COMMERCIAL SCALE COMPOSTING

2017 Tribal Lands and Environment Forum
The Shakopee Mdewakanton Sioux Community (Community) is located in Minnesota in the Twin Cities Metropolitan Area about 30 miles southwest of the center of Minneapolis. The Metropolitan Area has approximately 3.5 million residents.
MINNESOTA TRASH POLITICS

• Metropolitan Area landfill capacity is rapidly being consumed
• No yard waste in landfills statewide
• State policy moving toward no organic food waste in landfills
• Rapidly increasing source separated organic waste collection in metropolitan cities
• Local food producers and retailers looking for alternative disposal for organics
ORGANICS RECYCLING FACILITY

• Commercial scale turned windrow composting facility
• 155,747 tons of organics in 2016
• Multiple feedstocks
• Multiple products including specialized materials for construction projects
• Bulk sales and bagged materials for retail sale
DISCUSSION

• Rules and regulations
• Process and product standards
• Scale impacts on the composting process
• Feedstock sourcing
FEDERAL RULES

• 40 CFR Part 503 is a Federal regulation controlling biosolids composting (biosolids are solid organics derived from treatment of sanitary sewage)
• 40 CFR Part 503 does not apply to organics composting without untreated biosolids
• 40 CFR Part 503 contains the Process to Further Reduce Pathogens (PFRP) which is translated to other regulatory jurisdictions for organics composting
• If surface water is discharged a Clean Water Act Industrial Stormwater permit will be required
• Air permits are not required unless the processing is done indoors (outside processing creates “fugitive emissions”)
• Possible OSHA issues if not covered by Tribal law
STATE RULES

- Many states have statutes and rules regarding composting yard waste and organic waste
- State law can impact your operation even if it is on trust and reservation land
- Your customers, both for tipping and product purchase, are likely to be state jurisdiction operators
- Many political subdivisions of states are required to limit dealings to “permitted facilities”
- There is a common level of misunderstanding regarding Tribal authority and jurisdiction
- For an on Reservation and trust land located facility the Tribal Government is the permitting authority
TRIBAL RULES

- The Community had a preexisting nuisance ordinance that covered many of the issues.
- The Community had preexisting safety policies and law.
- The facility operates under a Tribal permit with an operating manual that is included in the permit requirements.
- The facility is covered by a Tribal Safety and Hazard Plan.
- The Community Land and Natural Resources Department regularly monitors odors and safety compliance.
- The facility has an Environmental Technician on staff and self reports all composting data (temperatures, moisture, pH, bacteria results, volumes).
- All self reporting is verified monthly by Community environmental staff.
PROCESS AND PRODUCT STANDARDS

• Feedstocks
  • Carbon (brown)-wood, leaves
  • Nitrogen (green)-SSO, grass clippings, green leaves, other material containing proteins
  • Oxygen
  • Water
  • Bacteria (free gift from nature)
Process Standards

• Carbon to nitrogen ratio of 2.5-3.5:1
• Some carbon, typically wood, must be of sufficient size to provide structure
• Bulk density at 850-950 pounds per cubic yard
• Moisture content at 50-60%
• pH at 6.5 to 7.5 (finished compost is generally basic without additives)
• Oxygen content at 8%-18%
Process Standards

- Pass bacteria tests (fecal coliform)
- Pass contaminates testing (glass, rocks, plastic and other foreign material)
- All samples sent to an independent testing laboratory
- Test results preserved for sale verification
- If the product is going to a state, county or city job site there may be additional requirements
SCALE IMPACTS

- Biologically and chemically the same process
- Regulatory and product standards require significant oversight
- Odor and stormwater control require precise and accurate windrow composition
- Turning and stacking controlled by ambient temperature and humidity
- Onsite weather station for accurate data
- Equipment causes noise, light and safety issues
WILL IT SMELL?

- Yes there are attendant odors
- Odors are typically no greater than normal agricultural practices
- Anaerobic conditions will greatly increase objectionable odors
- Stormwater treatment ponds can also go anaerobic
- This can generate a lot of public comments and complaints
FEED STOCK

- This is critical to success
- We operate multiple municipal wood lots to ensure sufficient ground wood
- Source separated organics can vary greatly in quality
- Incoming quality control is a critical component
- We source manure from dairy operations and Canterbury Downs (horse racing)
- Grocery stores, schools and food manufacturing facilities are good sources
- Municipal source separated organics programs can produce large amounts of material in urban settings
EQUIPMENT

- Two Caterpillar loaders
- Windrow turner
- Low speed grinder
- Horizontal grinder
- Tub grinder
- Trommel screen
- Star screen
- Two skid steers
- Various stacking conveyors
- Semi tractor, lowboy and walking floor trailer
- Several light trucks
- Miscellaneous small equipment
PRODUCTS

• Straight compost at several screen sizes
  • Golf courses
  • Parks
  • Athletic fields
• Composted manure (organic)
• 50/50 blend
  • Street and road projects
  • Landscaping
• Rain garden blend
• Custom products
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What is “Organic” Compost

• Composted manure
• Composted Source Separated Organics
• Composted yard waste
• Any combination of the above

Cannot contain any biosolids regardless of the biosolids treatment
Pesticides

- Composting breaks down most pesticides
- Some persistent pesticides may survive composting

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<th>Lab Sample ID</th>
<th>Client Sample ID</th>
<th>Matrix</th>
<th>Aminopyralid (ng/g)</th>
<th>Picloram (ng/g)</th>
<th>Clopyralid (ng/g)</th>
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<td>Dairy Cow Bedding #1</td>
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<td>Ground Horse Manure Bedding</td>
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LTQ: Less than quantitation limit (1 ng/g)

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<tr>
<th>Sample Description</th>
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<th>Lab</th>
<th>Auxinic Effects (8)</th>
<th>Sensitive Crops</th>
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<td>Composted Manure</td>
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<td>2.5</td>
<td>Use not recommended</td>
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<td>Regular Compost (1)</td>
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<td>WE</td>
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<td>At 50% dilution</td>
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<td>Windrow O (no horse bedding feedstock)</td>
<td>4/11/2014</td>
<td>WE</td>
<td>0</td>
<td>At 50% dilution</td>
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<td>Windrow Z (Includes horse bedding feedstock)</td>
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<td>WE</td>
<td>2.7</td>
<td>Use not recommended</td>
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</table>
Pesticides

• Laboratory analysis for Clopyralid is expensive
• Very low levels can impact sensitive plants
• Conducted a bioassay to test Dakotah Roots product and four (4) others
  • Bioassay used Sweet Snap Pea – P, sativum
  • Plants in Dakotah Roots product germinated and developed leaves
  • Only one other commercial compost showed germination and leaf development