



Land Application

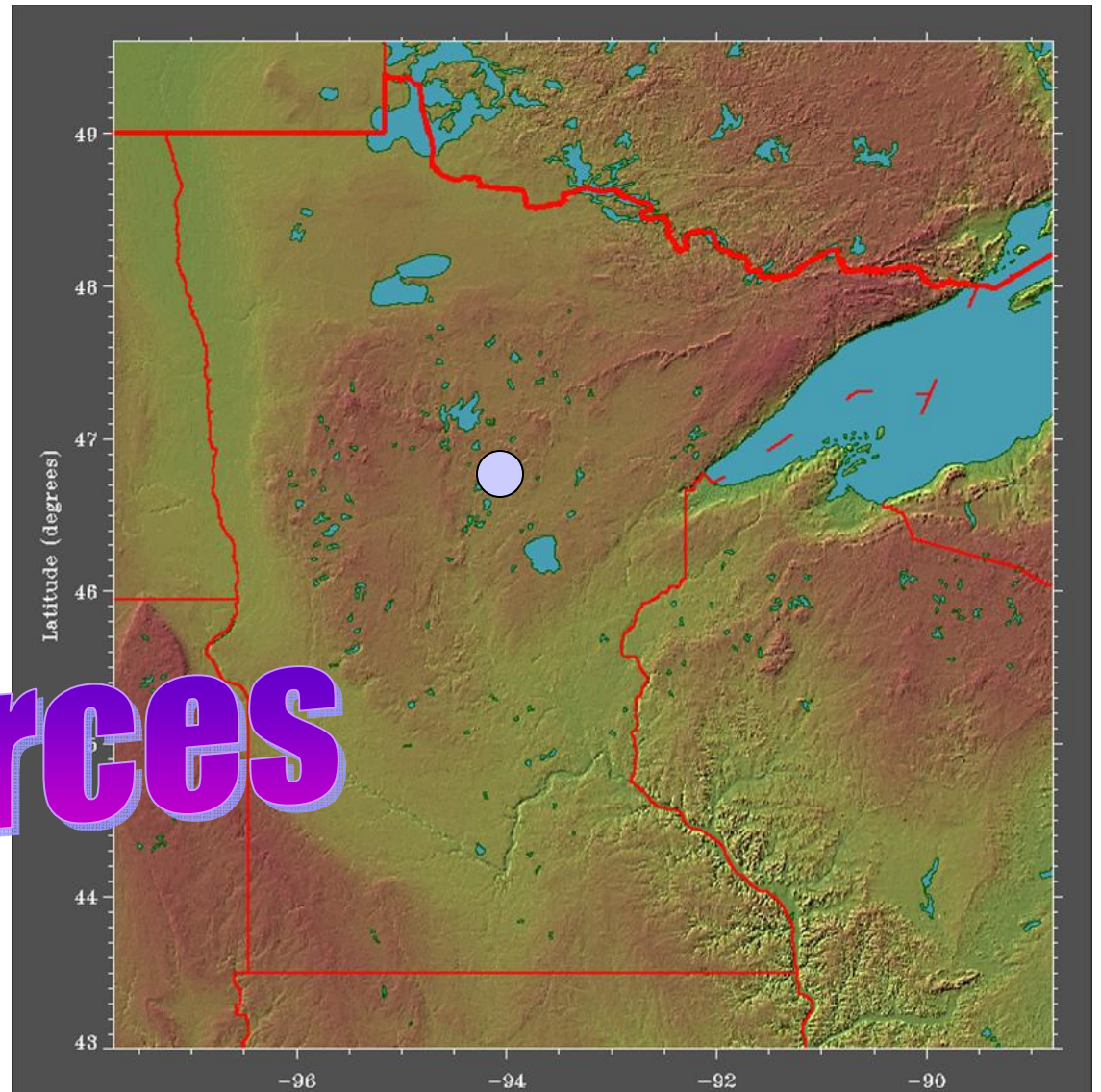
Beneficial Reuse in MN



Example Company: Location

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

Resources



Business

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



Best Choice:



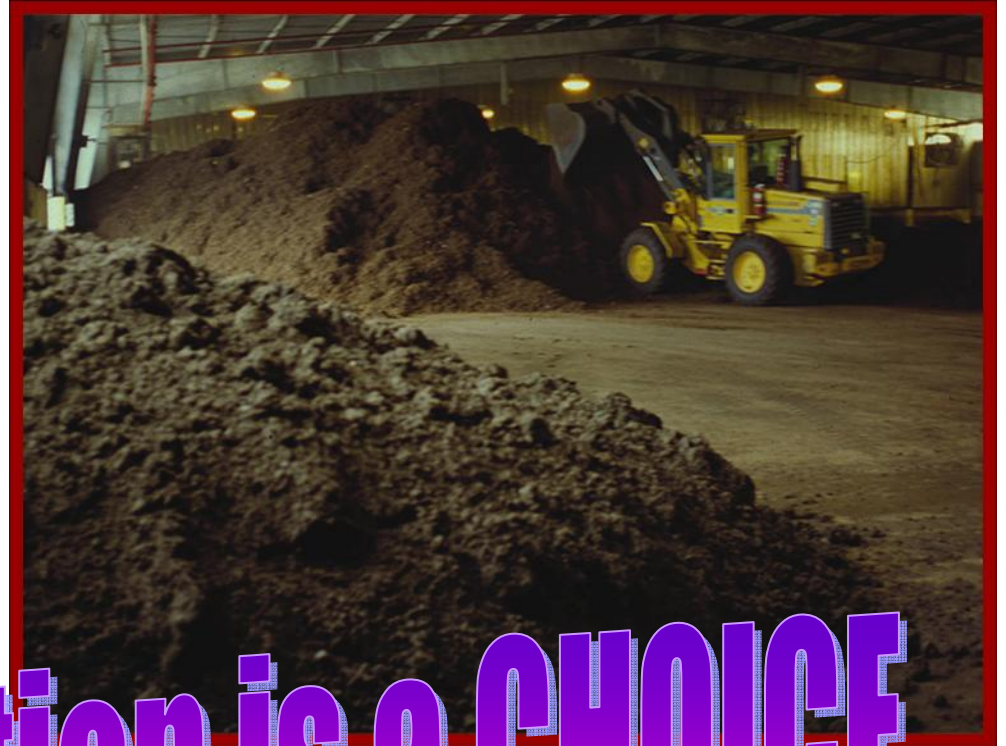
Septage Regulations

- 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

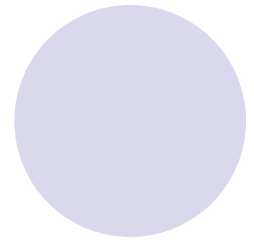
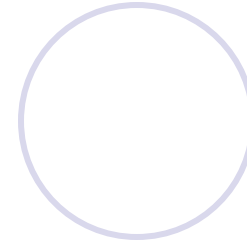
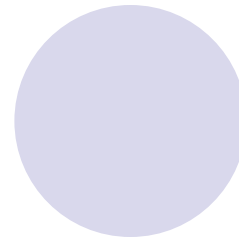


Dealing with Neighbors

- 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

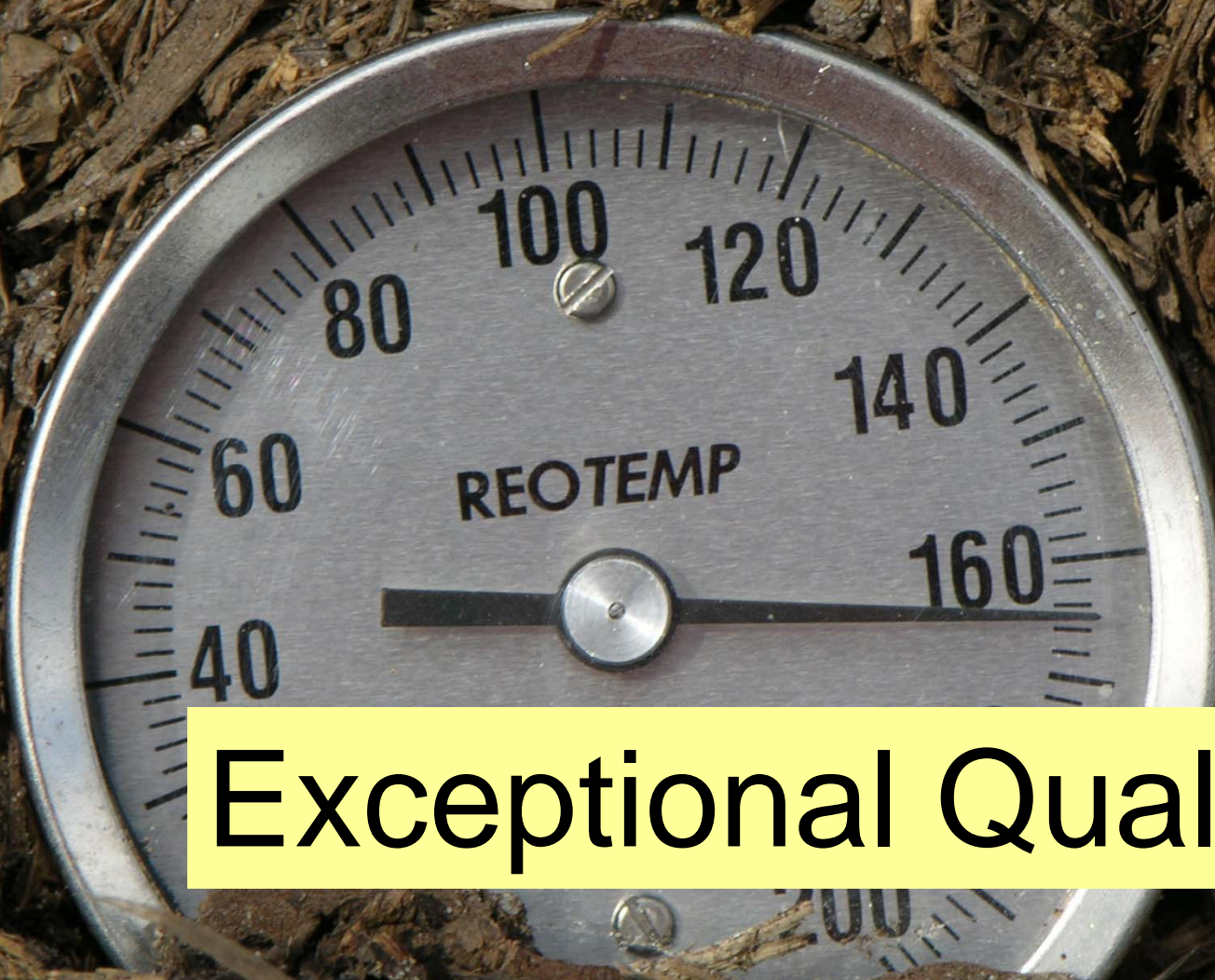


Air





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
- $\text{MANA} \div 0.0026$



Annual Limits

- MANA \div 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

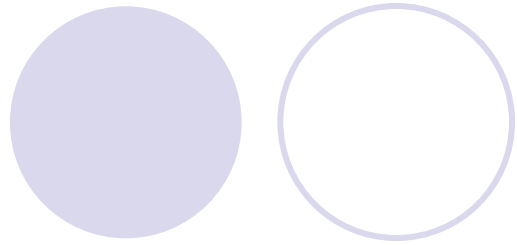
- No nitrogen
- No septage



Running total of Septage

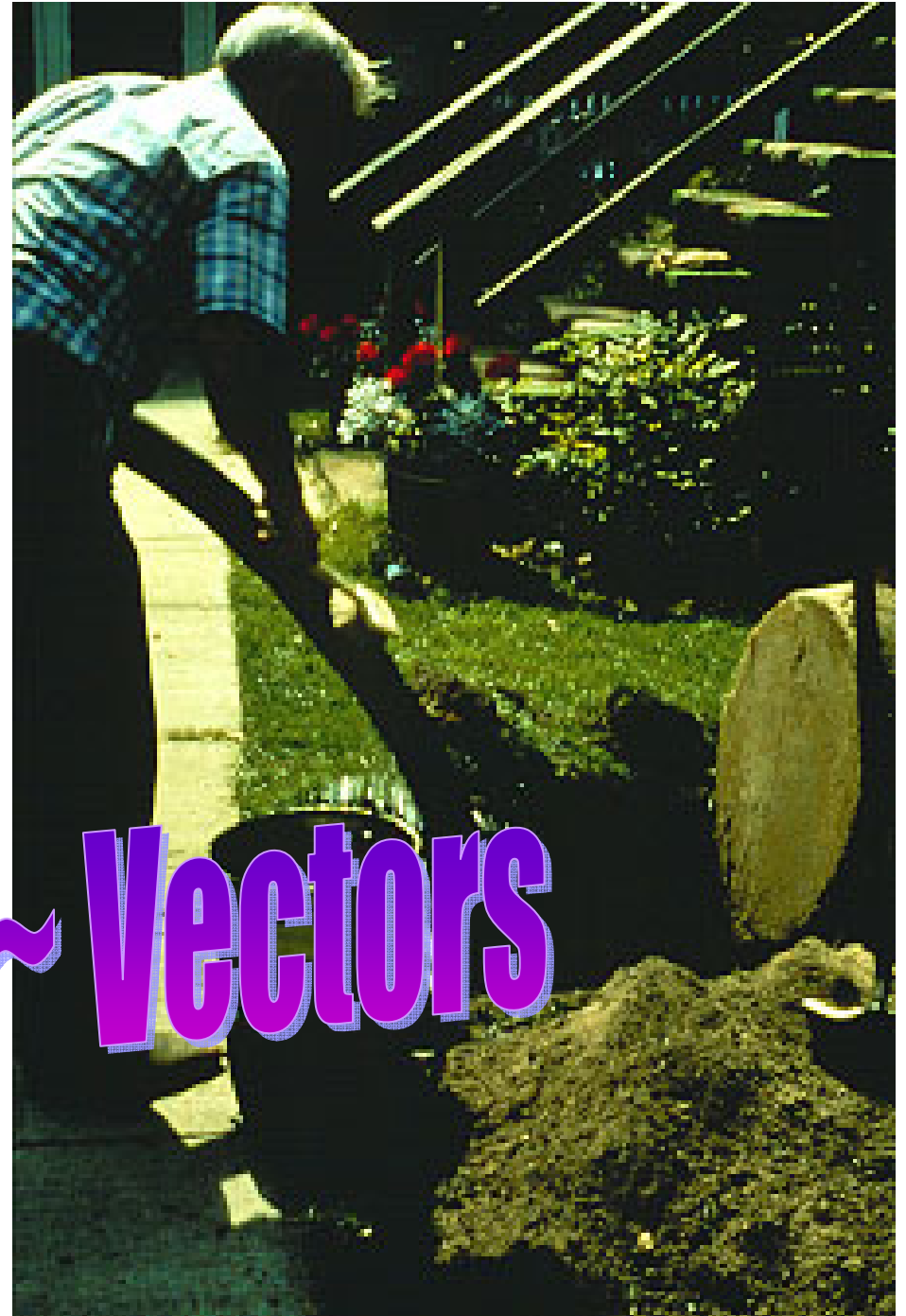
- Keep track of loading
- Keep track at the site
- Record method





Septage can make
YOU sick

Pathogens ~ Vectors



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

Hydrated Lime

- Powder
- Slurry



Quick Lime



Sample for testing



Check pH



>12





100 Strips 11020740 Set 1.09585

pH indicator strips non-bleeding

colorpHast®
pH 11.0-13.0

EMD

Dip in - read while still moist,
immersion in solution will cause color change in 10-15 sec.

11.0 11.5 11.8 12.1 12.3 12.5 12.8 13.0

A-CHEK 0-13
EMBO
8'klyn.N.Y.10210 U.S.A.

PH 0 1
PH 7 8 9
4 5 6
11 12 13



pH Meter



A decorative header consisting of five circles in a row. The first, third, and fifth circles are solid light purple. The second and fourth circles are hollow with a light purple outline. The text 'pH Definition 40 CFR 503.31(g)' is centered across these circles.

pH Definition 40 CFR 503.31(g)

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

- $\text{pH} = \text{Measured pH} + \{0.0167 \times (\text{Temp}^\circ[\text{F}] - 77)\}$
- Measured pH
 - 12.3
- Temp of Septage
 - 68°
- $12.3 + \{0.0167 \times (68^\circ - 77)\}$
- $12.3 + \{- .1503\}$
- 12.1 [pH for 503 regs]

OK

How Much Lime?

- 25 # per 1,000 gallons
- Stronger waste more lime
- Carry over in the tank



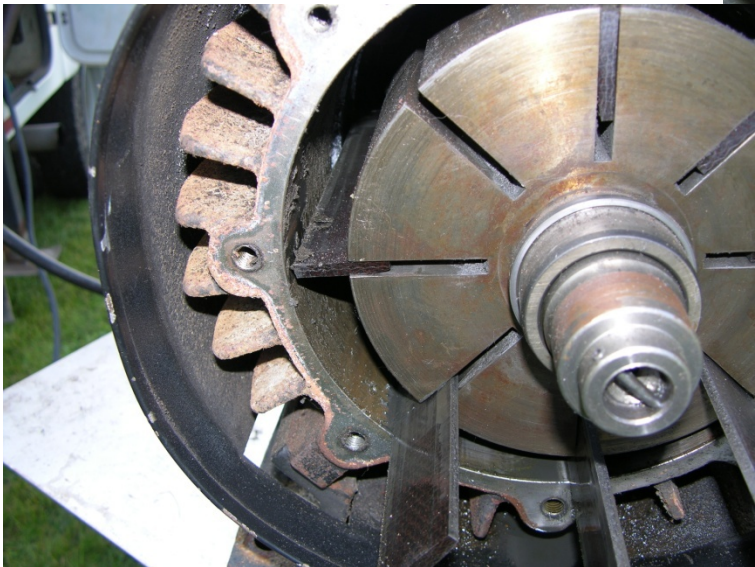
How long for Reaction?

- 30 minutes after mixing
- Some States 2 hours



Be Careful

- Pump wear
- Dust
 - Mask
- Eye protection



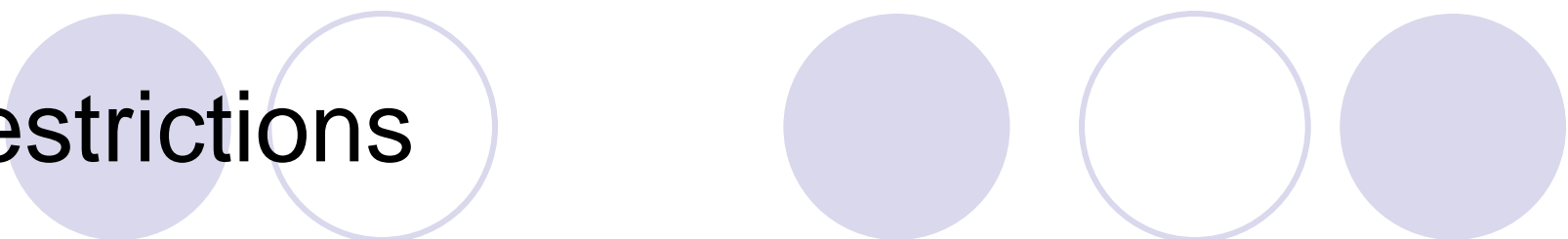
Safety

Benefits of Lime

- Perception
- Odor
- Soil treatment
- Pathogens



Restrictions



<u>Crop</u>	<u>Time limit</u>
● 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



The background features five circles of varying shades of purple and lavender. Two are solid, and three are hollow outlines. They are arranged in a loose, abstract pattern around the text.

Questions

NAWT.org