TRENDS IN BIOSOLIDS MANAGEMENT
Biosolids Symposium – Michigan WEA, March 2013

Andrew Bosinger, Synagro. March, 2013
AGENDA

• Description of Synagro – The Commercial Part of Your Day
• Regulatory Trends
• Technology Trends
  – The Class A Move
  – Digestion
  – Dryers
• Voice of the Market
  – What’s Keeping you up at Night?
Synagro executes smart, efficient, integrated solutions to unique wastewater treatment needs. We lead the field in transforming biosolids management challenges into sustainable programs.
SNAPSHOT

FOUNDED: 1986

HEADQUARTERS: HOUSTON

EMPLOYEES: 850

STATES WE OPERATE IN: 34

MUNICIPAL AND INDUSTRIAL WASTEWATER TREATMENT FACILITIES SERVICED NATIONWIDE: 600+
SYNAGRO’S PERSPECTIVE

- 12,000,000 wet tons of biosolids and other organic byproducts managed per year
- $300 million annual revenues
- 60% transport & land application
- Biosolids processing facilities:
  - 9 heat drying
  - 3 composting
  - 3 regional incineration
  - 12 alkaline stabilization
  - 35 permanent & 48 mobile dewatering
Presentation Basis: 2011 WEF/NBP Report
REGULATORY TRENDS
Sludge Incineration Rule Changes

• Classification of sewage sludge as solid waste when used in combustion unit
  – Concern: impact combustion in cement kilns and other resource recovery approaches
  – Key issue: legitimacy criteria (sludge contaminants compared to traditional fuels)

• New emissions requirements for sewage sludge incinerators (SSIs)
  – Moved from CAA 112 to CAA 129
  – Defined tech-based emissions criteria for new/exist SSIs
SSI and Solid Waste Definition Rules

• NACWA petitioned EPA to reconsider both rules
  – EPA rejected SSI request, but will “partially reconsider” solid waste definition rule
  – Clarification to definition issued in April 2012
    • Expected to note that biomass is not considered to be a waste when burned for energy, and therefore excluded from rule
• NACWA /others have filed suit against EPA on both rules
  – Oral arguments set for May, 2013
Revisions to 503?

• 503 rule being reviewed, topics include:
  – Arsenic number being reviewed – Risk Assessment
  – Also, updating Biosolids Core Risk Assessment
  – Targeted National Sewage Sludge Survey (TNSSS) key!
  – Result could be new numeric limits for 503s

• General discussion: “fix” other parts of rule that EPA has long wanted to/planned to address:
  – New molybdenum limit (40 mg/kg?)
  – Eliminate “numeric criteria only” pathogen alternatives
  – Update test methods
State Regulatory Changes

• State revisions of “503 Rule”
  – Elimination of some Class A alternatives
  – Differentiation between Class A cake and value-added products
  – Class B restrictions
  – Phosphorus-based mgt

• Fragmented regulatory landscape
  – County and local restrictions
  – Other state agencies
Ohio Land Application Rule Changes

• Effective July 1, 2011
  – Limited field stockpiling to 90 days;
  – Imminent precipitation restrictions;
  – December 15th to March 1 – Incorporation required;
  – Additional signage and reporting requirements.

• Effective July 1, 2013
  – Phosphorus limited application.

• Impacts
  – Increased landfill disposal or Construction of on-site storage;
  – Larger landbase required, longer transportation distances;
  – Higher rates for all biosolids management services.
Long-Term Regulatory and Policy Drivers: Emerging Issues and Research

- **Trace Organics**
  - Fate, transport
  - Bioassays
  - Source Reduction

- **Regrowth, Odors and Sudden Increase (ROSI)**

- **Emerging Pathogens**
  - Validity of indicator organisms

**Odor Research**
- Compounds associated with longer-term odorants
- Mechanisms for production
- Reducing methanogen inhibition
- Benchmark low odor product
- Targeted control

**Sudden Increase Research**
- New culturing method
- Time-temperature curve
- Mechanism of reactivation

**Effect of Processes**
- Land application, storage, dewatering, digestion, upstream collection and treatment, amendments

**Reducing Substrate Availability**
- Factors impacting indicator regrowth
Public Perception Continues to Drive Policy and More

- “Persistent uncertainties” remain
- Survey of regulators found that it is greatest pressure on biosolids programs (NEBRA, 2007)
- Survey showed only 14% of public know what “biosolids” means (NEBRA, 2004)
TECHNOLOGY TRENDS
Our Changing View of Beneficial Use

1991:
“Beneficial Use means any application of sludge on land specifically designed to take advantage of the nutrient and other characteristics of this material to improve soil fertility or structure and thereby further some natural resource management objective.”

December 2011:
“The Water Environment Federation (WEF) supports a comprehensive approach to wastewater treatment and solids management that ensures the recycling and recovery of valuable resources including water, nutrients, organic matter, and energy.”

Source: NEBRA, 2007
Source: WEF, 2011
Pressures Driving Diverse Biosolids Products and Outlets

• Increased interest in Class A, value-added products
  – Compost
  – Heat-dried

• Looking beyond agricultural land application
  – Landscaping/horticulture
  – Cement kilns
  – Fuel for synthetic gas
    • Gasification
Technology Trends: Anaerobic Digestion Optimization for Improved Solids Reduction/Gas Production

- Enhanced mixing
- High temperature
- Separate phases
- Increased solids retention
- Hydrolysis
Co-Digestion: Going Beyond the Fence Line to Optimize Biofuel Production

- FOG (fats, oils, grease)
- Food Waste
- Biodiesel
- Biogas
Biogas: Looking Beyond Boilers and I.C. Engines

- Boilers
- I.C. Engines
- Blowers
- Fuel Cells
- Heat Dryers
- Micro-Turbines
- Natural Gas
- Vehicle Fuel
VOICE OF THE MARKET

What is keeping utility managers up at night?
What Biosolids Generators are Saying

• Synagro conducted an in-depth survey of wastewater and biosolids decision makers;
  – Third-party, anonymous survey
  – Large – medium – small utilities
  – Customers and non-Synagro customers
  – Broad geographic sample
  – Other stakeholders too – Regulators, Consulting Engineers

• Goal – Triple bottom line analysis - Understand the key challenges in the minds of the wastewater community to help us focus on the solutions that will address those concerns.
Key Survey Findings

1) What drives biosolids management choices?
   – 5 key things: Cost, Compliance, Public Perception, Diversification, and Desire for Green Energy Solutions.

2) Current & Future Regulatory Changes are the Top Concern
   – Almost half of participants mentioned that stringent regulatory changes were their top concern.
     – Broad impacts – Budgets/rates, Planning, staffing, compliance
     – Compared to regionally adjusted averages, biosolids generators in stringent regulatory climates had 27% higher costs;
3) “Green is In”

- Almost all municipalities indicated that Green Energy and sustainability were important to them – Reasons Differed;
  - Adapting to future regulatory changes
  - Cost Reduction drivers (e.g. heat recovery, cogeneration)
  - Grant Money Available

- However, proactive master planned Green Energy projects, have often been shelved based on total cost analysis;
4) Biosolids Costs are Not Optimized

- 55% of municipalities do not have a handle on their biosolids processing costs – Many define success in this area as simply meeting an overall plant budget.

- The Municipalities that could fully articulate their biosolids processing costs had, on average 40% lower costs than their benchmarked peers;
What Does it Mean?

• Takeaway - There is a substantial challenge facing wastewater and biosolids leaders, balancing key challenges:
  
  – While regulations tighten & costs increase - Budgets shrink;
  – 67% see meeting budget as their top priority;
  – Generators/the public still seeking Class A solutions;
    • Budget pressures holding back some of what would be a broader, stronger move;
Addressing the Challenges

• As always, where there’s a will, there’s a way:
  – “Anything and everything is on the table in the future... we will try new things if it makes business sense”
  – Cost & Efficiency Improvements
    • Getting a stronger understanding of unit costs
    • NBP, WEF, NACWA – Optimization of performance
  – Collaboration – Between Departments & Agencies
  – Public - Private Partnerships
  – Utilization of New Technologies
  – New Types of Partnerships – Energy Service Companies
Thank you!

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Credits to:
Lynne Moss, CDM Smith
WEF, Charting the Future of Biosolids Management team
PWC Consulting