Compost Facility Management

- Site Design & Requirements
- Safety
- Fires
- Odors
- Contaminants
Compost Facility Management

• Site Design
  – Picking the right location will minimize potential problems in the future.
  • Buffers & Setbacks
  • Residential Developments
  • Topography
  • Common Sense Design & Engineering
# Sitting Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>North Carolina</th>
<th>South Carolina</th>
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<tbody>
<tr>
<td>100-yr floodplain</td>
<td>Outside</td>
<td>Outside</td>
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<tr>
<td>Property Lines</td>
<td>100’</td>
<td>50’</td>
</tr>
<tr>
<td>Dwellings</td>
<td>500’</td>
<td>200’</td>
</tr>
<tr>
<td>Streams</td>
<td>50’</td>
<td>100’</td>
</tr>
<tr>
<td>Wells</td>
<td>100’</td>
<td>100’</td>
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<tr>
<td>Depth to SHWT</td>
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<td>2’</td>
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<tr>
<td>Local zoning approval</td>
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<td>Yes</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Outside</td>
<td>Outside</td>
</tr>
</tbody>
</table>
Compost Facility Management

• Safety
  – The key to safety is common sense and good business practices.
Compost Facility Management

• Safety in Compost Production
  – Develop a Monitoring Program
    • Monitor Feedstocks - for hazardous waste & contaminates
    • Monitor Leachate – for nutrients & pathogens
    • Composite Sample in process
Compost Facility Management

- **Safety in Compost Production**
  - Equipment
    - Develop a preventative maintenance program
    - Identify potential work area hazards
      - Label - Pinch points, belts, chains, moving parts, throw zones
    - Equip with proper fire extinguishers
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• Safety in Compost Production
  – Personnel
  • Hold regular scheduled safety meetings
  • Train employees to recognize potential problems
  • Report injuries as per your company’s guidelines
Compost Facility Management

• Safety in Compost Production
  – Minimizing Risks
  • Pick the right site
  • Design for storm water and leachate collection and reuse
  • Incorporate wind breaks and fire breaks
  • Contact the local fire dept. for site inspection
  • Know your feedstocks
  • Maintain a good housekeeping program
Compost Facility Management

• Safety
  - The key to safety is common sense and good business practices.
  - Ensure that adequate safety equipment is available for workers, staff and visitors
  - Follow OSHA Guidelines
  - Have an action plan in place for emergencies
• Operations & Maintenance Manual
Compost Facility Management

• Fires
  – Chemical equation for combustion
    organic hydrocarbon (fuel) + oxygen →
    carbon dioxide + water + heat + residue (e.g. compost or ash)
  • Typical compost materials ignite at temperatures in the 150-200ºC (302-392ºF)
Compost Facility Management

• Fires
  - Ready available fuel source
  - Configured in piles or windrows
  - Ignition Source
    • Mechanical - sparks, equipment, cigarette
    • Biological - uncontrolled microbial activity.
    • At Temperatures exceeding 70-80°C (158-176°F) chemical oxidation takes over and spontaneous combustion occurs.
Compost Facility Management

- Rules for Fire prevention
  - Meet with your local Fire Dept
    - Discuss & agree on guidelines
    - Have proper equipment on site
  - Assure adequate ventilation of piles or windrows
  - Avoid pile depths greater than 12 ft
  - Watch for vents
  - Monitor temperatures on all piles weekly
  - Locate the fire & open with front-end loader
  - Water embers
Compost Facility Management

• A huge mountain of cow manure continues to smolder for 3 months at a feedlot near Milford, Neb. NATI HARNIK, AP
Compost Facility Management

• Odors
  – Virtually all compost feedstock can produce some odor that is objectionable to someone.
  – The nose knows!

  – Some people believe that odor and compost are both synonymous.
Compost Facility Management

- Odors
  - Active composting
    - Breaking down complex organic compounds
    - Microbial action facilitates breakdown and odors
  - Odors released are dictated by
    - Facility design
    - Process design
    - Environmental conditions
Compost Facility Management

• Odors
  – Active composting
   • Creates hot air which rises and carries odors and volatile compounds are driven off
   • The more odorous the beginning feedstock the higher the potential for odor problems
Compost Facility Management

• Odors
  – Minimizing the risk
    • Understand the composting process
    • Facility design
      – set backs
      – topography
      – seasonal wind conditions
    • Screen with wind breaks and vegetation
    • Understand the composting process
Compost Facility Management

• Odors
  - Management practices to minimize odor problems
  • Know and understand composting & monitoring parameters, C:N ratio, Oxygen, pH, and moisture
Compost Facility Management

- Odors
  - Management practices to minimize odor problems

- C:N Ratio
  More than 30:1 - Seldom a problem except when piles are too wet, too large, and insufficient in oxygen.
  Less than 25:1 - Common problem due to excess Nitrogen. Most easily corrected by adding carbonaceous materials and increasing oxygen by reducing pile size, increasing bulking material.
Compost Facility Management

- Odors
  - Management practices to minimize odor problems
  - Oxygen - Less than 2%
    Measure with an Oxygen Analyzer
    Aerate more frequently
    Reduce pile size to increase convection currents
    Add courser bulking materials to increase porosity
    Check moisture
Compost Facility Management

- **Odors**
  - Management practices to minimize odor problems
- **Moisture**
  - Ideal range 50-60%
  - Hand squeeze test
  - Oven dry composite sample
  - Too wet - Turn to dry out or add more bulking materials
Compost Facility Management

• Odors
  – Management practices to minimize odor problems
  • pH
    Test feedstocks & compost mix
  Ammonia Odor - Indication of a high pH add lower pH materials such as sulfur, check C:N ratio or increase porosity
  Hydrogen Sulfide (Rotten Egg Odor) - indication of a low pH or low oxygen, add more bulking materials, reduce pile size or small amounts of lime
Compost Facility Management

- Contaminants
  - Pre-test feedstock sources
  - Post signs
  - Track all incoming feedstock by load
  - Visually inspect loads as they are received
  - Charge addition fees for contamination
  - Remove contaminants before processing
Compost Facility Management

- Plastic Contaminant
  - Yard Waste
    - Separate at curbside
    - Change to paper or bio-degradable bags
Compost Facility Management

- Plastic Contaminant
  - Post Process Removal
    - Separate at screening
    - Build in the oversize
        Komptech Hurricane