Organic Recycling Using N-Viro

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Dan – Viro Ltd
Effective and Efficient
Organic and Mineral
Byproduct Management
• Developer /owner/industry leader of patented BioMineral disinfection and stabilization processes.
• Developer of BioMineral recycling programs - Provider of technology transfer through direct license to third party, own/operate, partnership.
• Consultant for BioMineral derived products - N-Viro Soil; N-Viro BioBlend; N-Viro BioFuel
The Market Needs (Israel)

- The Barcelona Agreement
- Class A Disinfection and Stabilization
- Community Acceptance
- Responsible, Beneficial Reuse
- Integrated Flexibility
- Liability Concerns
- Environmental Stewardship
Where Do We Start
Dewatered Cake Sludge
What is the Goal

Finished N-Viro Soil
**Process Schematics**

### Traditional N-Viro Process

- **Biosolids Delivery**
- **Alkaline Admixture Storage**
- **Proportioning & Mixing**
- **Windrow Drying**
  - Temperature > 52°C for 12 hours
  - pH > 12 for 72 hours
  - Product solids > 50%

### BioDry Heat Drying System

- **Biosolids Delivery**
- **Curing Area**
- **Storage**
Three Product Technologies ®Registered

- **Biosolids Combined with CCPs**
- ~N-VIRO Soil™
- 23 N-VIRO Soil™ Facilities

- **Addition of Thermal Drying**
- ~N-VIRO BioDry™

- **Enhanced Thermal Drying**
- ~N-VIRO Fuel™
  - N-VIRO Fuel
Fairborn, OH
Syracuse, NY

55,000 wet tons of biosolids annually
Syracuse, NY
Windrow Building

Projects
Syracuse, NY
Windrow Building

- Project Intro
- Market Needs
- N-Viro Technology
- Israeli Market
- Alternative Techs
- DAN WWTP
- Business Formats
- Long-Term Results
- Summary
BioDry Provides Long Term Solution

- Rapid Installation Process
- Long-Term Solution
- Proven Success
- Flexible and Sustainable Process
- Exceeds Public Expectations
- Closes Recycling Circle
- Inherent Backup
Sarnia, Canada BioDry Facility
Sarnia, Canada BioDry Facility
Leamington, Canada BioDry Facility
Leamington Product Storage
Class A Markets For N-Viro Soil

- Agriculture
- Horticulture
- Topsoil
- Topdressing
- Landscaping
- Soil blending
- Soil conditioning
- Fertilizer
- Urban Reclamation
- Minespoil Reclamation
- Structural Fill Material
- Roadbase Material
- Landfill Cover
Class A Markets For N-Viro Soil

Agriculture

Before

After

Horticulture

Before

After
Class A Markets For N-Viro Soil

- Landscaping
- Turf Farms
- Topdressing
- Soil Conditioner
Prospective Israeli Markets

- Agriculture
- Horticulture
- Topsoil
- Soil Conditioning
- Soil Disinfection
- Landscaping
- Landfill Cover
Using Community Byproducts to Add Value to the Finished Product

Add Shredded Greenwaste at Curing Bin or During Windrowing

Biosolids Delivery
Alkaline Admixture Storage Proportioning & Mixing
Curing Area

Storage
Long-Term Storage
N-VIRO In Israel

Project Intro
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Long-Term Results
Summary

N-VIRO Fuel™
Dry, Granular Material with Density Comparable to Coal
Safe, Effective Energy Supplement

N-VIRO Fuel™ a Biomass-Derived Fuel
Substitute for Coal at Coal-Fired Power Plants
Fuel Gasification Process Turning Solid to Gas

100% Renewable Electricity
Through Steam and Hot Air Turbines
Biosolids

N-VIRO Mixer

Single Pass Rotary Drum Dryer

Retort Gasifier

Char Stabilizes Biosolids

Heat Exchanger

Oxidizer

Hot Air from Turbine to Dry Biosolids

100% Renewable Electricity
Process Flexibility

- Customized manufacturing
- Proven process with 40+ operating plants
- Off the shelf equipment for rapid installation
- Straight forward operation
- Simple materials handling
- Ministry of Environment approved
- Proven community acceptance
- Inherent Class A backup to the dryer
N-Viro Process Advantages (cont.)

- Class A Disinfection Approval from the Ministry of Environment
- Approved USEPA Class A Process Since 1998
Stability & Storability

- Stability is vital
- Maximize product value to drive demand
- Effective use of space
- Eliminate concerns due to fire and to re-inoculation by pathogens
Product Storage

Inside

Outside

Field
N-Viro Business Formats

- B.O.T. (Build, Operate & Transfer)
- Turnkey
- Turnkey & Operational Contract
- Expanded Partnership with DAN Water Assoc.
Summary

- An Immediate and Long-Term solution
- Accepted by Shafdan and the Community
- Rapid Installation
- Most Efficient Use of Capital
- Flexible and Sustainable
- Commercially Viable Product
**DAN Water Association**

- Barcelona Agreement
- Accelerated timeframe
- Siting concerns
- Short-term v. Long-term solutions
- Community Support
Dan – Viro Ltd

GES
87.5%

CRM
12.5%

12.5%

GES
87.5%

Dan – Viro Ltd

12.5%

GES
87.5%

CRM
12.5%
Dan – Viro Plant (Shafdan)
Final Design
Dan – Viro Plant (Shafdan)

- Between the end of 2011 to the present, 97,000 Ton of Raw sludge have been treated at the Shafdan Plant.
- 150,000 Ton Class A N-Viro Soil have been manufactured.
- They have been scattered over 27,000 Dunams.
- Professional studies conducted in recent years in agricultural observed good results.
Any Questions?

Thank you for listening

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