Land Application

Beneficial Reuse in MN
Example Company: Location

- Nisswa, MN
- Customers
  - Local friends
  - Vacation~ Lakes area
Business

- Management
- Septage
- Biosolids {Sludge}
  - Small community systems

**Best Choice:** Legal Cost

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Septage Regulations

- Local Ordinances
  - Pumping
  - Reporting
  - Application Sites
- State Rules
  - Licensing
- 503 Regulations
  - Federal Law
  - EPA enforced
  - Some States have delegation
Highlights of the 503’s

- Defines Septage
- Records
- Treatment
  - Exceptional Quality
- Application Rates

Land application is a CHOICE
What is Septage?

- Waste from Living
  - House
  - Apartments
  - Restaurants
- Portable Toilets
- Composting Toilets
- NOT Industrial waste
NOT Septage
- Industrial sludges
- Hazardous waste
  - Class V
- Sand pits
  - Water
  - Sand
  - Other stuff
- Grease traps
- Animal waste

Testing Biosolids

Grinder outputs
The solution for Customer Perception

- Professionalism
  - Records
  - Understanding
- Procedures
  - Timing
  - Locations
- Education
  - You
  - Public

Your the EXPERT
Professional

- You
- Your Regulators
  - Regulations
- Your competition
Dealing with Neighbors

- Pumping
- Site location
- Communication
- Treatment
- Performance
Managed sites
Treatment options {Biosolids}

- Dewatering
  - Landfill
- Effluent~ Spray [Like Tom]
- Solids
- Quality [Pathogens]
  - Level A
  - Level B
- Composting
Exceptional Quality {A}

- **Treatment**
  - Biosolids

- **Testing**
  - Free of Pathogens

- **Methods**
  - Drying
  - Heating
  - Composting

- **Applications**
  - Flexible
Composting
Air
Temperature to meet Pathogen Removal

Exceptional Quality {A}
Land application
Records [Septage]

- **Daily - Truck**
- **Who** - You got it from
- **What** - You got
  - Septage
  - Other
- **Annual – Site**
- **Where** - You spread it
- **How** - It was treated & Managed
Total gallons pumped

- Removed
- What you did with it
  - Land App
  - Treatment
  - WWTP
The solution for Nutrients

- Loading rates
- Annual
  - Crop need
- Daily
  - 10,000 gal/acre
Why the limits

- Nitrogen
- Run off
- Acceptance
Crop selections

- Type of use
- Type of treatment
- Cropping schedule
 Mana

- Maximum allowable nitrogen application
- Options
  - Seasons
  - Access
Application Rates

- Use table
- MANA ÷ 0.0026
Annual Limits

- MANA ÷ 0.0026
- Non harvested  50 #  ~ 20,000 gal
- Soybeans       120  ~ 45,000 gal
- Alfalfa        150  ~ 60,000 gal
- Hay            100  ~ 40,000 gal
- Other crops    50   ~ 20,000 gal

An Example - Conservative
Total acres used

- Total use [gallons per acre]
- Daily amount ÷ Loading per acre = Acres used
Hay

- With in 7 days of cutting
- After second cutting < 50% of loading
Fallow land

- No nitrogen
- No septage
Running total of Septage

- Keep track of loading
- Keep track at the site
- Record method
Septage can make YOU sick
Treatment

- Lime
- Incorporation
- Site Selection
Pathogen reduction

- How
- Lime record
- Temperature correction
Lime stabilization \{B\}

- Pump Tank
- ADD LIME
- Check pH
  - $> 12$
- Reaction Time
  - 30 min
- Check pH
  - $> 12$
- Land Apply
Lime addition

- Powder
- Slurry
Sample for testing
Check pH

Typical Septage

>12
pH Meter
pH mean the logarithm of the reciprocal of the hydrogen ion concentration measured at 25° Centigrade or measured at another temperature and then converted to an equivalent value at 25° Centigrade.
Temperature correction
Equation for temperature correction

\[ \text{pH} = \text{Measured pH} + \{0.0167 \times (\text{Temp}^\circ[F] - 77)\} \]

- Measured pH
  - 12.3

- Temp of Septage
  - 68°

\[ 12.3 + \{0.0167 \times (68^\circ - 77)\} \]

\[ 12.3 + \{-0.1503\} \]

12.1 [pH for 503 regs]
How Much Lime?

- 25 # per 1,000 gallons
- Stronger waste more lime
- Carry over in the tank
How long for Reaction?

- 30 minutes after mixing
- Some States 2 hours
Be Careful

- Pump wear
- Dust
  - Mask
- Eye protection
Benefits of Lime

- Perception
- Odor
- Soil treatment
- Pathogens

Makes a Corona better
Restrictions

- Crop
- Food Crops: 14 months
- Below surface: 38 months (20)
- Feed: 1 month
- Turf: 12 months (0)
- Grazing: 1 month (0)
- Public access: 12 months (0)

(after Lime)
Public Access

- High
  - Populated areas
  - Turf farms
  - Plant nurseries

- Low
  - Ag land
  - Forests
  - Rural
Vector Attraction

- Injection
- Incorporation
- Lime
Questions