Building a Sustainable Pelletized Biosolids Marketing Program
Manuel Irujo, VP of Operations
Presentation Contents

- Introduction
- Drying processes
- Biosolids recycling
- Pelletized biosolids product marketing
- Conclusion
Introduction

- NEFCO History & Background
- Dried Biosolids
NEFCO History & Background

- NEFCO was formed in 1986 as part of The O’Connell Companies, a 134 year old company
- Market leader in biosolids drying facility design, construction, permitting, and operations
- Company designed and operates five facilities:
  - MWRA in Quincy, MA - 1991
  - MCES in Shakopee, MN - 2000
  - GLSD in North Andover, MA - 2003
  - SWA in West Palm Beach, FL - 2009
  - Cumberland, MD - 2009
  - DWSD in Detroit, MI - 2015
Dried Biosolids

- Dried biosolids commercial fertilizer available since 1925
- Market trends
  - Drying process technology relevant
  - Biosolids benefits better understood
  - Value growing
Biosolids Drying Processes

- Drying Facilities
- Indirect Drying
- Rotary Drum Drying
U.S. Biosolids Dryer Facilities

- Milwaukee, WI
- Philadelphia, PA
- Hillsborough County, FL
- Tampa, FL
- Chicago, IL
- Sacramento, CA
- St. Petersburg, FL
- Winston-Salem, NC
- Honolulu, HI
- Green Bay, WI
- Camden, NJ
- Stamford, CT
Indirect Drying - Screw

http://www.therma-flite.com/bioscru.php
Indirect Drying - Tray

Indirect Drying Product Quality

- Larger particle size
- May require additional processing
Rotary Drum Drying

- Direct hot air contact
- Process consists of:
  - Dewatering
  - Dryer/furnace
  - Pellet processing
  - Conveyance
  - Air treatment
  - Silo storage
Dewatering Centrifuges
Dryer Furnaces
Rotary Dryer Drums
Material Conveyance
Air Treatment – Process Exhaust
Air Treatment – Building Exhaust
Silo Storage
Direct Drying Process – Solids System
Direct Drying Process - Air System
Biosolids Recycling

• Biosolids Types
• Public Perception & Acceptance
• Developing Relationships
Types of Biosolids

- Class B
- Class A
- EQ
Public Perception: Biosolids = Sludge!?

Perception = Reality

“The way in which something is regarded, understood, or interpreted”

Differing perceptions
- Generators – waste management, diversity
- Users – benefits, recycling, cost savings
- Public – odor, health, environment

What is your perception?
- Defend safe use, or
- Celebrate and advertise benefits
Public & Customer Perception

- Metals
- Microconstituents
- Is it safe? What are benefits?
- Understand customer well

*Biosolids are not a waste to be managed but a product we make with intent*
Developing Relationships

- Understand customer needs
- Strive for synergy
- Address and acknowledge concerns
- Educate and involve
Pelletized Biosolids Product Marketing

- End Uses
- Product Quality
- Biosolids Benefits
- Revenue Trends
- NEFCO’s Product Marketing Evolution
- Critical Success Factors
- Michigan Market
Product Marketing

End Uses
Land Application

- Food crops
- Feed crops
- Turf farms
- Tree farms
- Golf courses
- Landscaping
- Soil Blending
Land Reclamation Projects

Granite Links Golf Club – Quincy, MA
Fertilizer Blending

- Turf formulas
  - High value add
  - Nutrient-rich filler
  - Slow release N
  - Particle size needs
  - Minimal contamination

- Specialty agricultural formulas
Alternative Fuels

- Renewable fuel
- Cement kilns
  - Heating value
  - Ash incorporated into cement
- Power generation
Dried Biosolids as Fuel

- Lower cost alternative to coal
- BTU value 6,300 – 7,600 BTU/lb
- Chemistry similar to coal
- Steady volumes for generator and customer
- Helps users achieve “Green Energy” initiatives
- Class A EQ biosolids safe and acceptable to workers and public
Product Marketing

Product Quality
Product Quality

- Class A EQ
- Analysis
- Particle size
- Density
- Dust control
- Foreign Matter
- Minimal odor
- Hot product

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<th>ANALYSIS</th>
<th>AVERAGE</th>
<th>GUARANTEED</th>
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<td>4.6%</td>
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<td>0.3% Water Soluble Nitrogen</td>
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<td>Available Phosphorus (as P$_2$O$_5$)</td>
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<td>Potassium (as K$_2$O)</td>
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<tr>
<td>Iron</td>
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Nutrients Derived from Treated Municipal Biosolids

Quincy, MA Product Analysis
Particle Size

- Granular pellet
  - Free-flowing
  - Traditional spreading
Particle Size

- Digested sludge
  - 1-3 mm for blending
Particle Size

- Undigested sludge
Dust Control

- Friability
- Dust suppressants
  - Complex hydrocarbon mix
  - Crude glycerin
  - Vegetable oils
Hot Product
Product Marketing

Biosolids Benefits
Benefits of Land Application

- High organic content
  - Increased soil carbon storage
- Slow release nutrients
- Natural micronutrients
- Faster plant establishment
- Repeated application leads to:
  - Better root development
  - Increased water retention
  - Reduced potential for leaching
Manuel’s House – 4/27/13
Higher Crop Yields

Winter Wheat

Product Marketing

Revenue Trends
Value of Biosolids Pellets

- “Black Gold”
- Business model
- Profit center vs. cost center
- Cost to farmer
  - Must be lower than chemical fertilizers
  - Savvy farmer may pay for biosolids benefits
- Fertilizer blender value
Product Marketing

NEFCO’s Evolution
NEFCO Product Marketing History

- Started in 1991
- Experience in 26 states
- Biosolids demand increasing

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<tr>
<td># Plants</td>
<td>3</td>
<td>5</td>
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<td>Tons Marketed</td>
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<td>64,000</td>
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<td>Product Customers</td>
<td>14</td>
<td>30</td>
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<tr>
<td>% Land Applied</td>
<td>88%</td>
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<td>Revenue per Ton</td>
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NEFCO 2013 Product Diversity

- Land App.
- Fert. Blend
- Alt. Fuel
- Other
Product Marketing Considerations

- Plant size and location
- Seasonal demand variations
- Customers of multiple plants
- Use of product marketing brokers
- Value of alternative fuel outlet
Product Marketing

Critical Success Factors
Critical Success Factors

- Diversified customer base
- Maintain backup plans
- View biosolids as product, not waste
- Supply chain approach
- Inventory management
- Know customer’s needs
- Use product marketing brokers
- Understand permitting & regulations
Diversified Customer Base

- Variety of end uses
- Geographical diversification
  - Seasonality
  - Land application demand
  - Winter diversity
  - Transportation costs
Inventory Management

- Supply chain approach
- Raw material trending
- Finished goods demand
- Silo storage
  - Days of storage is function of client specification
  - Product heating
  - Product segregation
Raw Material Trending

Dry Tons per Day '06-'12
Understand Regulations

- EPA 503
- State-by-state regulations
- Know the laws!
- Transportation
- Spill response
- Environmental compliance calendar
  - Annual reports
  - Permit renewals
Product Marketing

Michigan Market
City of Detroit
DWSD Biosolids Drying Facility

- DBO project
- $143 million capital
- 200 to 420 dry tons per day
- 8 centrifuges and 4 direct rotary dryers
- 8 days or 800 dry tons per silo of storage capacity
- Construction commenced November 2013
DWSD Biosolids Drying Facility
Facility Layout
DWSD Biosolids Product

- Available August 2014
- 100,000 dry tons per year
- Undigested sludge
  - Nutrient value
  - Particle size
  - Density
Future MI Customers

- High agricultural demand predicted
  - Use of marketing brokers
  - Importing MA product
  - Crops – corn, wheat, soy, hay
- Agriculture blending TBD
- Cement kilns located favorably
- Some export to IN, OH, etc.
Conclusion

Biosolids drying adds value
Conclusions

- Growth in product availability
- Growth in product demand
- Biosolids = Resource

Successful biosolids marketing programs take this into account
Questions?

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