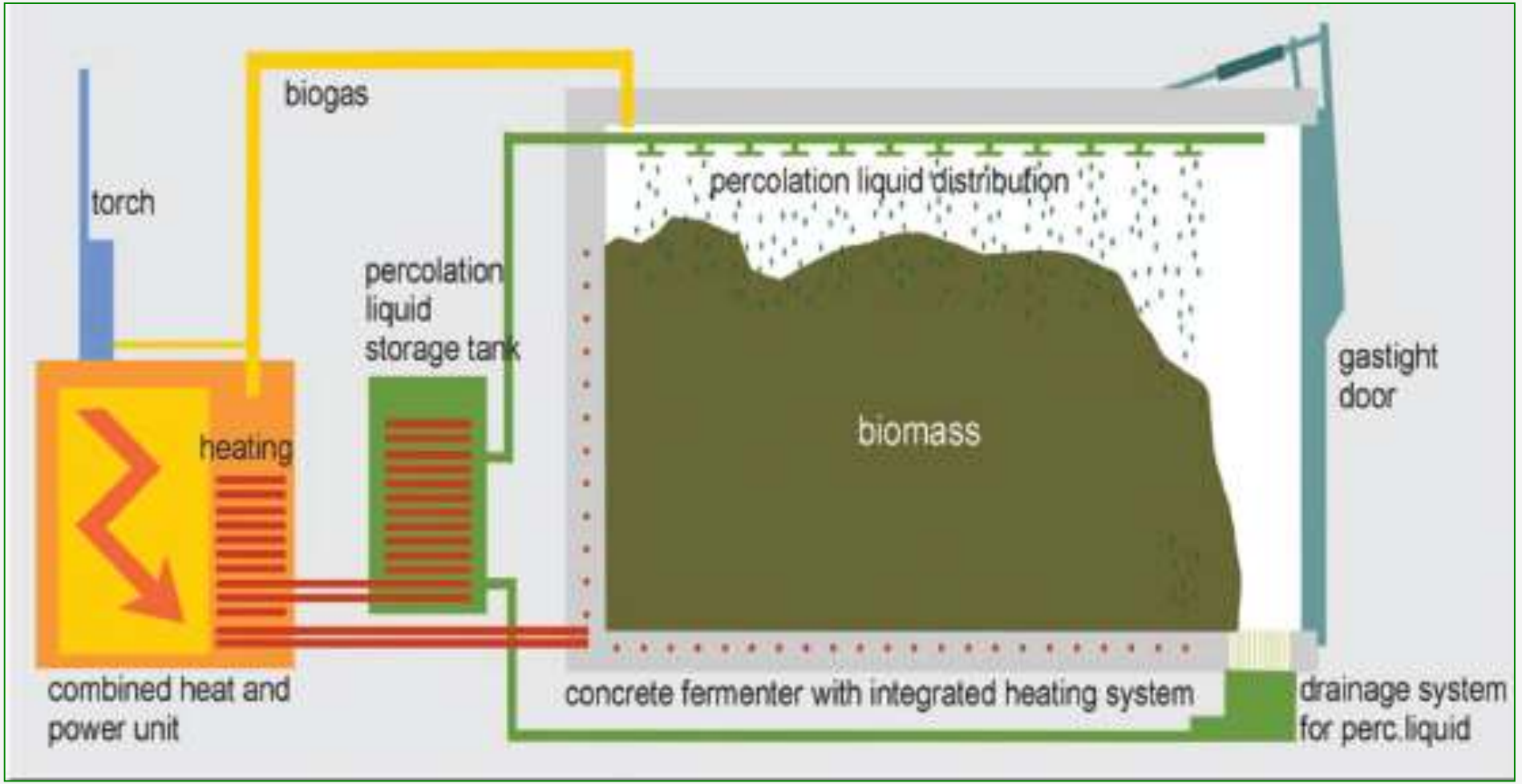

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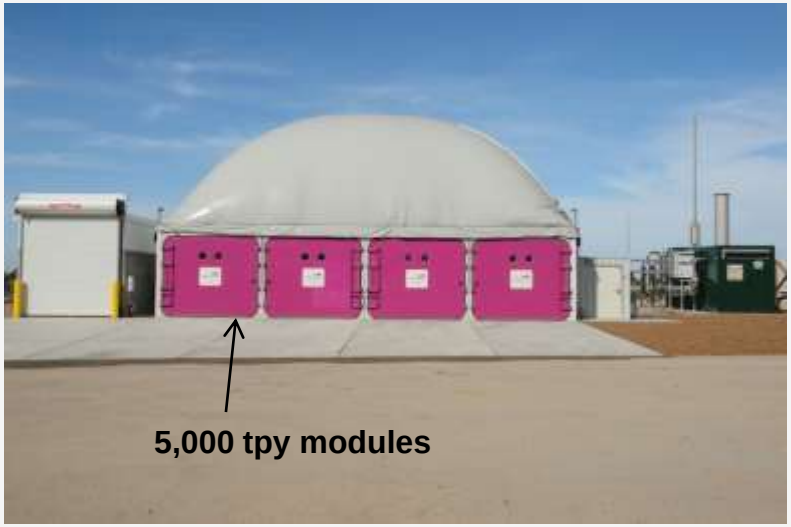
Holbaek, Denmark


Neiheim , Germany



Monterrey Regional Solid Waste Mgt. District, Marin, CA

San Jose AD/IVC Facility, San Jose, CA

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National trends in organics management

- Gasification
  - Cost-effective operation at commercial scales still in question
  - Max. moisture content 27-30%
  - Product is hydrogen-rich syngas
    - Waste streams include char & oils
  - Ineos Bio Gasification Plant, Vero Beach, FL
    - Gasifying yard trimmings from Indian River landfill
    - Unforeseen problem with HCN contamination of gasifier
  - Sevier Solid Waste Management, Sevierville, TN
    - Plans to gasify MSW compost; use syngas for heating
    - Char to be marketed as biochar

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Regulatory developments

- Composting
  - More states simplifying permitting process
    - U.S. Composting Council model rules used in MD, SC
    - Permits-by-rule, registrations, exemptions
  - Recognition of difference between wastes & products
  - Zero discharge for storm water becoming norm
    - In VA: 1-hr, 10-yr storm; many states: 24-hr, 25-yr storm
- AD
  - Regulations still in development; final in MA, CA
  - No digestate end use standards yet
    - American Biogas Council drafting model standards

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VPDES Permit - *Who Needs One*

- VPDES permit required if “primary activity” is a “covered sector” with a point source discharge of stormwater associated with the industrial activity
- Composting is a regulated industrial activity covered under the VPDES Industrial Storm Water General Permit – Sector C (SIC 2875)
- Mulching is a regulated industrial activity covered under the VPDES Industrial Storm Water General Permit – **Sector A** (SIC 2499)
- Benchmark monitoring and SWPP Plan needed

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Process Water Composition

Pollutant	Units	Avg Concentration*	SIC 2875 Benchmark Standards
Biological Oxygen Demand (BOD)	mg/L	78.6	30
Chemical Oxygen Demand (COD)	mg/L	608.0	120
Fecal Coliform	#/100 ml	295,970	
Ammonia	mg/L	0.3	2.14
Total Nitrogen	mg/L	13.0	2.2
Phosphorus	mg/L	6.1	2.0
pH	SU	6.7	
Total Petroleum Hydrocarbons	mg/L	7.6	
Total Suspended Solids (TSS)	mg/L	398.0	100
Total Copper	mg/L	0.03	
Total Lead	mg/L	0.01	
Total Zinc	mg/L	0.13	

*Avg. of 10 annual samples, 80,000 tpy yard waste composting facility, Charlotte, NC

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Composting under SW Mgt regulations

- Composting of solid waste that **does NOT include biosolids** is permitted through the DEQ Land Protection & Revitalization Division, Office of Waste Permitting & Compliance
  - VSWMR 9 VAC 20-81
  - Waste permit fee regulations 9 VAC 20-90

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Composting managed by Water regulations

- Composting of solid waste that **includes BIOSOLIDS** is permitted through the DEQ Water Division
  - Virginia Pollution Abatement (VPA) Permit Regulation 9VAC 25-32
  - Water Permit Fee Regulations 9VAC 25-20

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Permit Comparison

Solid Waste Permit

- Permit by Rule
- Completeness review by DEQ
- $390 permit fee, $1200 annually
- WMFO required
- Quarterly DEQ inspections
- FA varies

VPA Permit

- Individual
- Public meeting & comment period
- $5000 permit fee, $100 annually
- No licensed operator
- Annual DEQ inspection
- $2 million FA

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Virginia solid waste management regulations

- Permit-by-Rule Process
  - Types of compost facilities
  - Feedstock categories
- PBR Basic Requirements
- Siting
- Design
- Operations
- Closure

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Solid Waste Permit-By Rule Process
9 VAC 20-81-410

- Contact Regional Land Protection Manager
- Notice of Intent to Operate per 81-450.B
- Description of type of facility and material to be composted
- Certification of site criteria and Operations Manual
- PE certification of design/construction and closure plan
- Demonstrate legal control over site
- SCC Certification
- Financial Assurance
- Results of Public Participation
- Application Fee $390 (per 9VAC20-90-10 et seq)

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Types of Composting
9 VAC 20-81-310

- Type A: confined or enclosed vessel method of composting

In-Vessel Composting Limited – Model 616

- Type B: windrow or aerated static pile method

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Categories of Feedstock

9 VAC 20-81-310

- Category I: Pre-consumer plant or plant-derived wastes
- Category II: Animal derived waste material
- Category III: Animal and post-consumer food wastes with pathogen potential
- Category IV: Other wastes (non-rendered animal waste, MSW, industrial sludge)

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PBR Requirements

- Conform to requirements of VSWMRs, particularly 9VAC 20-81-320, -330.A, -340.A, -350, -360, and -485.B
- Operate under supervision of a DPOR- licensed solid waste management facility operator
- Submit annual SWIA 50-25 form
- Pay annual permit fee
- Comply with FA regulations 20-70-10

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Siting
9 VAC 20-81-320

- Access to paved/surfaced roads
- Not subject to base floods
- 100 foot buffer from property line
- 50 feet from stream or wetland
- 200 feet from residential area, health care facility, school, recreational park, other public institution
- Minimize traffic congestion
- Management of run-on, run-off, and leachate

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Design/Construction
9 VAC 20-81-330.A

- Handling area for receiving & sorting – covered if Cat II, III, or IV
- If seasonal high-water table within 2 feet of ground surface, composting & handling areas must be hard-surface and diked/bermed
- If receiving Cat IV feedstock, or > 1,000 tons/quarter Cat II or Cat III feedstock, several options for surface underlying all receiving, mixing, composting, curing, screening, and storing operations
  - Asphalt, concrete, soil-cement, HDPE liner (w/ leachate detection/collection)
- Uncovered sites – surface water control features sized for 1-hr / 10-year intensity storm event

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Operations
9 VAC 20-81-340.A

- Noncompostable and undesirable material disposed of at an appropriate permitted facility
- Implement a safety program to include fire prevention & suppression
- Control dust, odors, vectors, and mud
- Self-inspections & maintenance
- No discharge without VPDES permit

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Finished Compost Testing & Analysis
9VAC 20-81-340.A.2

- Does not apply to facilities composting only Category I
- Frequency of analysis based on tons of finished compost per year (1x/mo to 1x/yr)
- Five Stability testing methods:
  - Temperature decline (keep records)
  - Solvita Compost Maturity Test
  - Reheat Potential
  - Oxygen Uptake
  - CO2 Evolution

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Finished Compost Testing & Analysis
9VAC 20-81-340.A.2 (cont.)

- Microbial testing required, Cat III & Cat IV:
  - Parasites (viable helmith ova < 1 per 4 g (dry wt.))
  - Bacteria (fecal coliform< 1000 MPN/g (dry wt.) or Salmonella < 3 MPN / 4 g (dry wt.)
  - DEQ may approve alternate microbial testing or operating standards as applicable for specific facility

- Metals testing for all finished products produced from Cat IV materials

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Compost product trends

- USCC Certified Compost program
  - www.certifiedcompost.com
  - 9 DOTs now require STA compost

- More producers moving into blended soils markets
  - Rootzone mixes for golf, athletic turfgrass
  - Bioretention & bioswale growth media
  - Manufactured/engineered topsoils

- Growing recognition of market demand needed for lesser quality composts made from processed MSW
  - Land reclamation, ADC, final/intermediate cover

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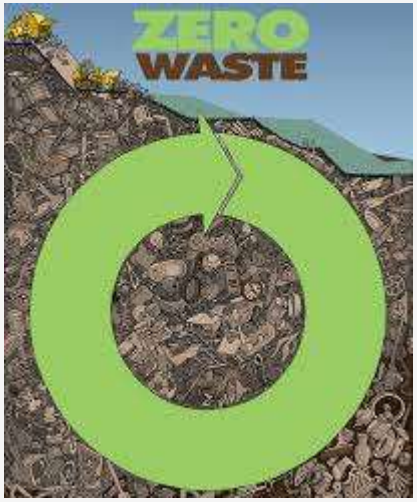
Where do we go from here?



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Realities

- Raising recycling rates very difficult without capturing and recycling organics in some way
- Work of siting and building new landfill air space capacity very challenging, if not impossible in some areas
- There is no “one size fits all” solution

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Open discussion

- Option 1 – Source-separated processing
  - Separate processing areas for trash, recyclables, organics
  - Need strong education/outreach about separation quality
  - Impact of multiple truck pickups?
- Option 2 – Mixed-waste materials recovery facilities
  - Coupled with composting/AD facilities and landfills
  - Need to minimize recyclables contamination
  - Need market demand for lower-quality composts
- Option 3 – Landfills
  - With robust recovered gas-to-energy systems

Pros/Cons of Each?

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Questions?

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