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Organics Composting Forum: Building Infrastructure and Markets

Composting Food Wastes In Virginia

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How Did We Get Here?

- Aug ’03 – EPA RCRA meeting
  - Goal – 35% recycle rate by 2008
  - Paper, food scraps, yard trimmings, packaging
- Aug ’06 – VA Food Waste Workshop
  - Innovative case studies
- Nov ’06 – EPA Reg. 3 Mid-Atlantic Organics Summit
- 2007 – Reg. 3 Follow-Up Meeting; MACA Conf.
- Now – Quarterly conference calls to discuss infrastructure stimulation

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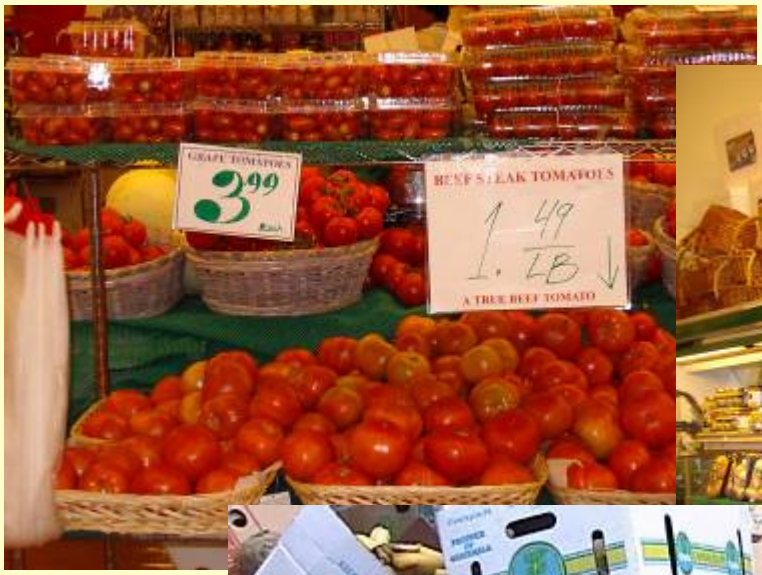
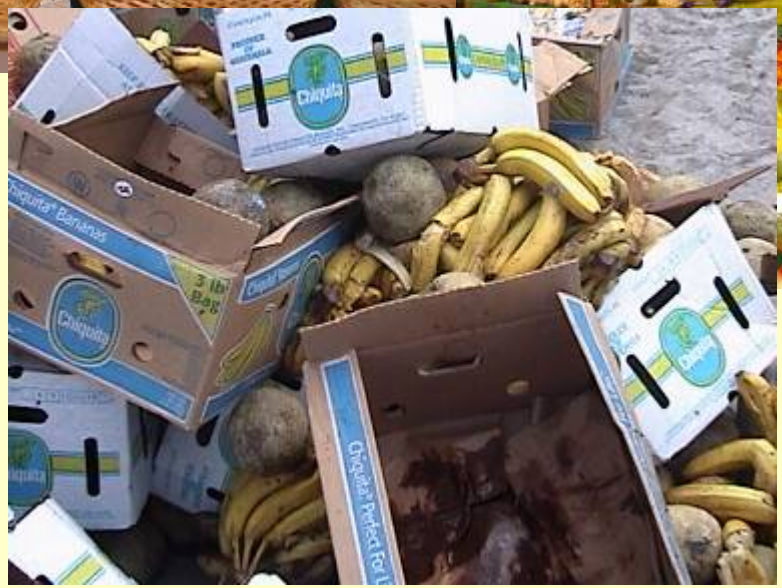
Where Are We Now?

- Vegetative/Yard Waste
  - Good news – most mulched, some composted (> 70% overall recycling)
  - Bad news - Still not banned from landfilling in VA
- Food Residuals
  - Good news – people are talking about it
  - Bad news – very little is being recycled
- Paper
  - Good news – more mixed paper recycling
  - Bad news – only 25% now recycled (per VA-DEQ)

Let's Focus on Food Wastes





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What Are The Numbers?

- VA MSW in 2007 = 16,245,465 tons
  (just in-state generation)
- Food Waste = 11.9% MSW stream
  (source: Franklin Assoc./EPA, 2005)
- VA Food Waste ~ 1,933,210 tons
  - ***501.3 pounds per year per Virginian***
- % Recycled = 2 - 3% (nationally)
- % Recycled in VA = not much

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Food Losses in America

- Households – 1.28 lbs/day (as MSW, excluding garbage disposals, BYC, scraps to the dog, etc.)
- Fast Food Estab. – 418.4 lbs/day
- Full Service Restaurants – 138.2 lbs/day
- Supermarkets – 120.8 lbs/day
- C-Stores – 52.7 lbs/day

Source: Jones, T.W., “Using Contemporary Archaeology and Applied Anthropology to Understand Food Loss in the American Food System”, University of Arizona, 2002

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What Do We Do?

- Follow The Hierarchy
  - Source Reduction
  - Food Rescue Programs
  - Animal Feed
  - Composting
  - Digestion / Energy Recovery
  - Landfilling / Incineration

Composting

- Composting – a viable outlet for food wastes
- Key issues –
  - Source separation – dual collection infrastructure
  - Transport distances and costs
  - Contamination – a ***major*** issue
  - Few facilities permitted to take food wastes
  - Collection transportation efficiencies
  - Costs to develop new merchant facilities are high

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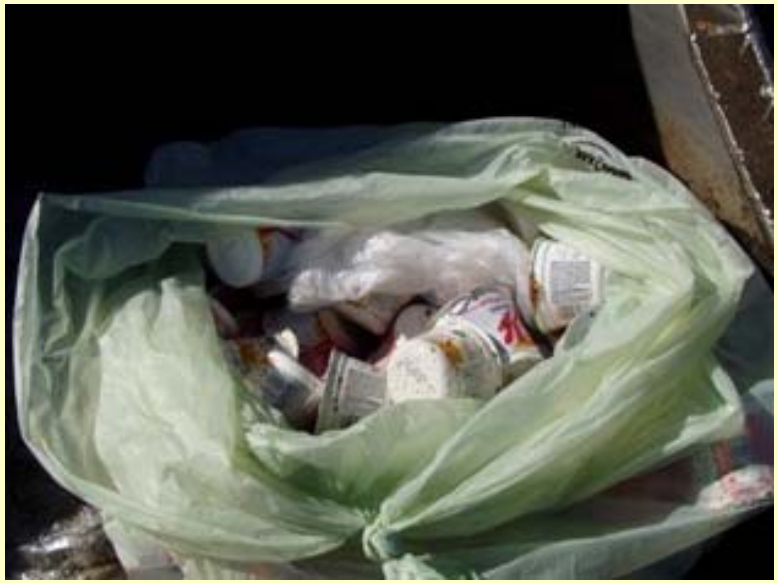
Pre-Consumer Food Waste

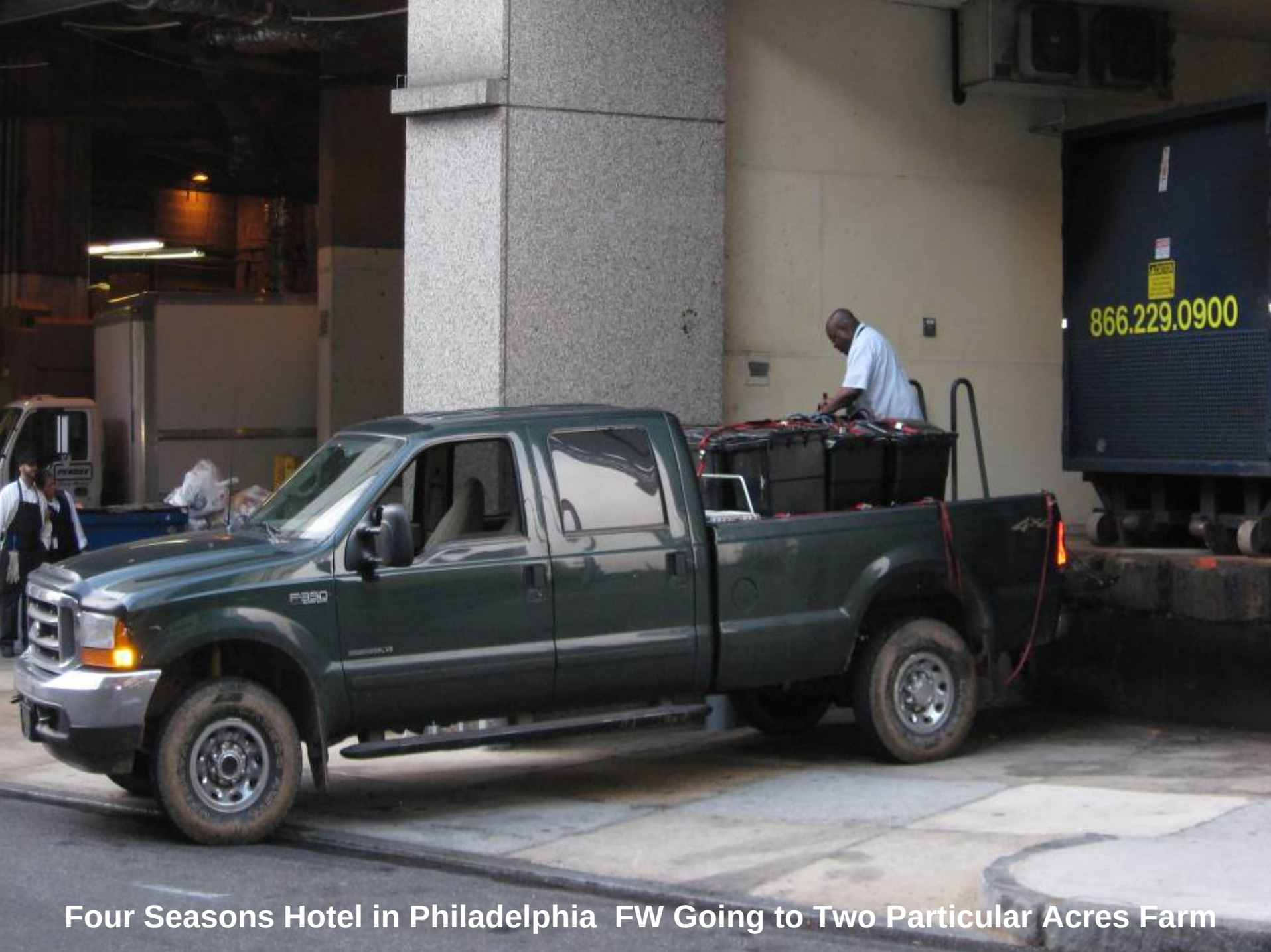
Post-Consumer Contamination



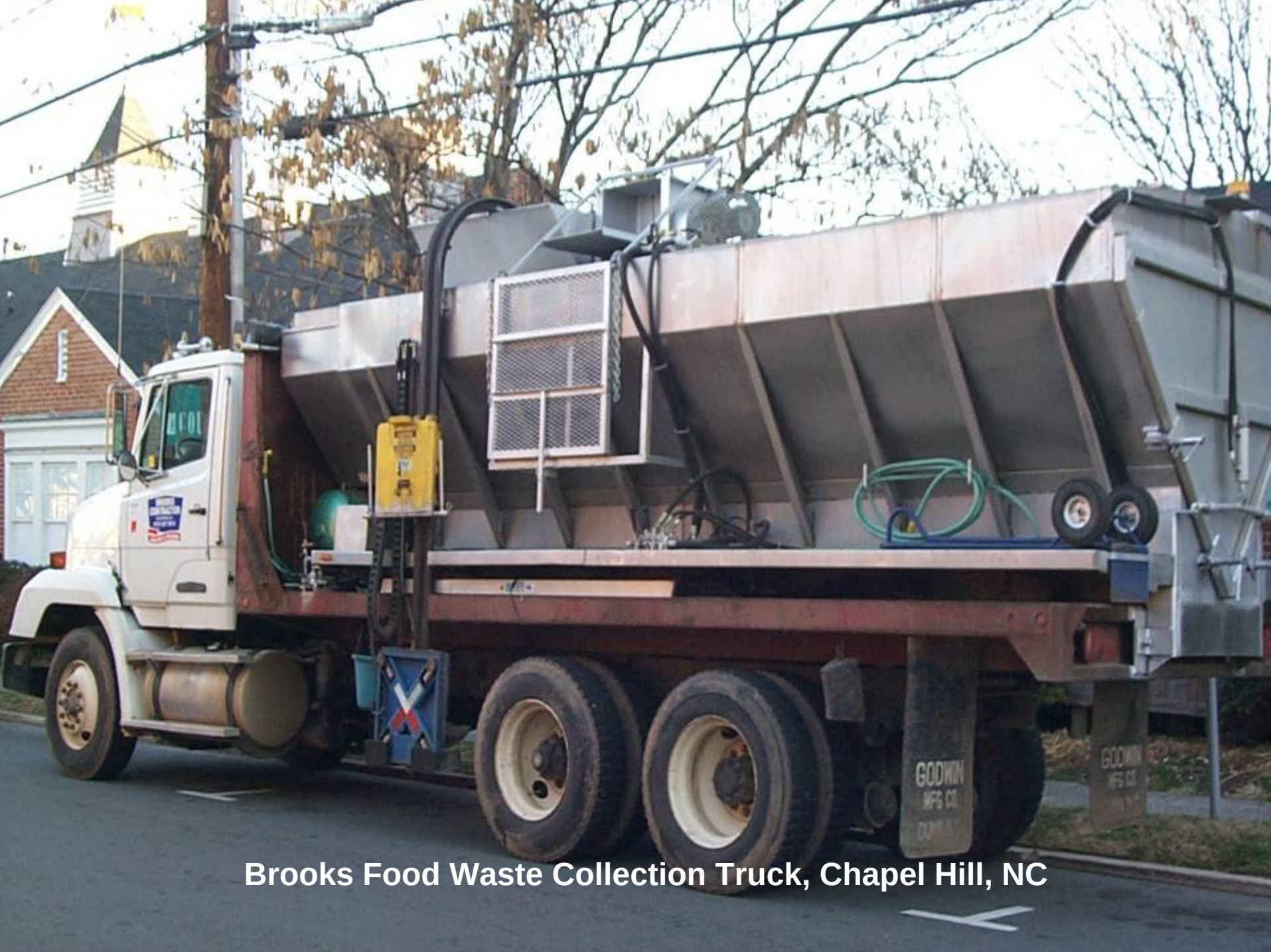
Multi-lingual Signage Needed

Collection Transportation

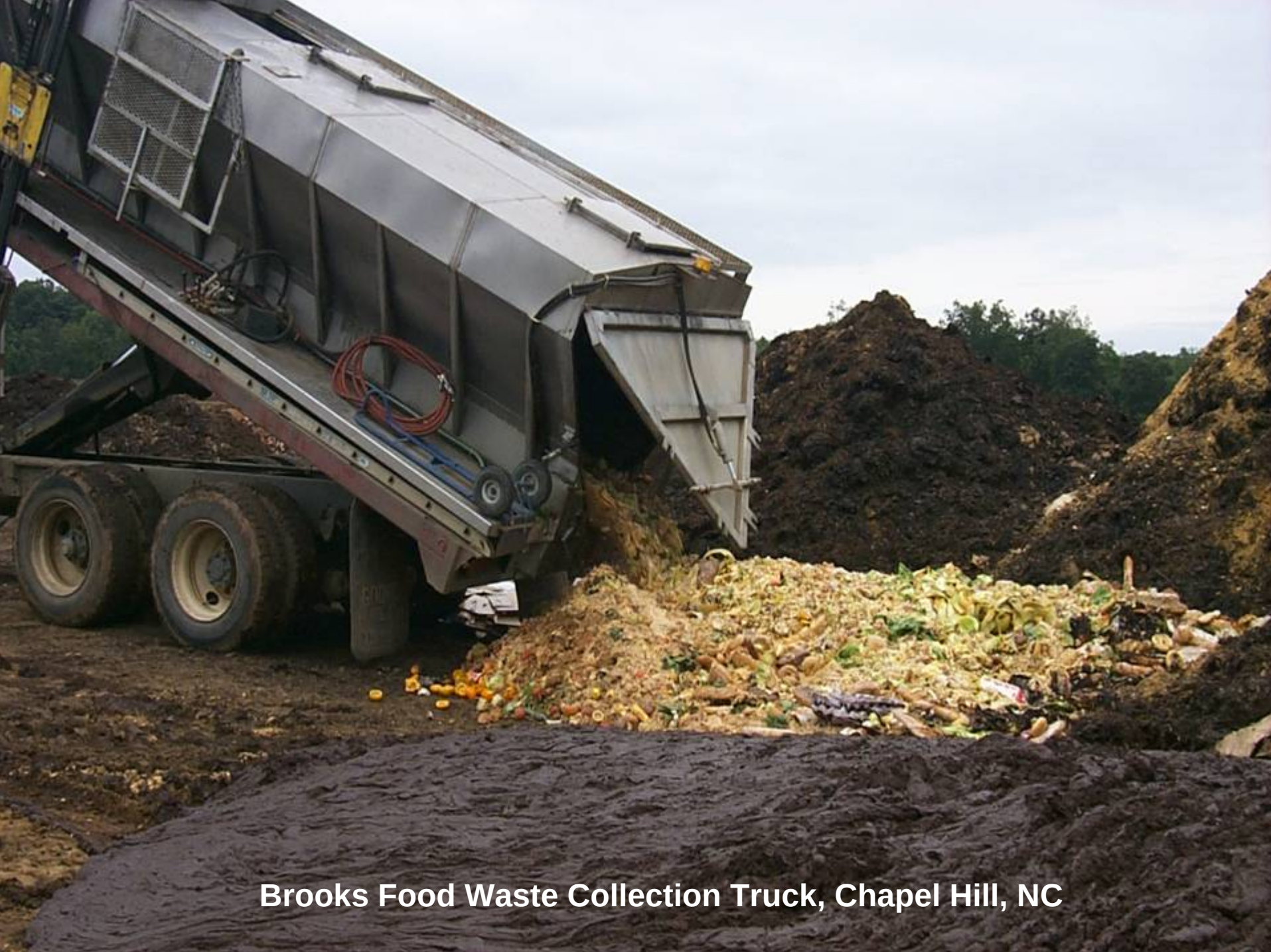
- Small scale – pick up trucks & carts
  - Labor intensive
- Larger scale - traditional solid waste hauling vehicles used
  - Issues with leakage, fuel economy
- Need to consider transfer functions to increase hauling efficiencies to distant facilities



Four Seasons Hotel in Philadelphia FW Going to Two Particular Acres Farm

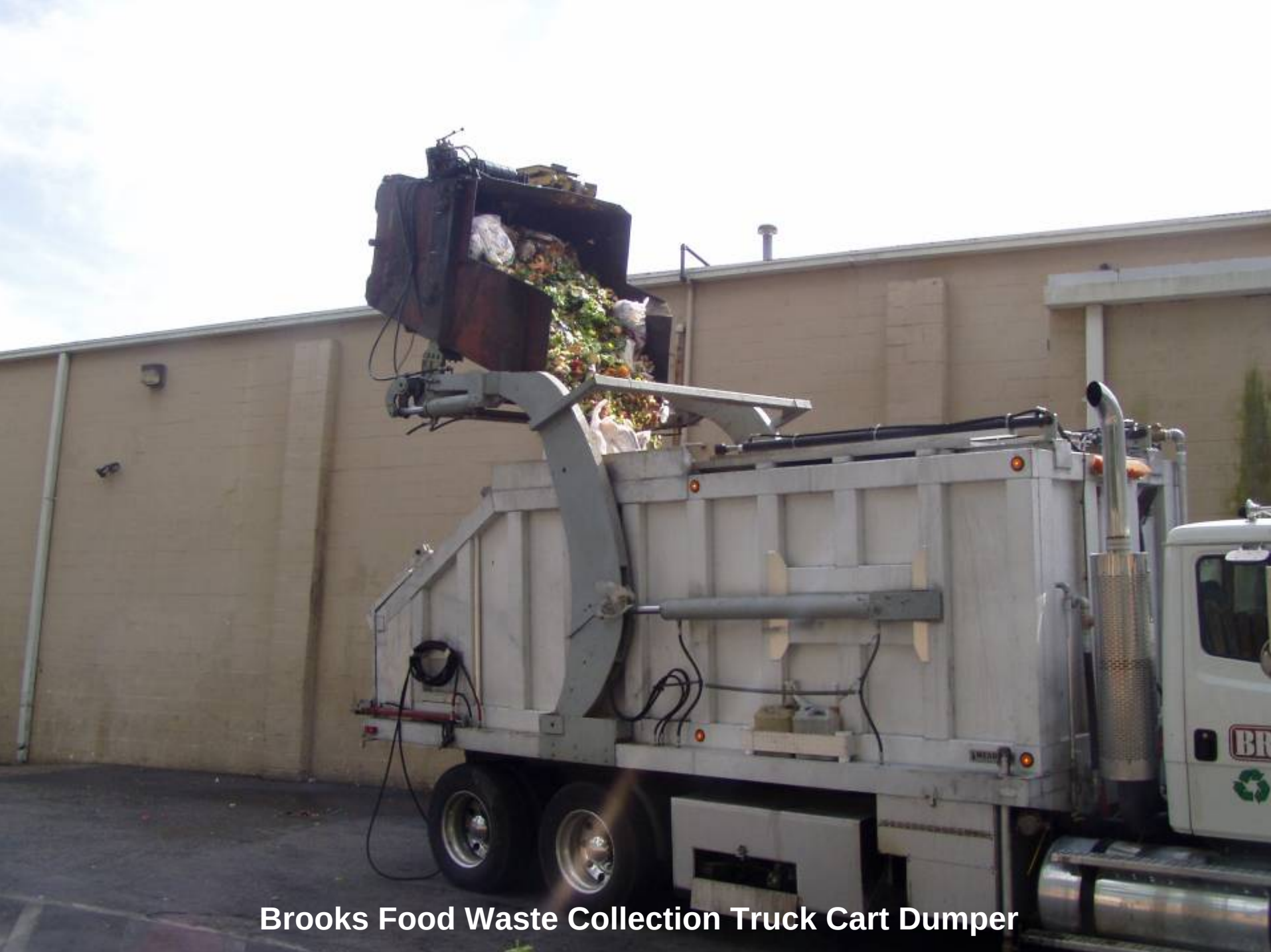


Brooks Food Waste Collection Truck, Chapel Hill, NC



Brooks Food Waste Collection Truck, Chapel Hill, NC

Brooks Food Waste Collection Truck Cart Dumper



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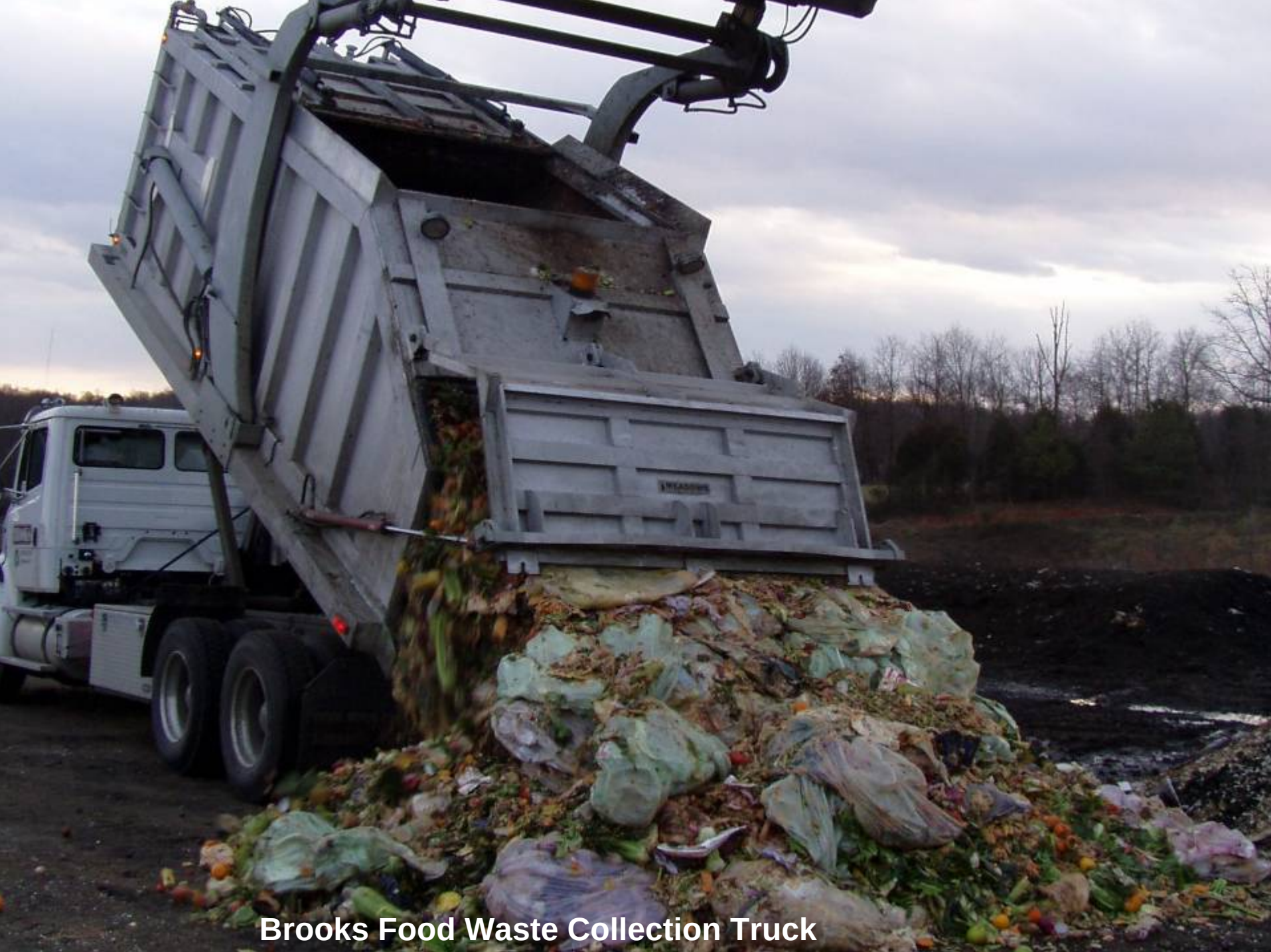
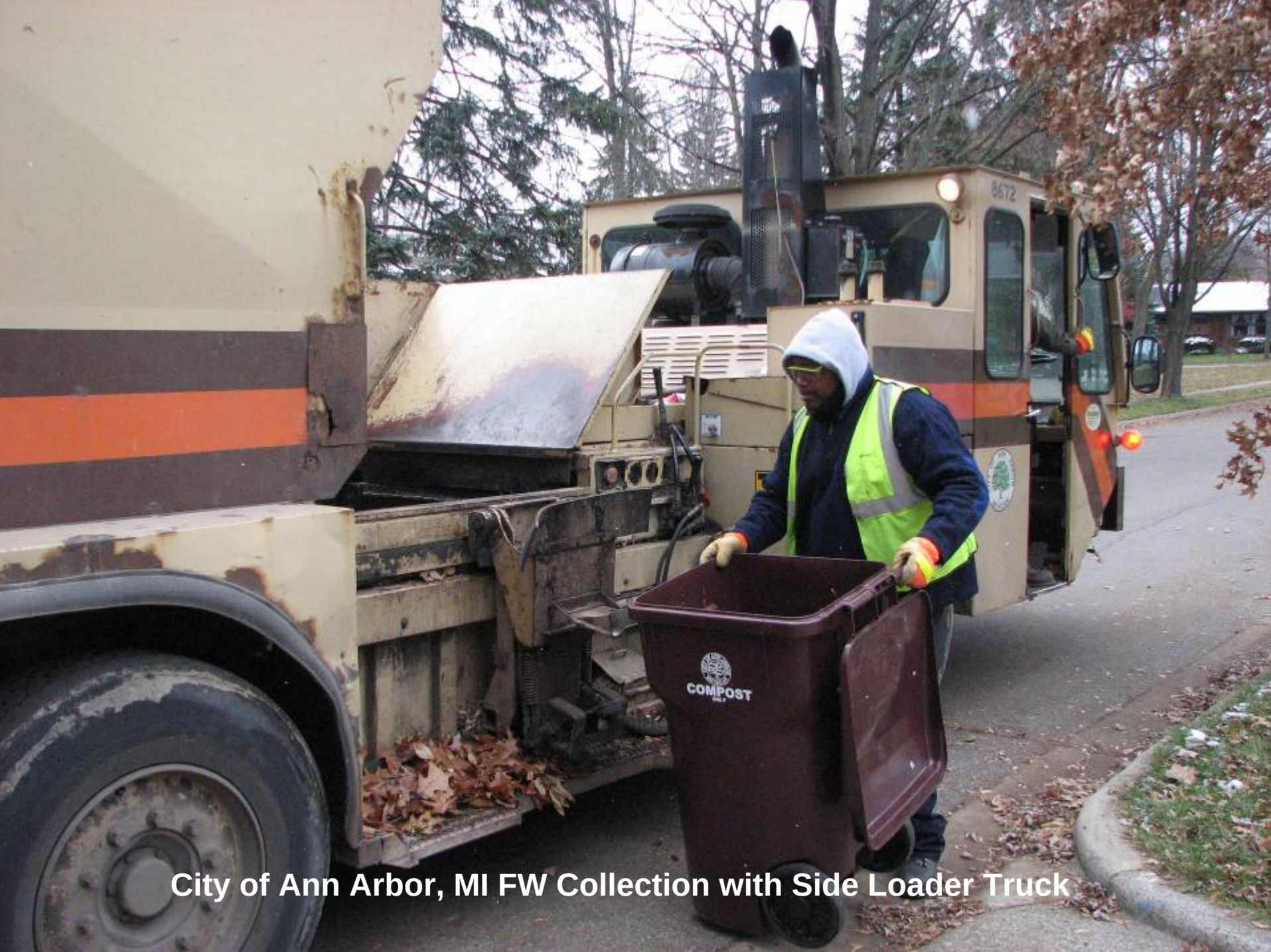
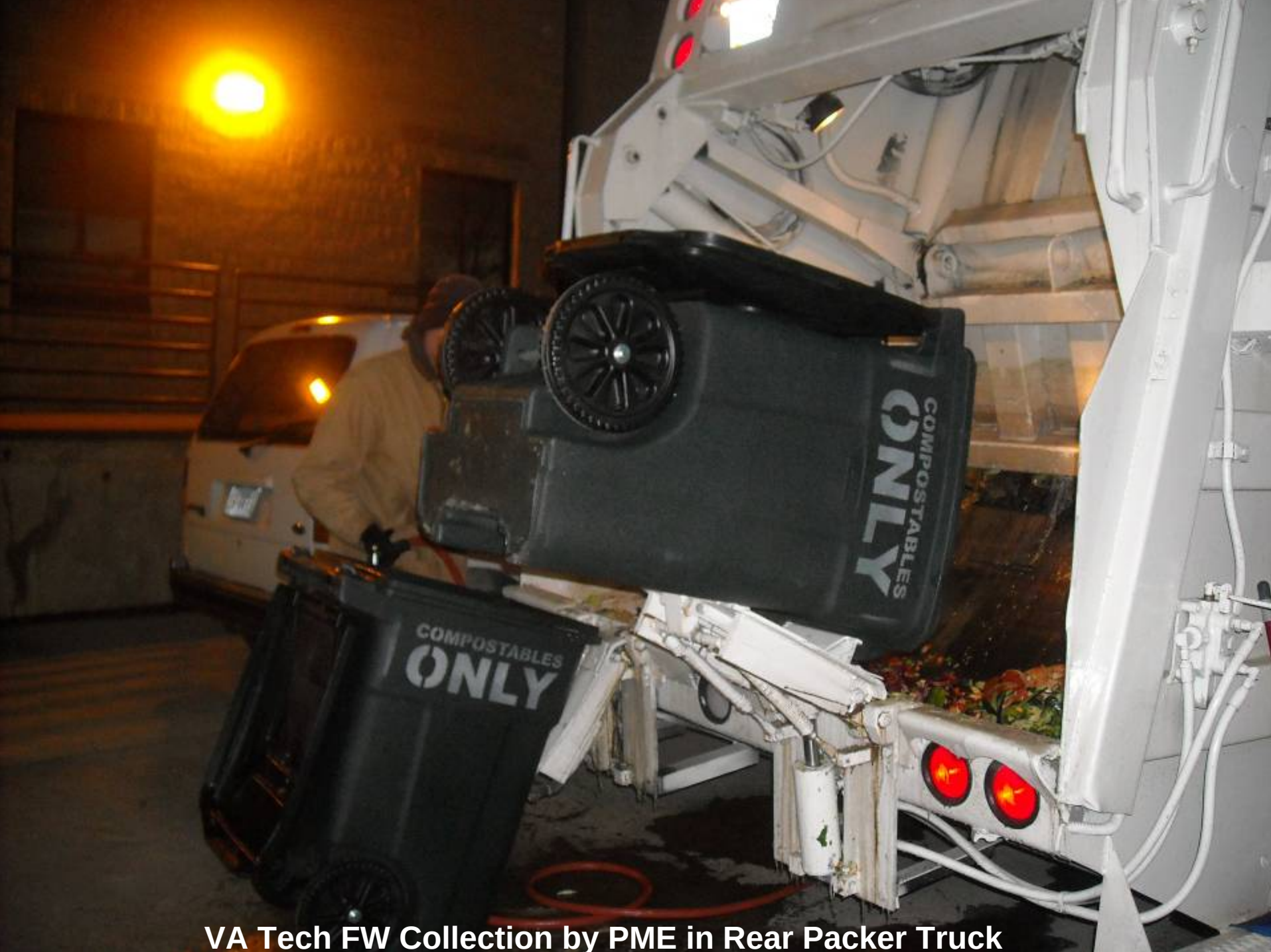


Brooks Food Waste Collection Truck



City of Ann Arbor, MI FW Collection with Side Loader Truck



VA Tech FW Collection by PME in Rear Packer Truck

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Virginia Composting Facilities

- Food waste
  - Watkins Nursery/Ukrops, Chesterfield County
  - DOC James River Correctional Complex (6 facilities), Goochland & Powhatan Cos.
  - Royal Oak Farm, Bedford Co.
  - Poplar Manor Enterprises, Floyd Co.
  - McGill Environmental, Sussex Co.
  - Panorama Farms, Albemarle Co.
  - Washington-Lee University

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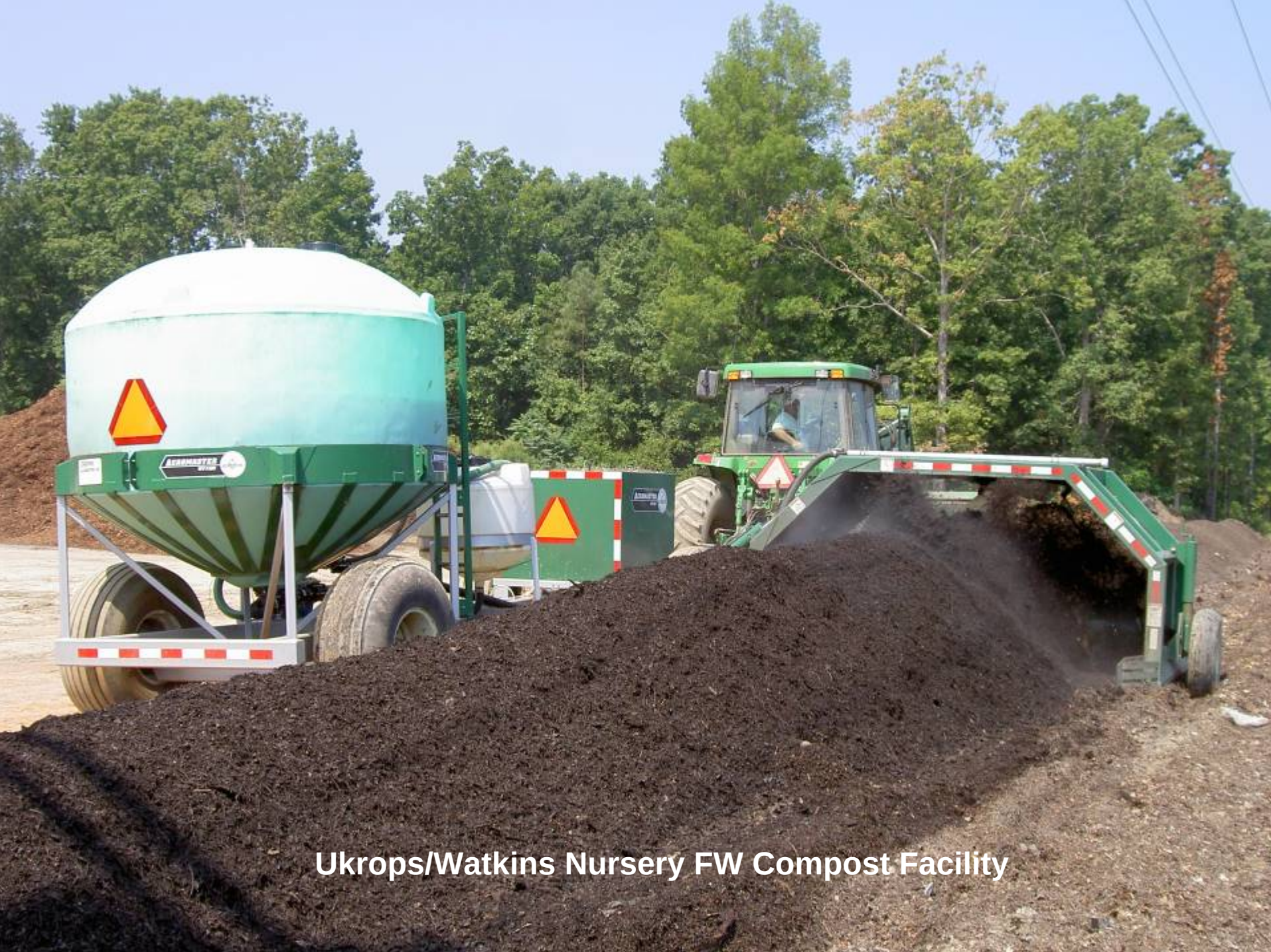
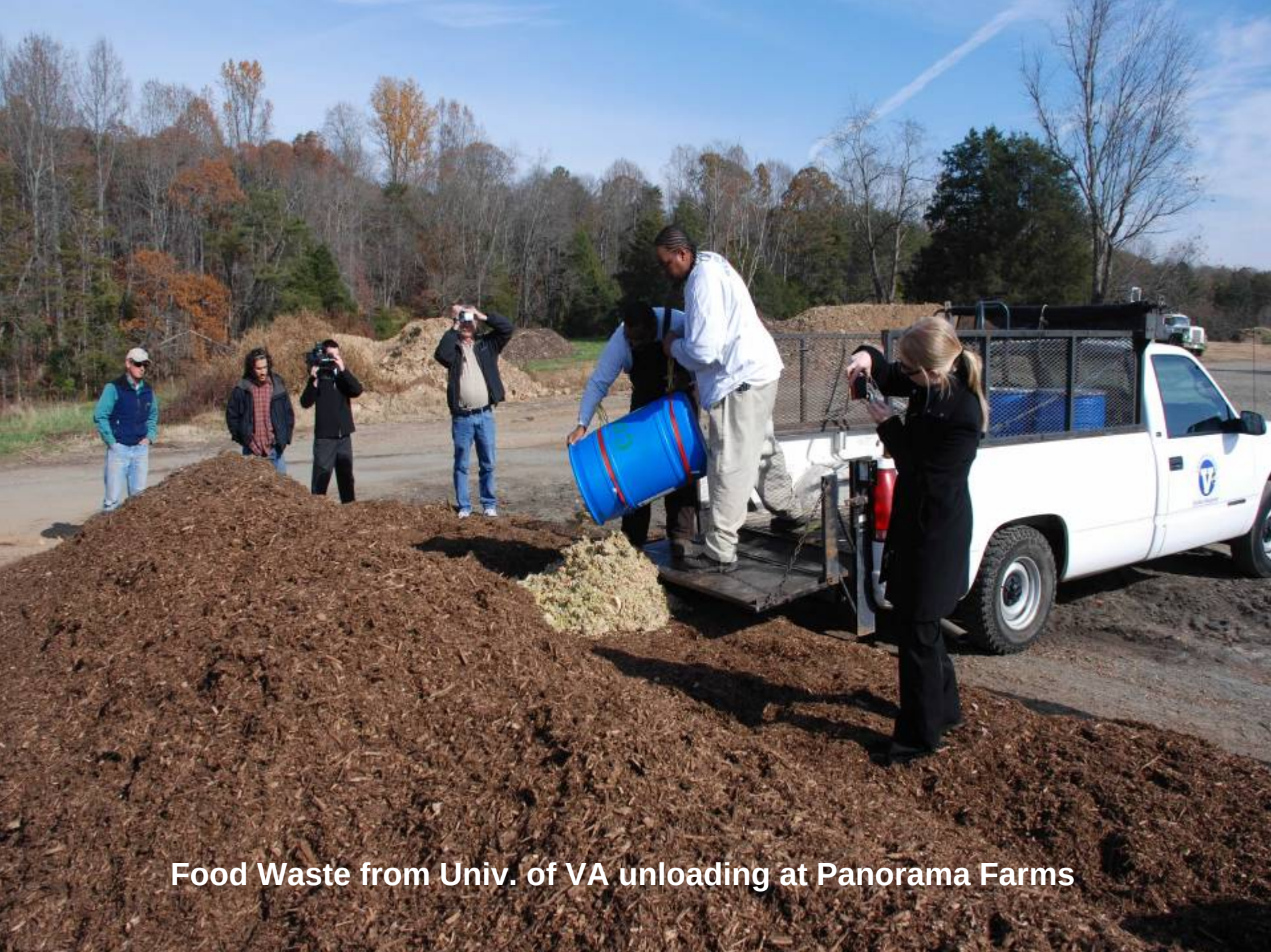
FW Quantities Diverted
(tons/year)

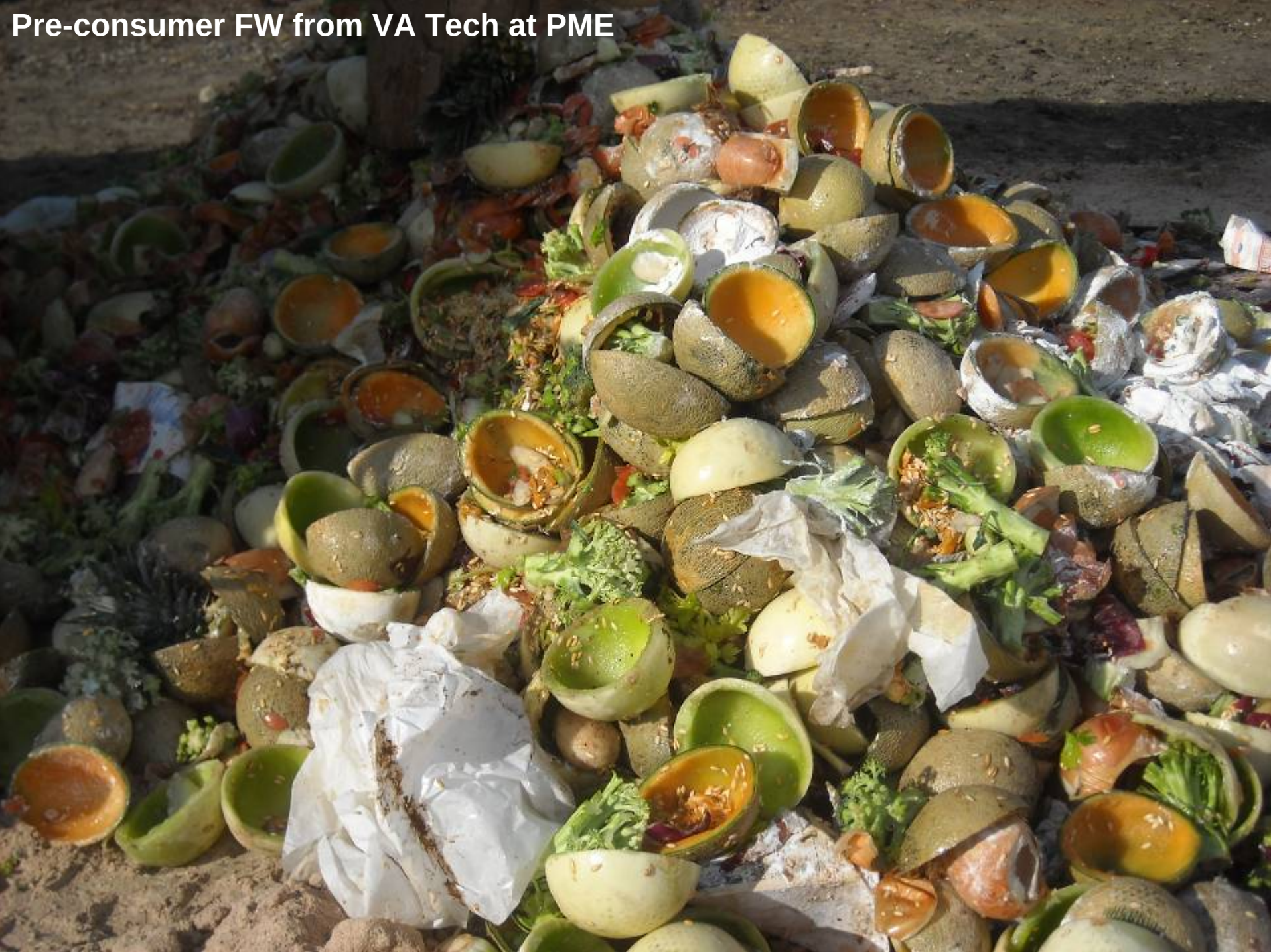
Facility	Diversion	FW Type
Ukrops/Watkins	1,600	Pre-Consumer Fruits & Vegetables
DOC – JRCC	106	Pre- and Post-Consumer
Royal Oak	7,700	Food Processing residuals
PME - VT	90 (started Jan. 2009)	Pre-Consumer
McGill	18,500	Food Processing DAF sludges
Panorama - UVA	70 (started Nov. 2008)	Pre- and post-consumer
W-L Univ.	6	Pre-consumer

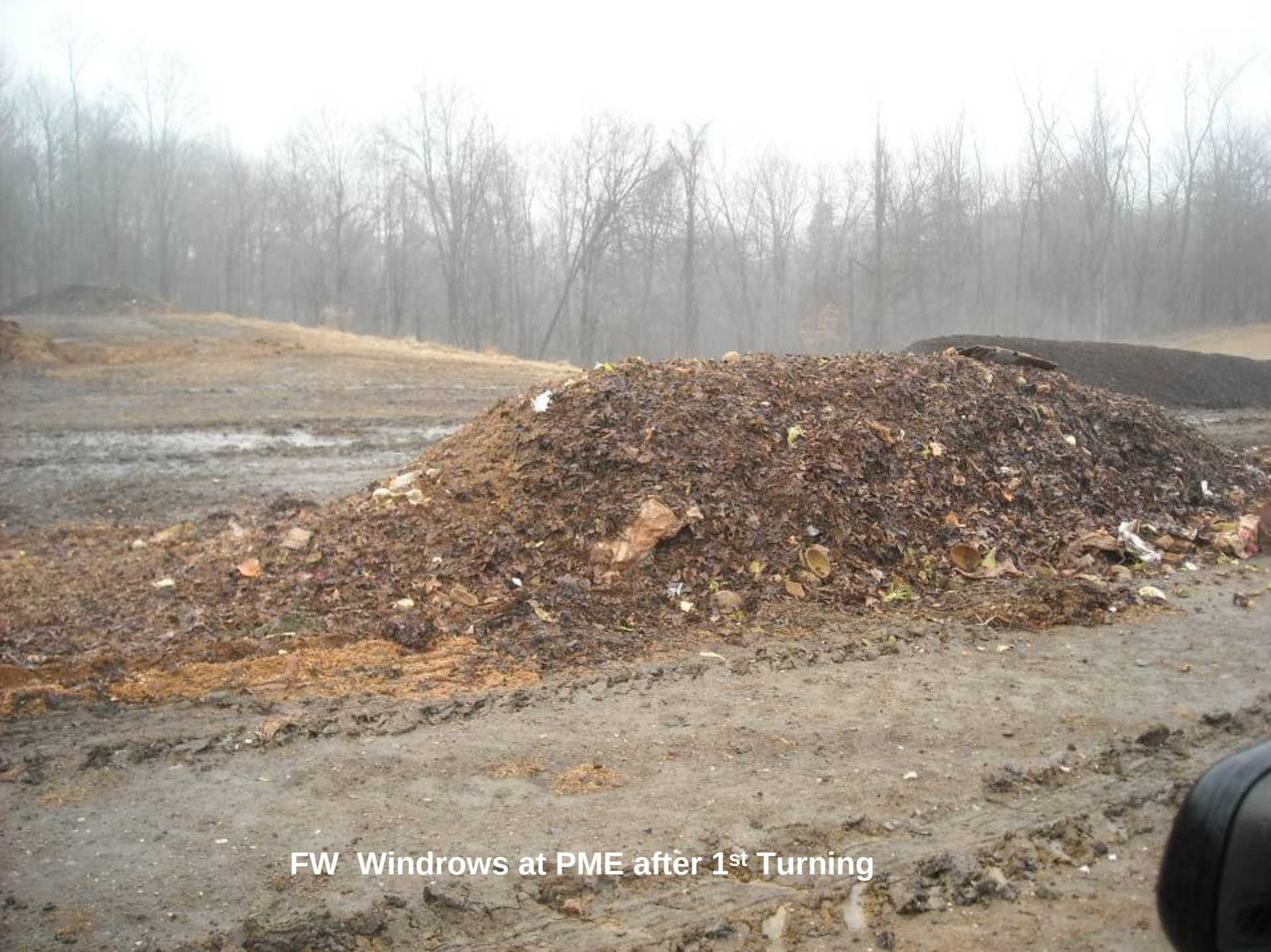


Ukrops/Watkins Nursery FW Compost Facility

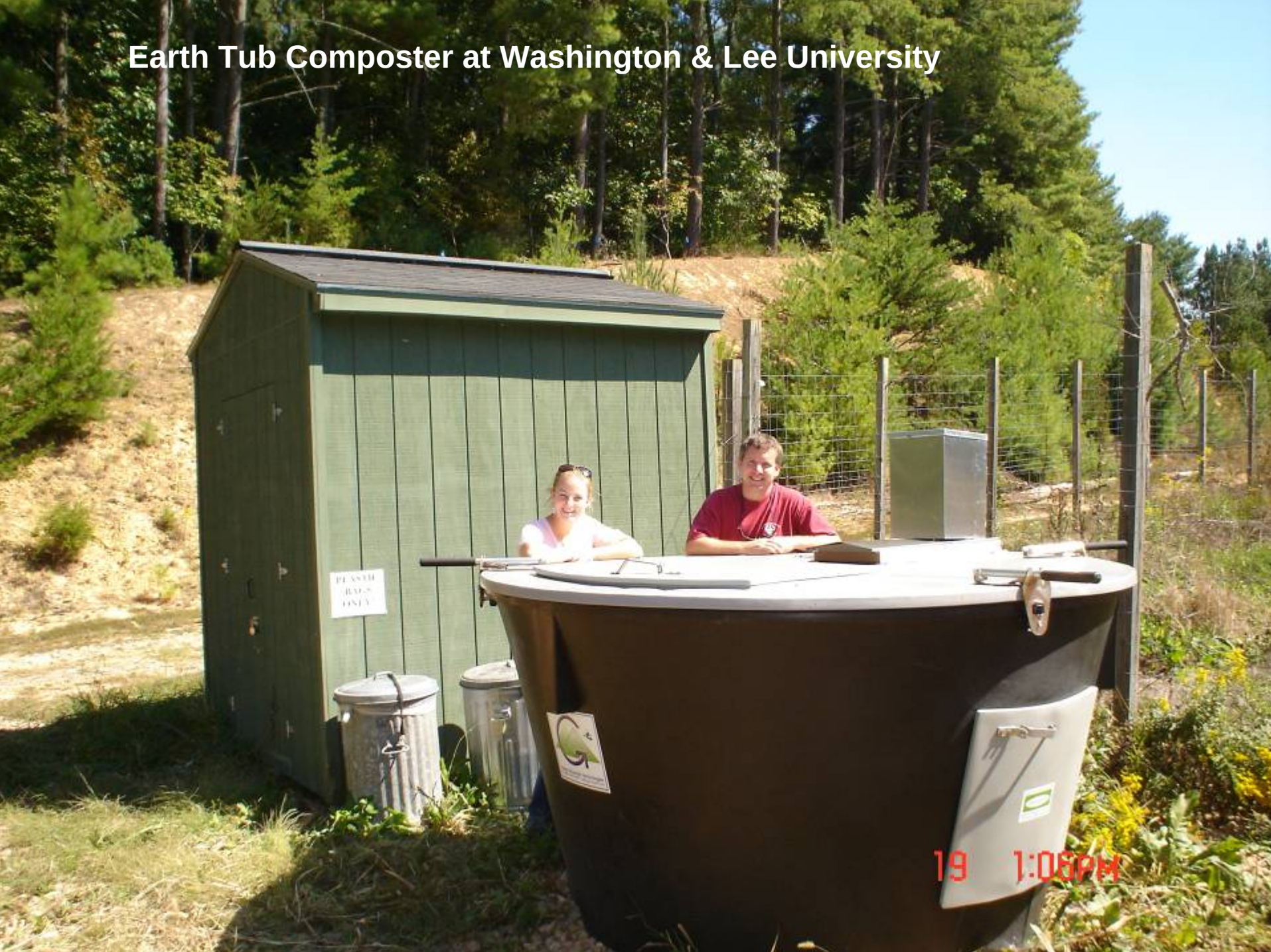


Food Waste from Univ. of VA unloading at Panorama Farms

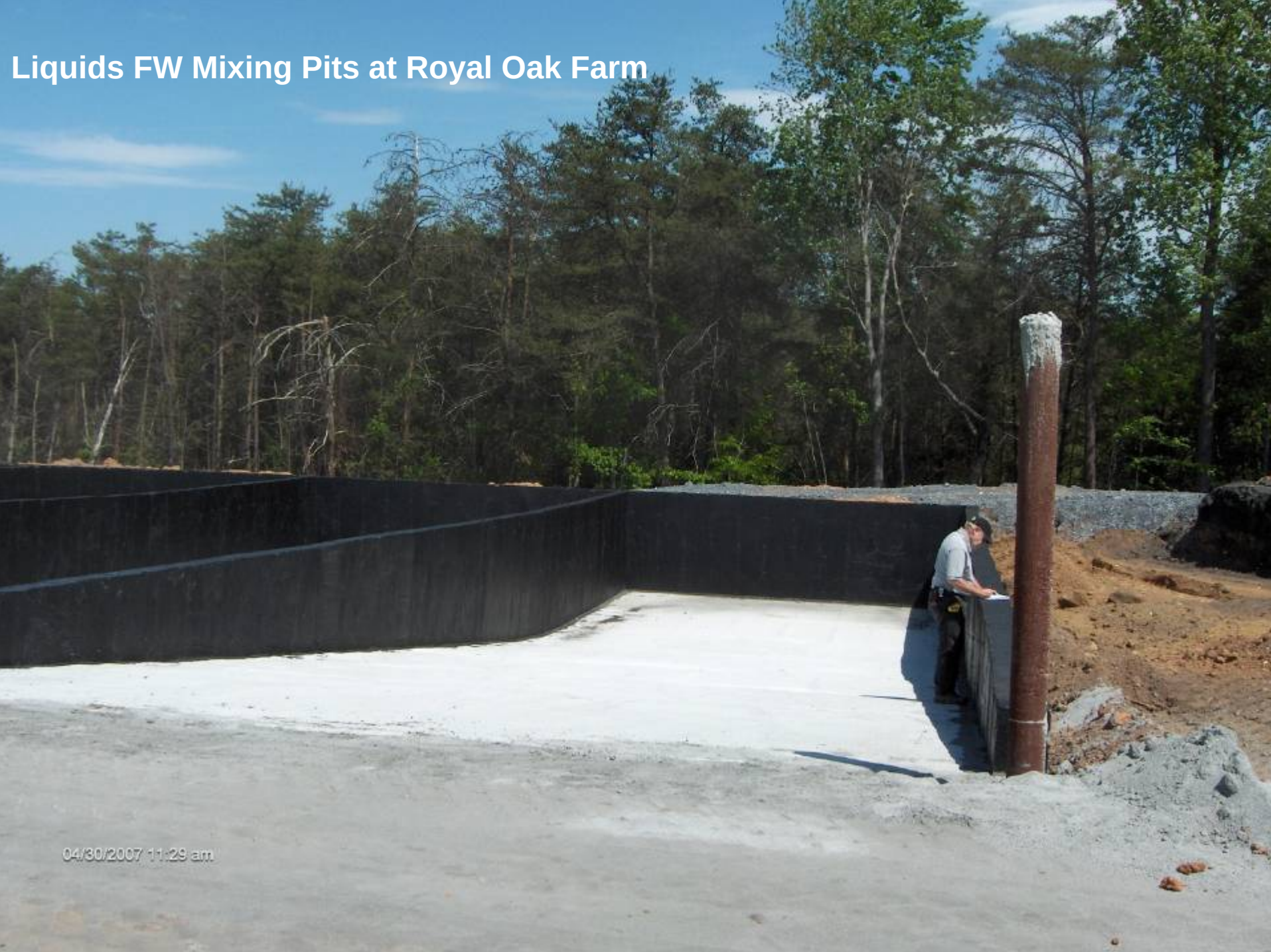

Pre-consumer FW from VA Tech at PME

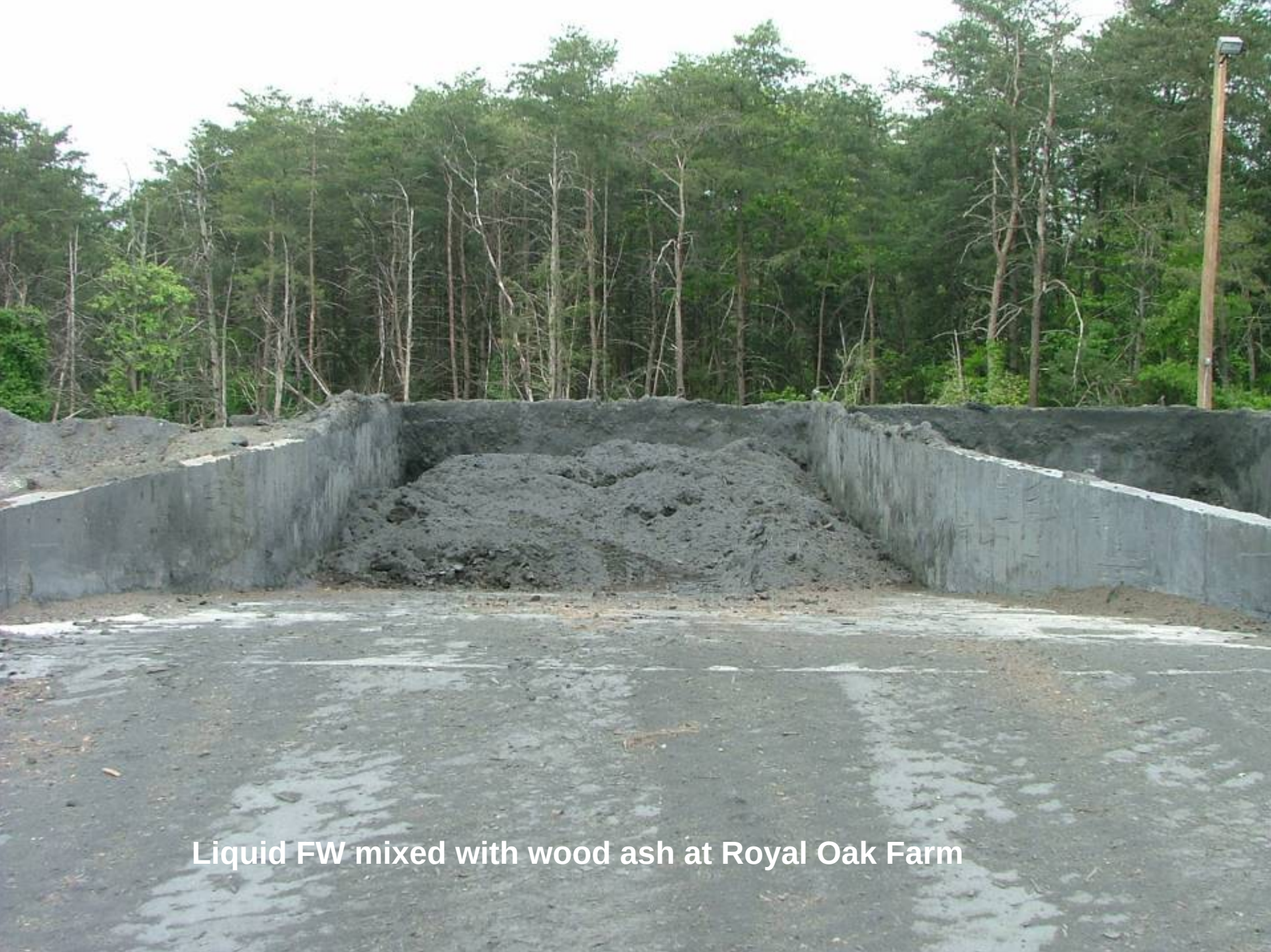


FW Windrows at PME after 1st Turning

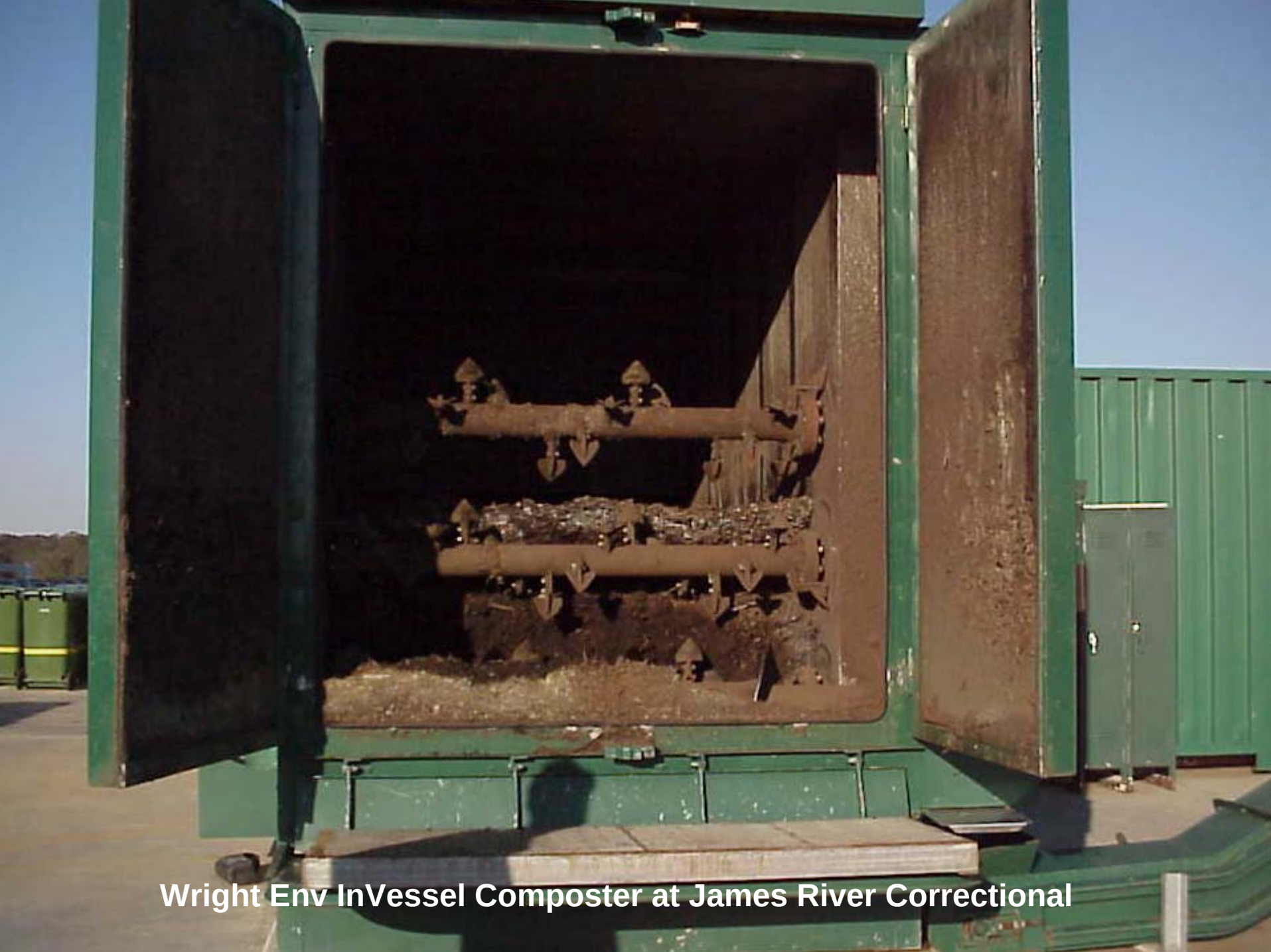

Earth Tub Composter at Washington & Lee University

Liquids FW Mixing Pits at Royal Oak Farm

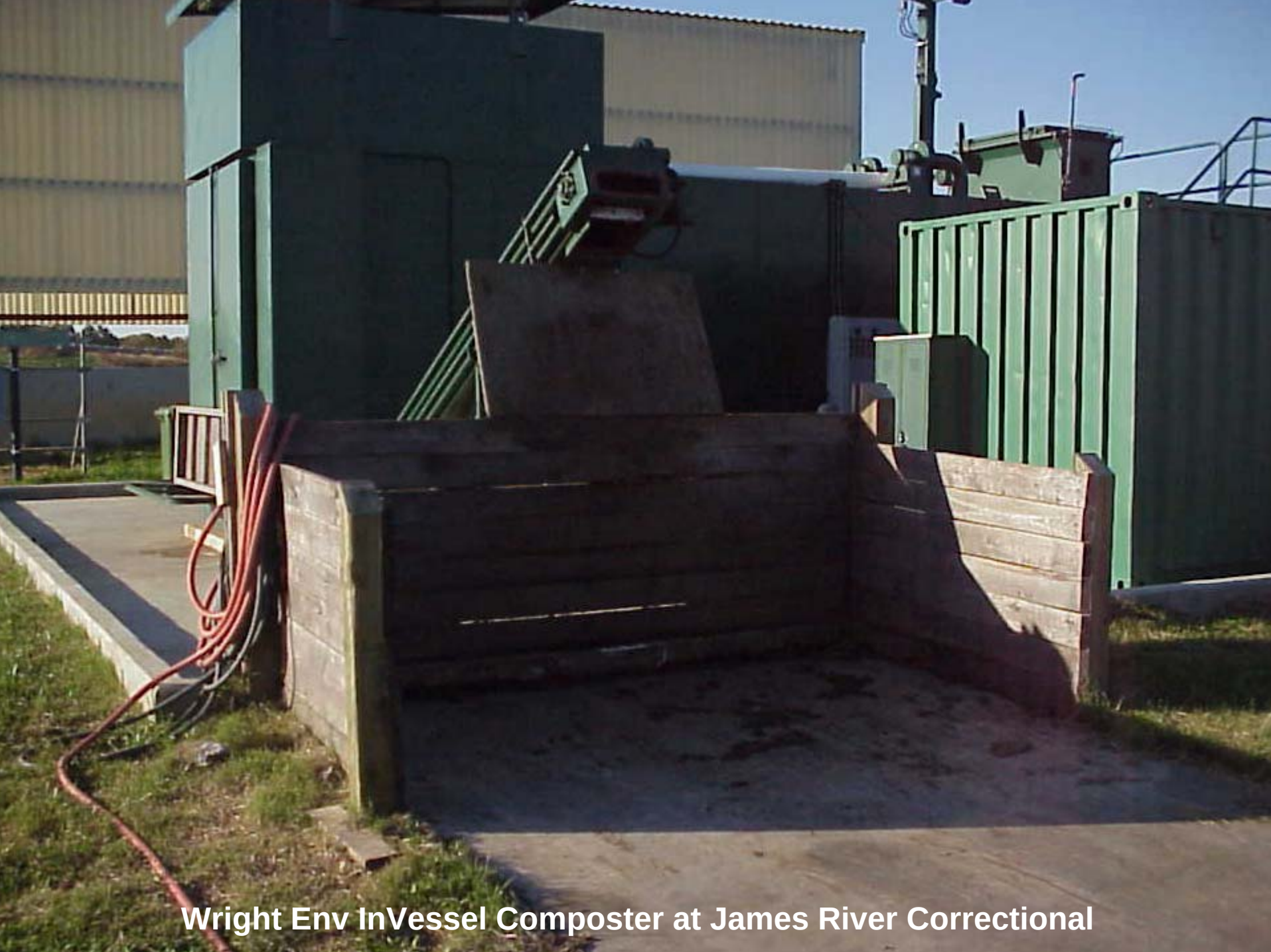




Liquid FW mixed with wood ash at Royal Oak Farm



Wright Env InVessel Composter at James River Correctional



Wright Env InVessel Composter at James River Correctional

Virginia Composting Facilities

- Yard waste
  - Prince William County
  - Loudoun Composting
  - Spotsylvania County (Fredericksburg)
  - City of Danville
  - City of Bristol
  - City of Newport News
  - Virginia Peninsulas Public Service Authority (VPPSA)
  - 623 Landfill, Goochland Co.

Virginia Composting Facilities

- Other (mostly smaller facilities)
  - Huck's Hen Blend (poultry manure)
  - Valley Pride (poultry manure)
  - Messick Farm (dairy manure)
  - Commonwealth Gin (cotton gin trash)
  - Greif Brothers (paper mill sludge)
  - Hayfield Nursery (veg. debris, manure)

Virginia Composting Facilities

- Other, cont.
  - Brookfield Farm (veg. debris, manure)
  - Hale Farm (veg. debris, horse manure)
  - Rhodes Farm (cow manure)
  - Shoosmith Bros. (land clearing debris)
  - Yardworks (land clearing debris)
  - Wenger Farm (cow manure)

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Virginia Regulations

Categories of Feedstocks

- Category I: Pre-consumer plant or plant-derived wastes (agriculture crop residue, livestock feed, non-food agricultural process waste, source-separated pre-consumer food waste – spoiled food, food process waste – peelings)
- Category II: Animal derived waste material (dairy and fish processing wastes – eggs, spoiled milk, clam bellies, fish shells, and rendered animals)
- Category III: Animal and post-consumer food wastes with pathogen potential (source-separated wastes – restaurant wastes, institutional kitchen wastes; animal manures)
- Category IV: Other wastes (non-rendered animal meat – slaughterhouse waste; municipal solid waste; and sewage sludge)

Types of Compost Facilities

- Type A: confined or enclosed vessel method of composting

- Type B: windrow or aerated static pile method (If the method requires material to be stabilized or cure in piles the facility is classified as Type B even if composting performed in enclosed vessel)

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Four Categories of Composting Facilities in VA

- Yard Waste Compost Certifications
  - 9VAC 20-101-60 and 80
- Permit By Rule*
  - 9VAC20-80-485
- Full Composting Permit*
  - 9VAC 20-80-330
- Biosolids Composting –VPA permits
  - 9VAC25-32 Sections 310 through 760

* Only employ composting processes with prior operational performance in US. Any other process requires an experimental permit (9VAC 20-80-470)

Siting

- Outside of areas subject to base floods
- 50 feet from any regularly flowing stream
- Adjacent to or direct access to paved/surfaced roads
- 200 feet from residential area, health care facility, school, recreational park, or similar public institution
- Sites shall allow sufficient room to minimize traffic congestion and allow for proper management of leachate
- 50 feet from property line
- Type B facilities shall not be located in geologically unstable areas, where site topography is heavily dissected, or where seasonal high water table lies within 2 feet of ground surface

Design/Construction

- If composting MSW – need covered area for receiving, segregation of MSW
- Cat. IV or >700 tons/quarter Cat. I-III - all receiving, mixing, composting, curing, screening & storing areas must have one of the following:
  - Asphalt or concrete pad draining to wastewater treatment facility
  - Asphalt, or concrete pad (or soil-cement pad area 6” thick, permeability $1x10^{-7}$ cm/sec), and diked or bermed area to prevent run-on or run-off which is then discharged to an on-site treatment facility or discharged under VPDES permit

Design/Construction (cont.)

- Area and appropriate equipment to segregate nonbiodegradable or otherwise undesirable components
- Type B facilities – sound engineering controls on sites with springs, seeps, utility lines above and below active areas
- Roads shall be all weather construction
- Auxillary power, standby equipment, or contingency arrangements for continued operation
- Uncovered sites – capture, contain & control runoff from rainfall intensity of 1-hr duration and 10-year storm event

Operations

- Noncompostable material shall be disposed of at an appropriate permitted facility
- Product testing and standards:
  - Compost Stability
  - Pathogens (parasites, bacterial, fecal coliform)
  - Metals (Category IV)
  - ***Once standards are met, no longer a regulated waste***
- Maintain designed buffer areas
- Operation Plan (types of material to be composted, bulking agent, method used, etc.)
- Maintenance
- Recordkeeping

Closure

- Remove all waste residues, contaminated containment system components, contaminated soils, and structures and equipment contaminated with waste and leachate
- Provide a Closure Plan & Cost Estimate
  - Cost estimate based on $70/ton solid waste on-site
  - Must assume worst-case scenario (100% solid waste)
- Provide Financial Assurance = Cost Estimate
  - Trust Fund (fully funded on Day 1) or Certificate of Deposit
  - Letter of Credit
  - Surety Bond or Insurance Policy (very hard to get)

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Yard Waste Certification

- Required for yard wastes generated off-site
- Total time for composting and storage does not exceed 18 months
- No waste other than yard waste is received
- ***Less than 6,000 cy in a 12 month period***
- Must comply with local ordinances,
- Pose no nuisance or threat to human health or environment (9VAC20-101-60)
- Permit not required if they meet siting & operating criteria (9VAC20-101-80.C)
- Must submit Certification letter prior to receiving waste (9VAC20-101-90)

Vegetative Waste Permit-By-Rule: 9VAC20-101-120

- Requires submittal of:
  - Documentation of legal control of property
  - Certification from local government
  - Disclosure Statement
  - Certification that sites meets siting criteria
  - PE certification that facility was designed & constructed in accordance w/regulations, operations plan, and closure plan
  - Proof of Financial Responsibility if required
- Permit Fee: $390 ; Annual Fee: $500

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Solid Waste Permit-By Rule: (9 VAC 20-80-485.A.4)

- Solid waste composting facilities receiving less than 700 tons per quarter (2,800 tpy)
- Must submit Notice of Intent to Operate, description of type of facility and material to be composted, certification of site criteria and design/construction, Operations Manual and Closure Plan
- Financial Assurance required
- Demonstrated results of Public Participation
- Permit Fee: $390; Annual Fee: $500

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Full Solid Waste Permit
9 VAC 20-80-330

- Composting facilities that receive more than 700 tons per quarter of compostable material
- Part A permit for siting; Part B permit for design, construction, operation, and closure
- Financial Assurance required
- Part A Permit Fee: $4,180
- Part B Permit Fee: Cat. I = $6,850
  Cat. I-III = $10,550
  Cat. I-IV = $12,670
- Annual Fee: $500

Amendment 7 SW Regulations Possible changes forthcoming

- No full permit requirement – only PBRs
- Expand exemptions for agricultural operations receiving yard waste and manures from off-site (but not FW….yet)
- Revise waste categories
  - Include veg debris & YW in Category I
- Revise testing requirements (more flexible)
- Inclusion of vermicomposting

Should be out for public comment in Summer 2009

What Do We Do Next?

- Remove obstacles
  - Government/regulatory
  - Economic
  - Technical/infrastructure
- Educate
  - Regulators
  - Public

Removing Gov't./Regulatory Obstacles

- Local Governments
  - Develop zoning ordinances that define composting, composting facilities and acceptable land uses by right, or by conditional approval
- State Governments
  - Streamline regulations/permitting programs
    - Allow small on-farm FW composting with registrations
    - Put biosolids & solid waste composting under same regulatory program
    - Require all FW composting to meet PFRP and VAR
    - Increase flexibility for meeting financial assurance
    - Require operator training & certification
  - Train all regulators in the basics of composting and organics diversion

Removing Economic Obstacles

- Federal Government
  - Expand USDA/SBA grant/loan guarantee programs to backstop private capital
  - Subsidize market rates for state IRBs
  - Tax credits for compost capital expenditures
  - Promote/incentivize “brownfield” programs for FW composting in urban areas
  - Expand USDA/NRCS cost-share programs to encourage compost use
  - Require subsidized alternative energy projects to use composting for residuals

Removing Economic Obstacles

- State Governments
  - Require “Pay-As-You-Throw” solid waste programs in all municipalities
  - Encourage Resource Management Analyses of solid waste alternatives by providing guidance
  - Promote Industrial Revenue Bond programs for composting facility construction capital
  - Monetize GHG emissions reductions from waste diversion from landfilling

Removing Economic Obstacles

- State Governments
  - Monetize GHG emissions reductions for carbon sequestration in compost-amended soils
  - Ensure State Agency and contractor compliance with EPA CPG and USDA BioPreferred programs
  - Require DOTs and other Agencies to use composts certified by USCC's Seal of Testing Assurance program

Removing Technical Obstacles

- Develop alternative collection mechanisms
  - Dedicated small-scale FW transfer stations
    - Allow for more efficient collection in urban areas
    - Allow for more efficient transfer to distant merchant composters
- Encourage co-digestion with other substrates for biogas production
  - Pre-processing of OFMSW needed; technologies still need to be optimized
  - Co-digestion with sewage sludge at WWTPs
  - Co-digestion with animal manures on-farm

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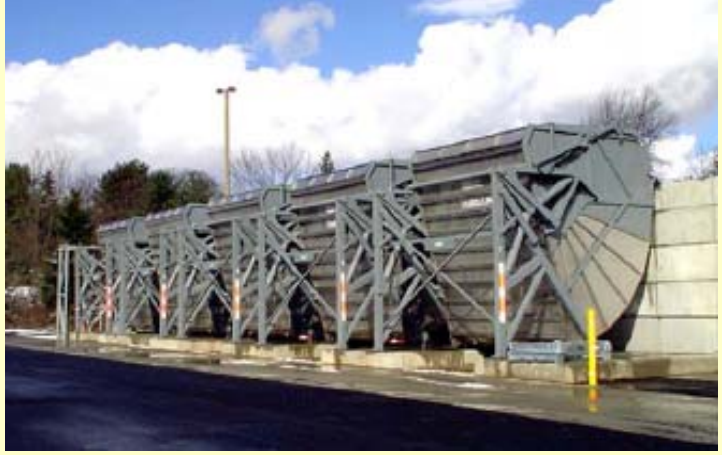

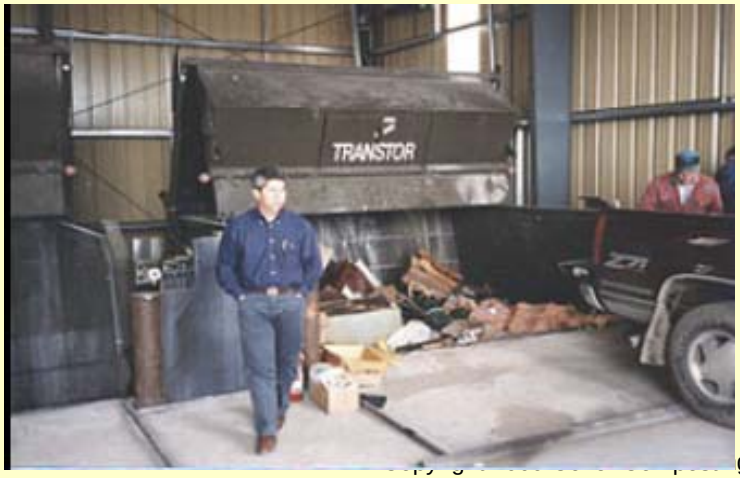

Education & Outreach Needed

- GHG emissions reductions from
  - Diversion to composting from landfilling
    - (~ 0.87 MT CO_{2eq} per ton diverted, over 10 yrs with 75% efficient gas collection in Yr. 3)
  - Usage of compost as soil amendment
    - (~ 0.35 MT CO_{2eq} per ton incorporated)
- Physical, chemical, biological benefits of healthy compost-amended soils
- Avoided future costs of replacing consumed landfill air space

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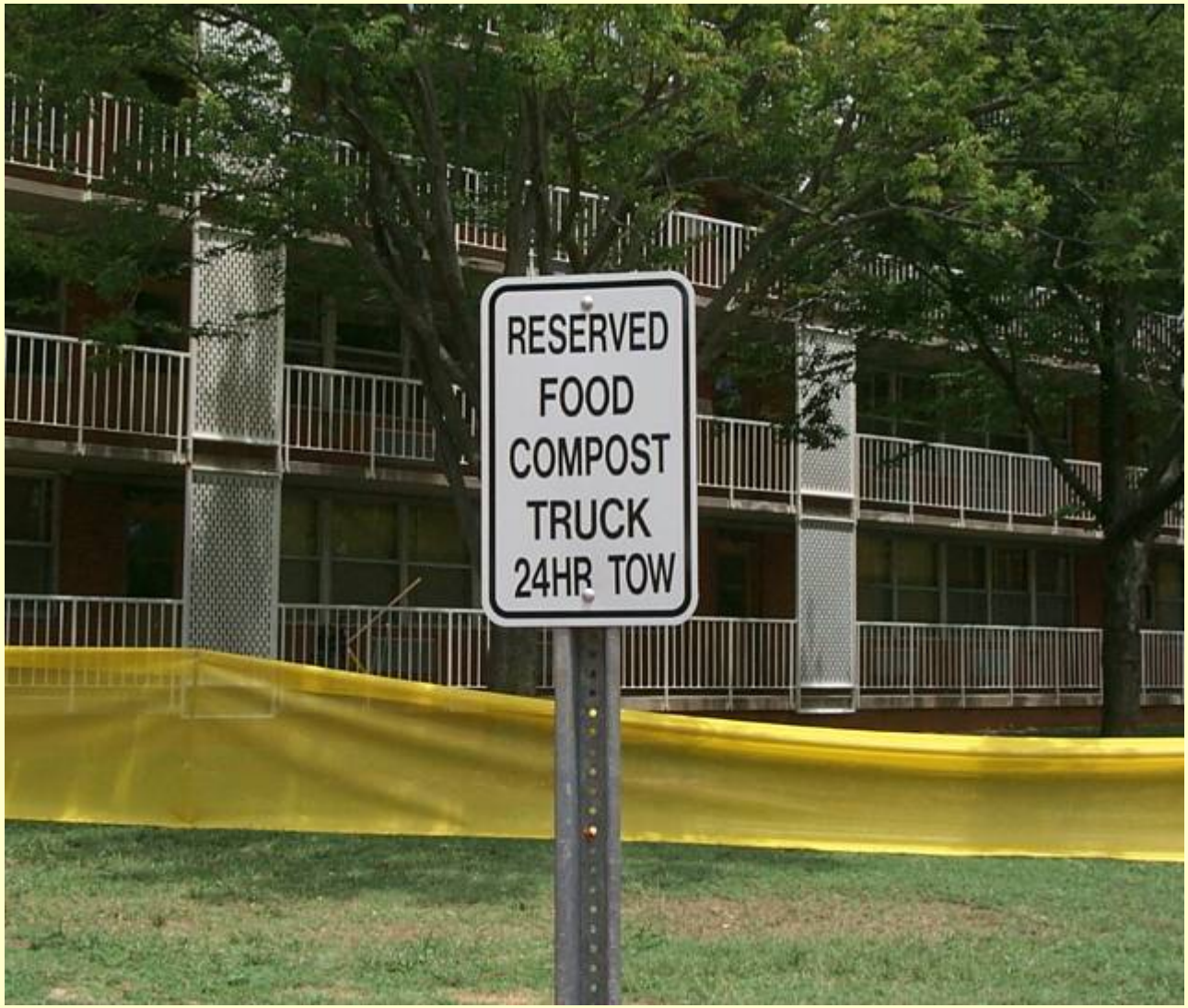
Maybe Someday?



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Questions?

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