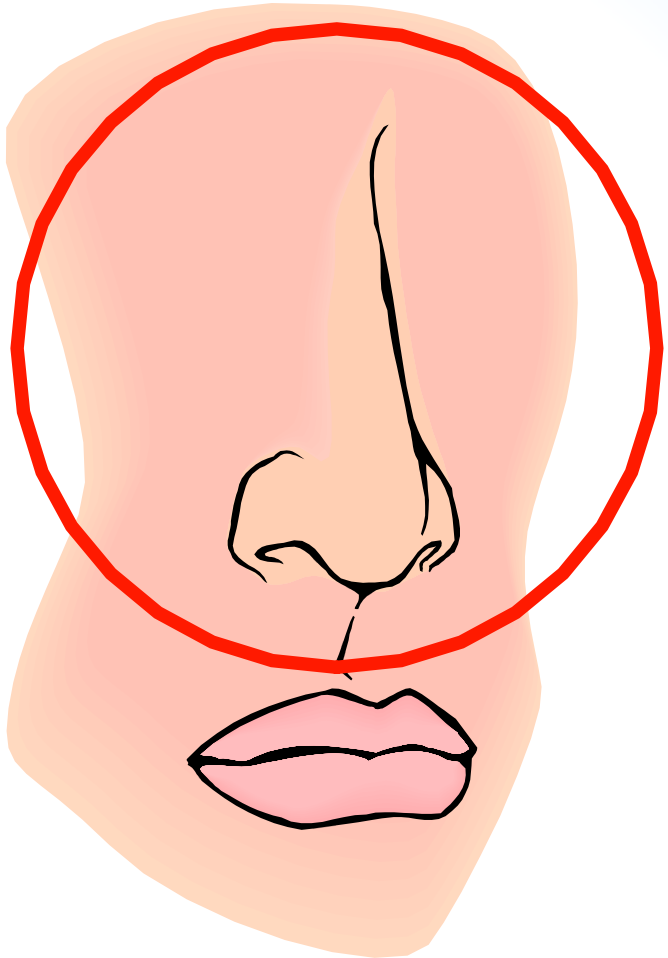
Introduction to Odor Control

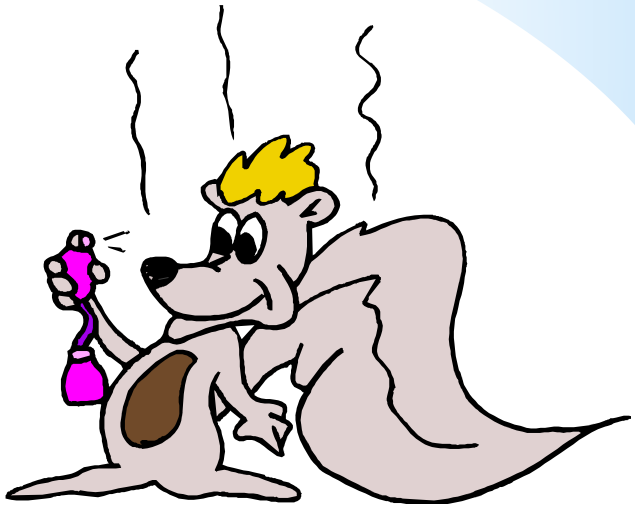
Tom Ferrero

Elkhart Environmental Processing Corp

- Overview
  - Why Odor Control?
  - Available Techniques
  - Biofilter Construction



The Nose



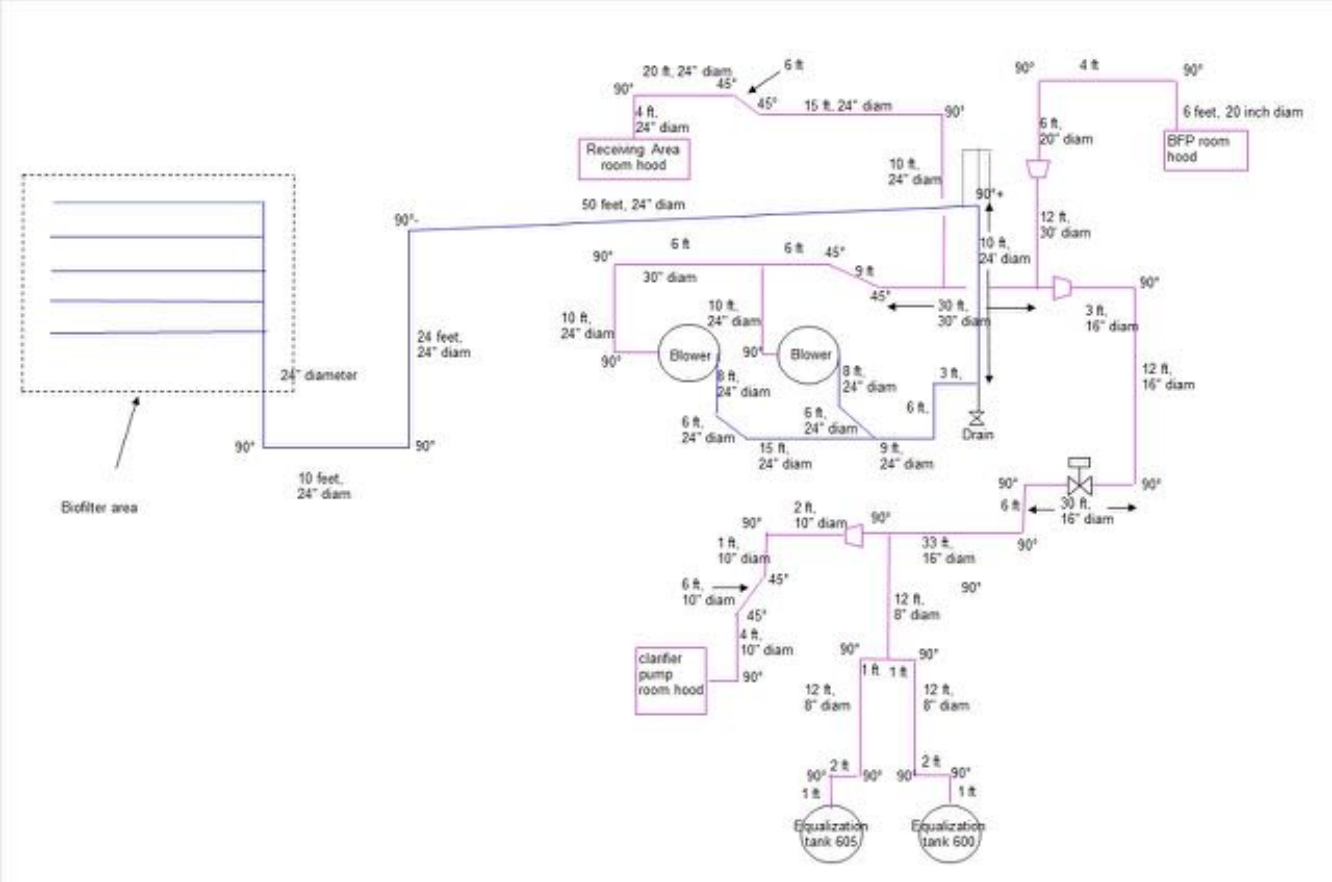
- Safety
  - Corrosion
    - Hydrogen Sulfide
  - Explosion
    - Methane
  - Health
    - Air borne disease

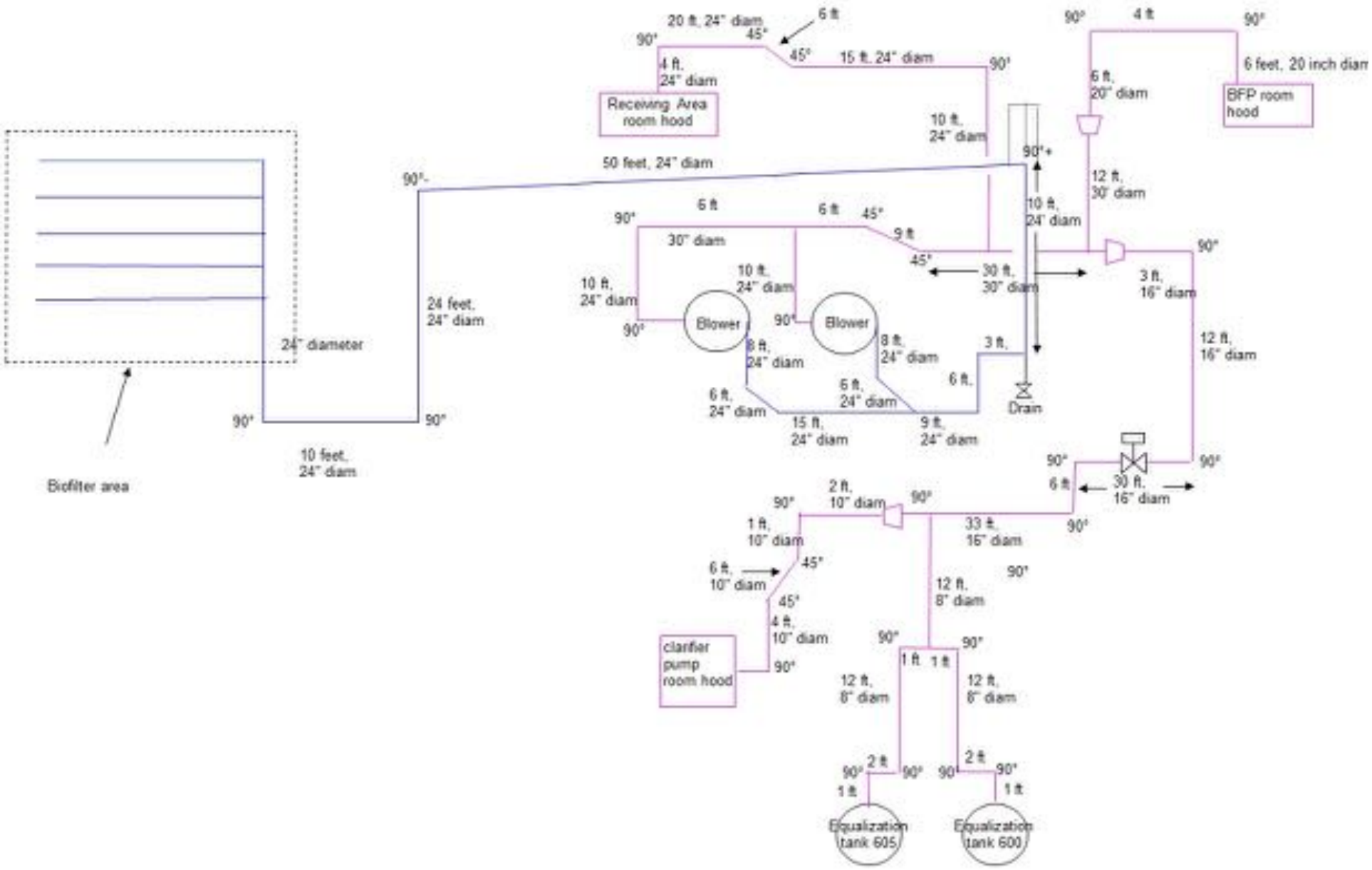
- Odor Control Strategy
  - Identify Sources of Odors
    - Septage Receiving Area
    - Screening and Grit Removal
    - Equalization Tanks
    - Processing – Dewatering
    - Filtrate
  - Estimate Degree of Control Required based on proximity of downwind receptors
  - Evaluate Options
  - Select Appropriate Strategy
  - Design and Construct

- Odor Control Strategy
  - Best Management Practices
    - Use quick-disconnect fittings
    - Avoid “Free Fall” of septage
    - Provide washdown facilities for spills
    - Ventilate tanks to odor control system
    - Everything inside!

Odor Control Strategy

Best Management Practices




Biofilter area
24" diameter
24 feet, 24" diam
10 feet, 24" diam
50 feet, 24" diam
20 ft, 24" diam
4 ft, 24" diam
Receiving Area room hood
15 ft, 24" diam
10 ft, 24" diam
6 ft
45°
90°
6 ft, 20" diam
4 ft
6 feet, 20 inch diam
BFP room hood
12 ft, 30" diam
10 ft, 24" diam
30" diam
9 ft
30 ft, 30" diam
3 ft, 16" diam
12 ft, 16" diam
Blower
Blower
8 ft, 24" diam
6 ft, 24" diam
15 ft, 24" diam
9 ft, 24" diam
3 ft
Drain
30 ft, 16" diam
2 ft, 10" diam
1 ft, 10" diam
33 ft, 16" diam
12 ft, 8" diam
4 ft, 10" diam
clarifier pump room hood
1 ft
2 ft
Equalization tank 605
Equalization tank 600

- Odor Control Strategy
  - Best Management Practices

- Odor Control Strategy
  - Best Management Practices

Odor Control Strategy

- Best Management Practices

- Odor Control Strategy
  - Best Management Practices

- Available Techniques
  - Remote Site
  - Odor counteractants (Misting)
  - Wet Scrubber
  - Activated Carbon
  - Biofilter

- Available Techniques
  - Remote Site

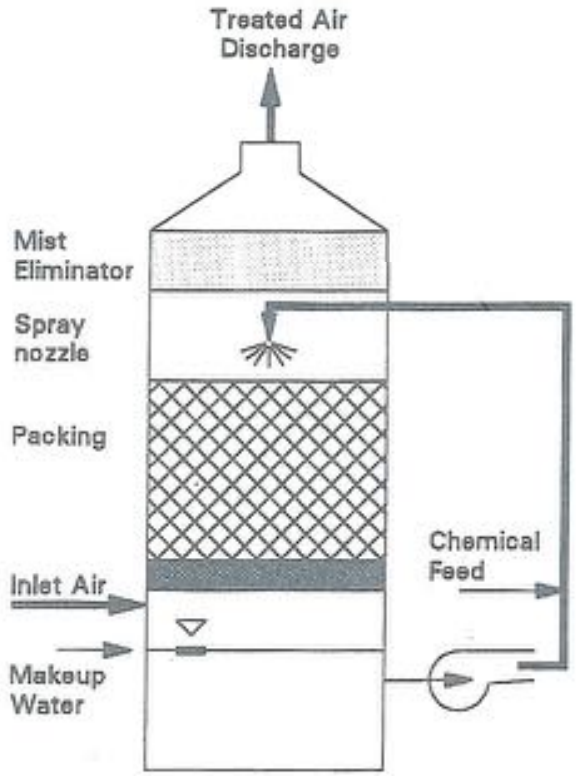
- Available Techniques
  - Misting (odor counteractants)
    - Sprayed into the atmosphere
    - React with odorous compounds
    - Encapsulate odorous compounds
    - Substantial cost of chemicals
    - 30 to 40% reduction of odors

- Available Techniques
  - Odor Counteractants

- Available Techniques
  - Odor Counteractants

- Available Techniques
  - Odor Counteractants

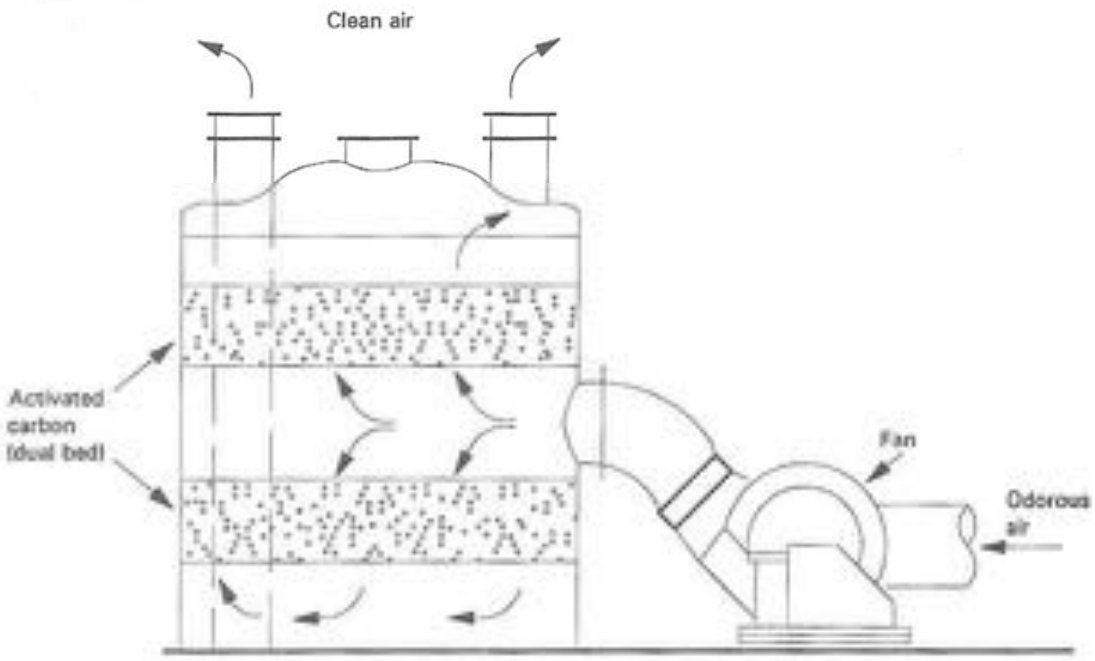
- Available Techniques
  - Wet Scrubber



Wet Scrubber System for Odor Control

Wet Scrubber

- Available Techniques
  - Activated Carbon Absorber



Activated Carbon Absorber for Odor Control

- Available Techniques
  - Activated Carbon Absorber

- Available Techniques
  - Biofilters

-Passing odorous air through a media containing microbial populations

-Microbes use the odorous compounds as a food source

-Media must be kept moist and air must have good paths through media

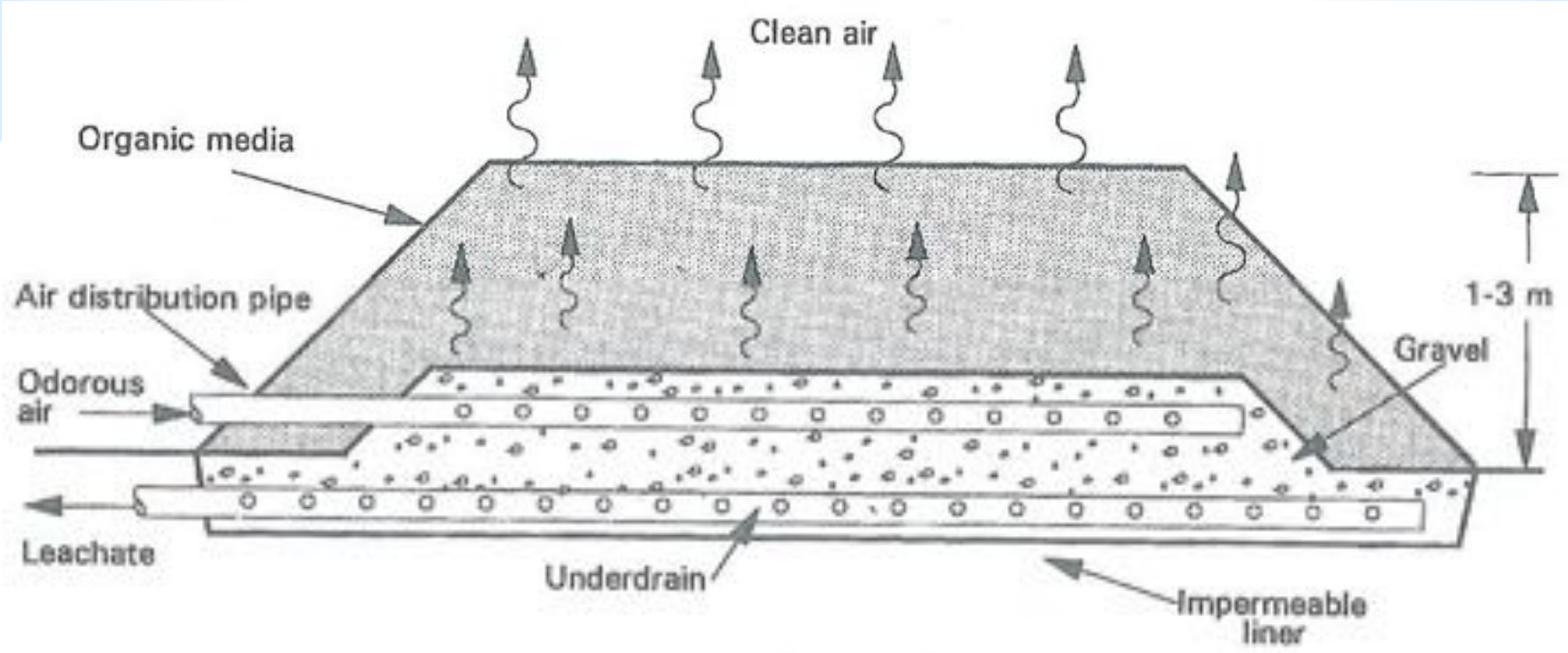
-Requires long contact times and low velocities

-Systems come in a variety of designs and media configurations

- Available Techniques
  - Biofilters

Technique	Cost Factors	Advantages	Disadvantages
Wet Scrubber	Moderate Capital and operating costs	Effective and Reliable	High Chemical Use, and spent chemical to dispose
Activated Carbon Absorber	Cost depends on frequency of carbon use	Simple, few moving parts, effective	Only applicable for dilute streams
Biofilters	Low capital and O&M costs	Simple, minimum O&M	Design criteria not well established, large land area
Odor Counteractants	Cost dependent upon chemical usage	Low Capital cost	Limited odor removal efficiency

- Biofilter Construction



Biofilter System for Odor Control

- Biofilter Construction

- Biofilter Construction

- Biofilter Construction

- Biofilter Construction

- Biofilter Construction

- Biofilter Construction

Typical Design Criteria for Biofilters	
Parameter	Value
Hydraulic Loading	2-10 cfm/sq ft
Detention Time	20-60 seconds
Media Depth	3-5 ft
Media pH	6-8
Pore Volume	40-50%
Moisture Content	50-60%
Media Constitutents	Bark Mulch, hardwood chips, biosolids or leaf compost
Humidity of inlet air	80-100%
Recommend air changes	6 volume changes/hour

Typical Design Criteria for Biofilters	
Parameter	Value
Hydraulic Loading	2-10 cfm/sq ft 15000 cfm / 2500 sf
Detention Time	20-60 seconds
Media Depth	3-5 ft
Media pH	6-8
Pore Volume	40-50%
Moisture Content	50-60%
Media Constitutents	Bark Mulch, hardwood chips, biosolids or leaf compost
Humidity of inlet air	80-100%
Recommend air changes	6 volume changes/hour

Typical Design Criteria for Biofilters	
Parameter	Value
Hydraulic Loading	2-10 cfm/sq ft 6 cfm / sq ft
Detention Time	20-60 seconds
Media Depth	3-5 ft
Media pH	6-8
Pore Volume	40-50%
Moisture Content	50-60%
Media Constitutents	Bark Mulch, hardwood chips, biosolids or leaf compost
Humidity of inlet air	80-100%
Recommend air changes	6 volume changes/hour

Typical Design Criteria for Biofilters	
Parameter	Value
Hydraulic Loading	2-10 cfm/sq ft 6 cfm / sq ft
Detention Time	20-60 seconds
Media Depth	3-5 ft 4 ft
Media pH	6-8
Pore Volume	40-50%
Moisture Content	50-60%
Media Constitutents	Bark Mulch, hardwood chips, biosolids or leaf compost
Humidity of inlet air	80-100%
Recommend air changes	6 volume changes/hour

Typical Design Criteria for Biofilters	
Parameter	Value
Hydraulic Loading	2-10 cfm/sq ft 6 cfm / sq ft
Detention Time	20-60 seconds 40 seconds
Media Depth	3-5 ft 4 ft
Media pH	6-8
Pore Volume	40-50%
Moisture Content	50-60%
Media Constitutents	Bark Mulch, hardwood chips, biosolids or leaf compost
Humidity of inlet air	80-100%
Recommend air changes	6 volume changes/hour

Introduction to Odor Control

Questions?

Tom Ferrero
Elkhart Environmental Processing Corp
tom@ferrero.bz (267) 250-4068