

Kinston Regional Water Reclamation Facility

Biosolids Treatment Alternatives for the
Future

By

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Solids Handling History

- Prior to 1994, solids were either sent to a sludge holding lagoon or were placed on drying beds and landfilled.
- From 1994 to 2002, solids were digested to meet Class B standards and was land applied as a liquid.
- In 2002 to present, Two Ashbrook Filter Presses were installed and caked solids were continued to be land applied.

Why the Desire to Change?

- Under current conditions we have about 3 months storage capacity.
- Due to other obligations and weather conditions, moving material is proving to be more difficult.
- Animal waste is competing for land use.
- Disposal cost continue to increase.
- Dried solids mostly eliminate these issues depending on end use of product.

Problems with Class B Materials

- Mother Nature
- Contractor Issues
- Land Use Restrictions
- Limited Participation from Farmers
- Can Only be Land Applied or Land Filled
- Cost of Disposal

More Problems with Class B Materials

- The National Research Commission (NRC) is an independent research group that worked with the USEPA in developing the Federal 503 regulations.
- Based on scientific data of the time, the NRC concluded that sludge treated to meet Class B standards was safe and not an issue to public health as long as their protocols and recommendations were met.

Class B Continued

- The NRC did not complete their study as it left out direct exposure effects to workers handling this materials.
- New concerns to public health as a result of new and emerging antibiotic bacteria have been steadily increasing over the last ten years.
- To date, there is no scientifically documented evidence to support public health concerns associated with Class B materials.

Class B Continued

- However, due to the lack of knowledge and outdated operational criteria, allows room for doubt and concerns for the safety of public health.
- Since the rise of the “Super Bug”, more concerns have been raised associated with runoff from land applied areas for water quality of downstream users.

Why Class A?

- More Options for Disposal
- Less Scrutiny by Regulators and the General Public.
- More Accepted by Public
- More uses for Dried Biosolids
- Potential for cost reduction for Biosolids Treatment.
- Not at the Mercy of Mother Nature and the Contractors.
- Mitigates public concerns of harmful bacteria.

Aerated Static Piled Composting



Composting

- Composting is a means to naturally breakdown the organics in solids to produce a stable and safe means for recycling biosolids for beneficial use.
- Composting is an environmentally friendly way to recycle nutrients.
- There are different methods of composting but the Aerated Static Pile was the most used in my surveys.
- For the exception of one case, composting has not been a very successful means of disposal.

Raw Materials

At this site, wood chips are stored in piled rows on the left side of the photo and leafy materials are on the right.

Approximately two acres were set aside for raw material storage.

This facility used a mix ratio of 1 part biosolids, 1 part chip wood, and, two parts of leaves.



Compost Curing Piles

Note the drainage of water from the pile.

Curing pile more under the shelter



Temperature Monitoring

Temps @ 140 degree F.



Equipment

**Blender used to mix raw material
and biosolids**



**Screener to separate the larger
particles**



Finished Compost



Chip Wood Storage



Mixing Area



Curing Area



Screenings



Finished Product



Storm/Wastewater Retention and Weighing Station

Wastewater Retention



Storm water Retention



Composting Summary

- Equipment
- Labor
- Fuel Cost for Loaders
- Land
- Virtually no electrical cost
- Low demand for final product

Thermal Dryers

Drum Dryers



Belt Dryers



Thermal Dryers

Rotating Disc



Batch Dryers



Thermal Drying

- Thermal Drying is another means to drive off moisture and kill off pathogenic bacteria.
- This method is widely accepted by general public.
- Low odor emissions.
- High demand for final product.

Continued Thermal Drying

- All units produced a great product.
- There were no issues with disposal.
- Depending on the unit, they had high maintenance issues, more some than others.
- There are fire issues with some systems but not all.
- Fuel consumption was a major factor in making our choice.

Thermal Drying Concerns

Drum Dryers

- Very high maintenance systems
- Fire prevention / extinguisher measures required.
- Dusty conditions
- Equipment repairs
- Personnel issues
- High fuel consumption
- High heat requirements

Maintenance Issues



Maintenance

Fire Suppression



Red Hoses for Nitrogen Gas

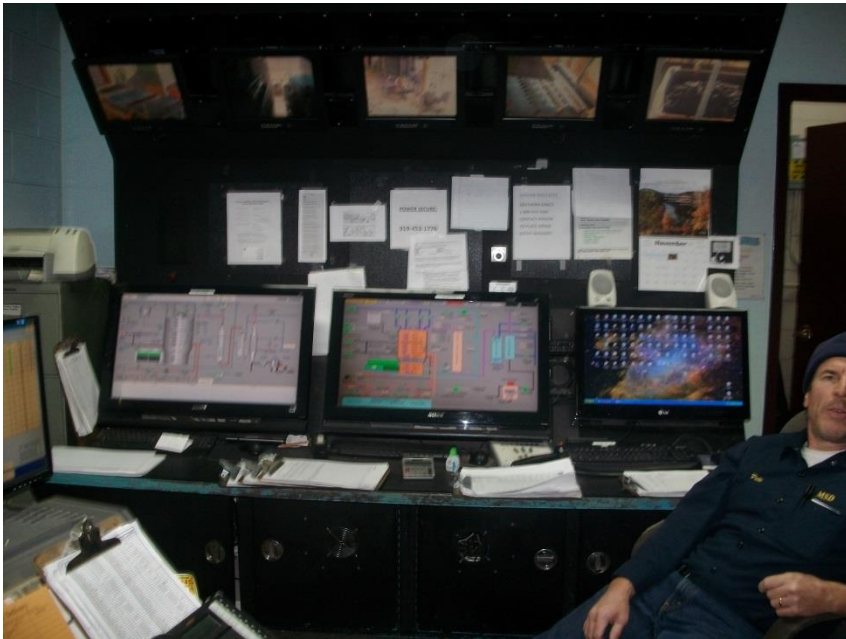


Finished Hopper



Maintenance

SCADA System



Duel Gas Feed System



Thermally Dried Solids Compared to Composting

- Compost – 29 pounds / cubic foot
- Thermal – 44 pounds / cubic foot
- Compost - \$288 / Dry Ton to produce
- Thermal - \$189 / Dry Ton to produce
- Compost Sales - \$15,000 / Year
- Thermal Sales - \$24,500 / Year

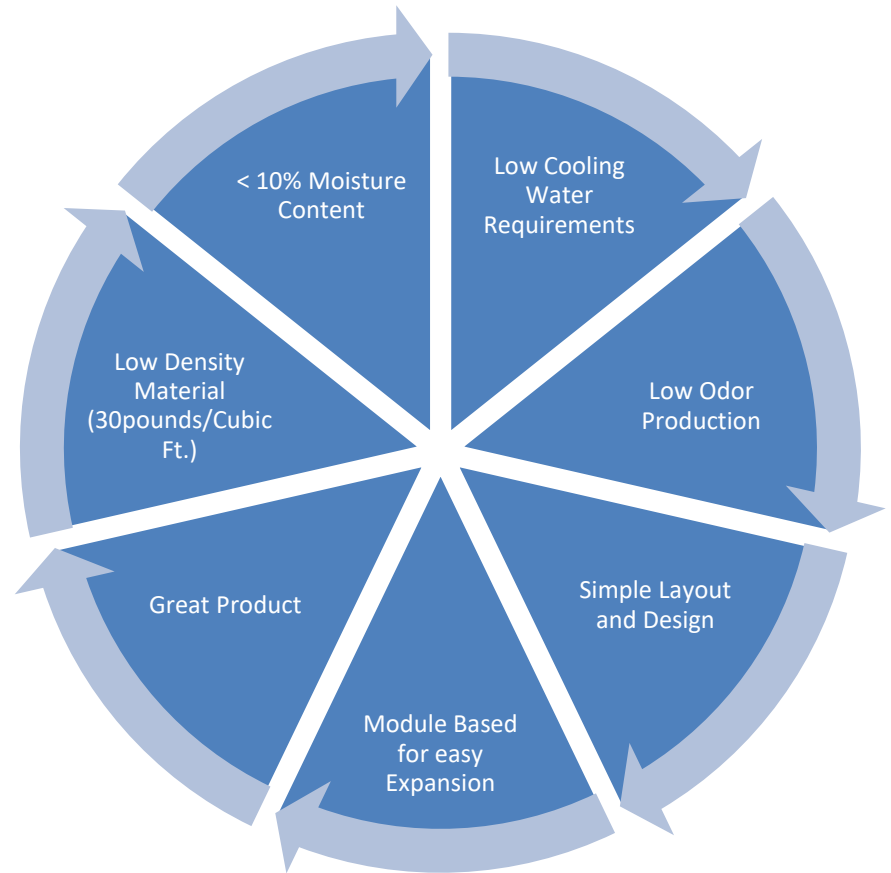
Summary

- Based of our research, we decided that thermal drying was our best option.
- We decided that a batch fed process would be a better fit for our operation.
- It has low heat/low fuel consumption
- Very flexible to our needs
- Produces a great product.



Demonstration Unit |
June 11, 2017

Portable Unit Performance



Kinston's Decision



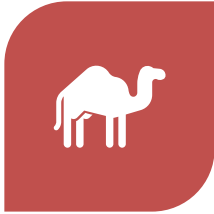
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Belt Dryer by Suez

Kinston's Choice

Why This System?



10 DRY TONS PER DAY



LOW HEAT REQUIREMENTS
(250F)



LOW DUST



ADDITIONAL MODULES CAN
BE ADDED FOR EXPANSION
AND GROWTH



INEXPENSIVE CAPITAL COST



LOW MAINTENANCE

Expectations

10 Dry Ton Dryer

Regionalization of Biosolids
Production

One Man Operation

Low Maintenance System

Solve our Disposal Issues

Reduce odor complaints from our
neighbors

Layout



Boiler



Feed Hopper



Feed Line



Loading Auger



Reality Check

- 12 Dry Tons (Batch Process)
- 1000 pounds per hour (Timed Readings)
- 179 Dry Tons Produced since start up
- Total full days of operation (75)
- Mechanical Problems
- Broken Couplers, Control Panel replacement three times, shut down for alarm issues
- Weather Issues
- Cooling Water Problems

What have we Learned

- Batch Processes – What does that mean
- Output Expectations – Understanding the meaning
- Employee Requirements
- Marketing

Traveling Conveyor



Dry Material







Questions?