

Protect Your Investment: Operation and Maintenance of Septic Systems



Operation and Maintenance of Septic Systems: presented by:

● **Mike Salati Sr.**

- Boone County Sanitarian
- Code Enforcement Officer

- For further information visit our website:
www.boonecounty.iowa.gov

Please
turn off or silence
your cell phone



Thanks!



SO, ... HOW'S YOUR DAY GOING?

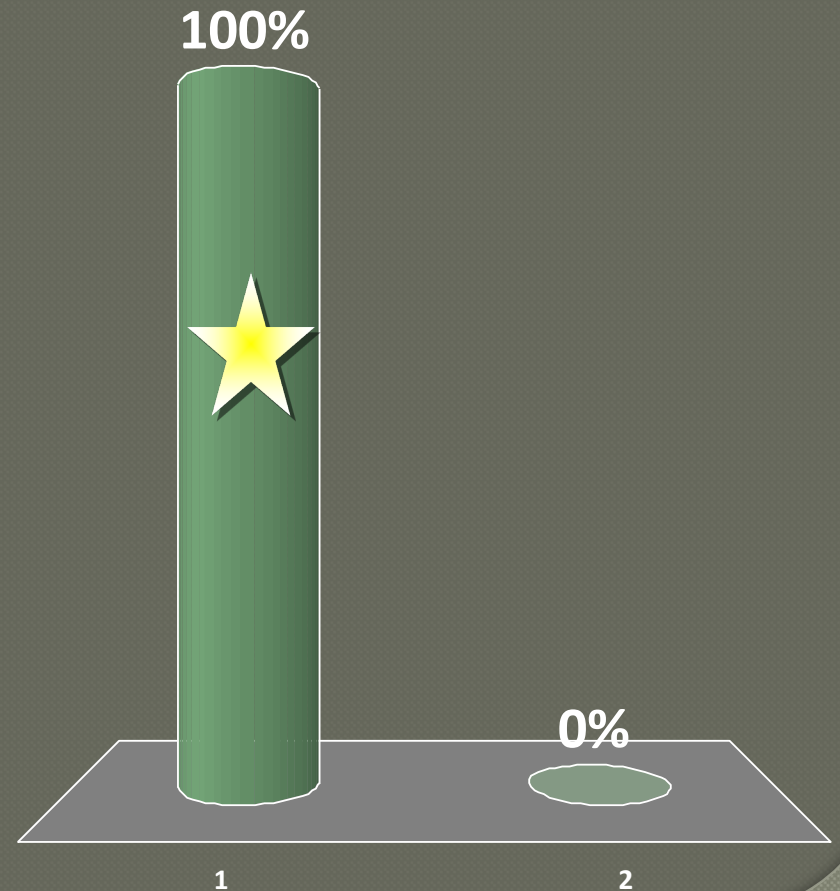
Our Technology

- ◉ We use TurningPoint technology in this presentation which allows us to:
 - Involve you in the program
 - Get immediate feedback from you
 - Help us to understand the audience
 - Tailor the presentation to your needs.



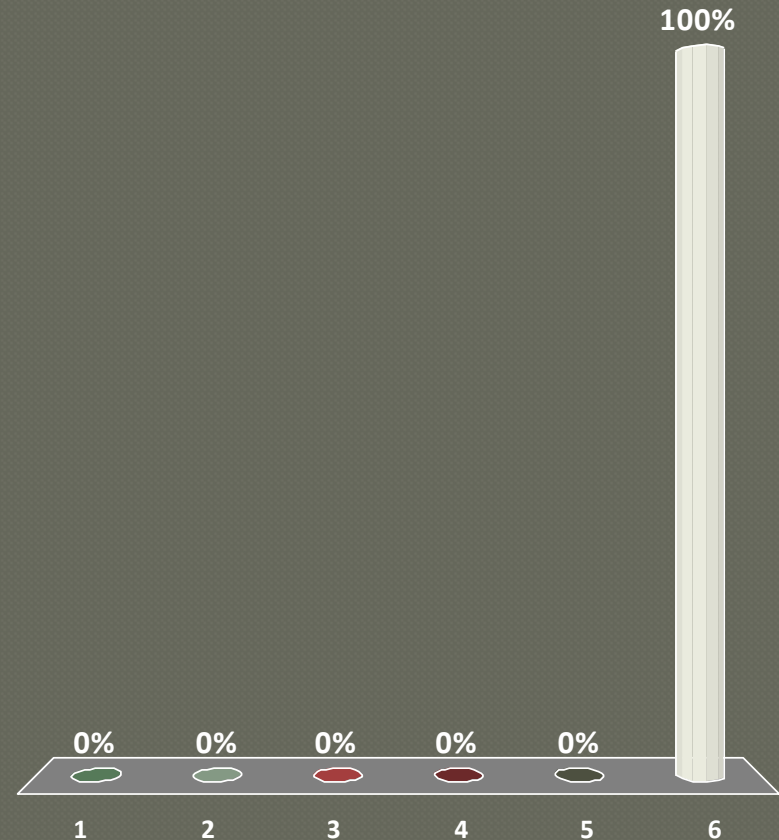
Does everyone have a Response Card?

1. Yes
2. No



Have you attended a previous Keep Boone County Healthy Seminar?

1. Intro to HH
2. Septic Seminar
3. Radon
4. Composting
5. Weatherization
6. No, I have not.



The H.O.M.E. Program is about:

- ◉ **H** – Home (Where You live)
- ◉ **O** – Owner (What You have)
- ◉ **M** – Maintenance (What You can do)
- ◉ **E** – Education (How to do it)

Why Are We Here?

- **To learn how a septic system works.**
- **To potentially save you money.**
- **Extend the life of your system.**
- **Protect human health and environment**



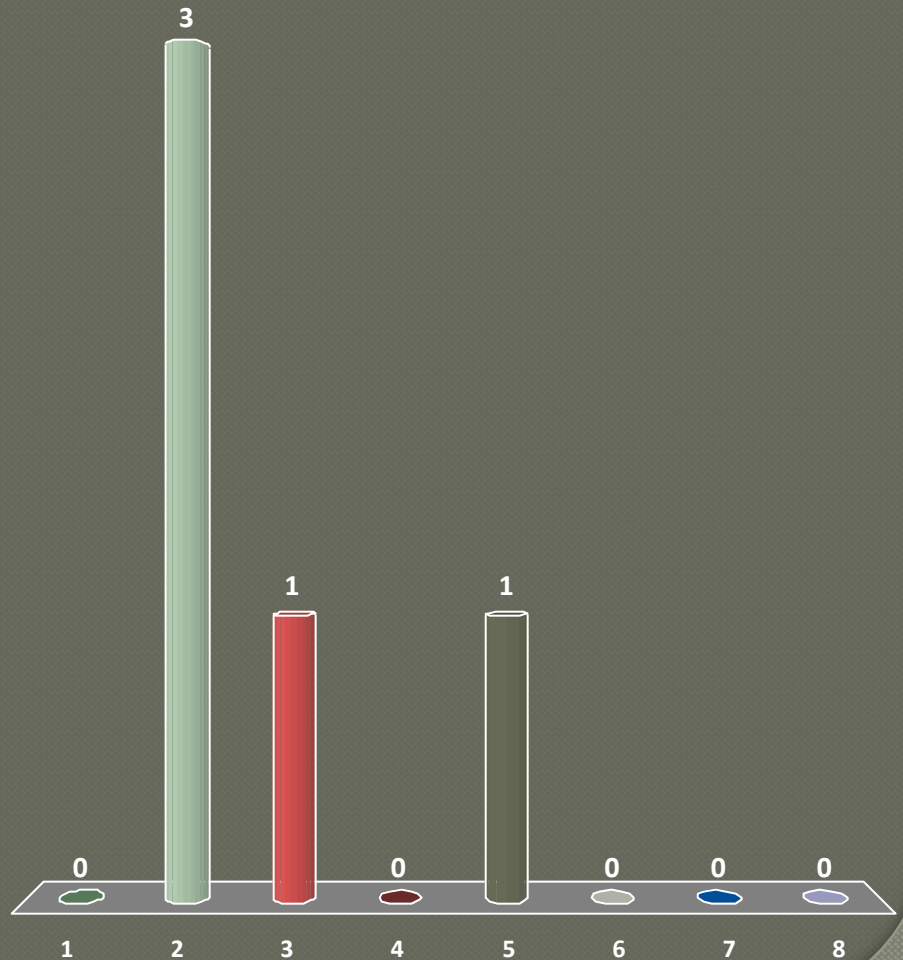
REMEMBER

- This is NOT an ENFORCEMENT ACTION
- This IS a Resource for EDUCATION

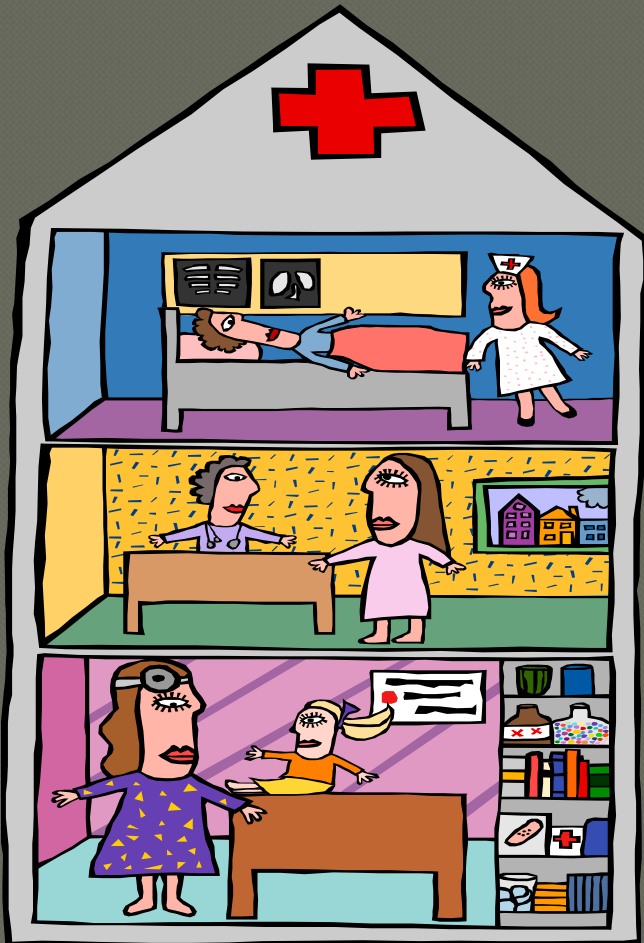


What type of Septic System do you have?

1. I Am Not Sure
2. Lateral Field
3. Sand Filter
4. Mound
5. Peat Filter
6. Advantex
7. Mechanical
8. Farm Field Tile



Home Management tips



- Tank pumping
- Bathrooms
- Kitchen
- Laundry
- Other water using devices
- Soil treatment system
- Freezing
- Landscaping

Iowa Rules & Septic Systems

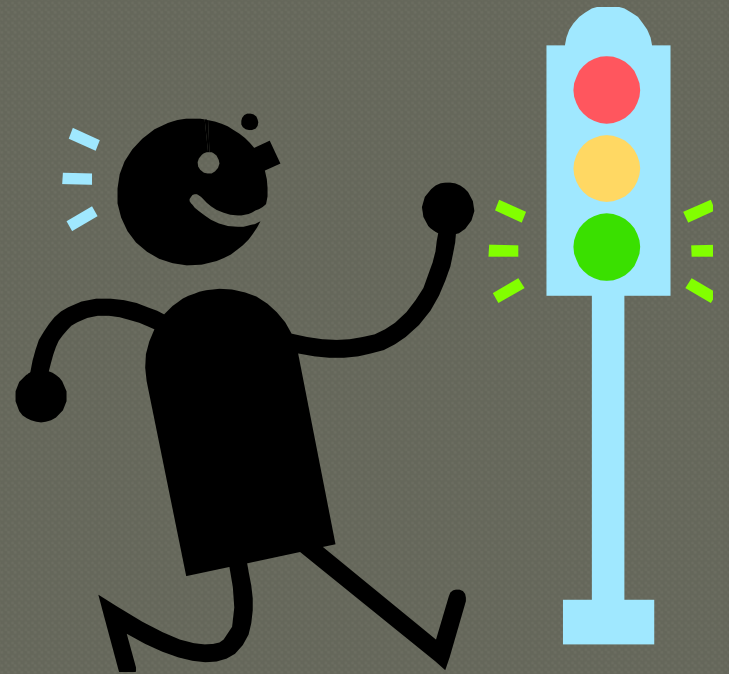
Iowa Administrative Code (IAC) 567,
Chapters 68 and 69

- New Code Effective March '09
- Enforced by Board of Health
- Local Code is same as State Code.
- Information available on Website:

www.boonecounty.iowa.gov

How Do I Get a Permit?

- ◉ File Application – available online
- ◉ Pay Fee - \$ 150
- ◉ Prepare for a Perc Test



What is a Perc Test?

- **Has 2 major functions:**

- 1) **To measure how fast water absorbs into soil**

- 2) **To survey the soil composition.**



System type based upon soil borings for characteristics and soil conditions

System size based upon:

- **Number of bedrooms**
- **Amount of water used (garbage disposal, jacuzzi etc.)**
- **Percolation test results**
- **Type of soil (sand, loam, clay)**



Types of Septic Systems:

- Conventional (or Lateral Field)
- Mound
- At - Grade
- Sand Filter
- Peat Filter
- Textile Filter (Advantex)

Typical water use

- Design Flow:
 - 150 gallons per day per bedroom
 - Assumes 2 people per bedroom
- Used with results of perc test to size systems



Do You Use Public Water?

- | | | |
|----|--------------------------------|-----|
| 1. | Yes (Xenia, Boone City, Other) | 60% |
| 2. | No, I have a well. | 40% |

Definitions

- ① **Pathogens:** Disease-causing organisms, such as viruses, protozoa, and bacteria. Often measured as fecal coliform bacteria
- ① **Aerobic:** Life that requires the presence of oxygen
- ① **Anaerobic:** Life that does not require the presence of oxygen
- ① **Retention time:** the amount of time sewage spends in the septic tank

WHAT IS SEWAGE?



Used water - **BEFORE** recycling

What do we add to the water?

○ Pathogens

- Virus, Bacteria (Human health)

○ Nutrients

- Phosphorus (Environment; weed & algal growth)
- Nitrogen (Blue Baby Syndrome, environment)
- Micro-nutrients (Human health and the environment)

○ Solids –

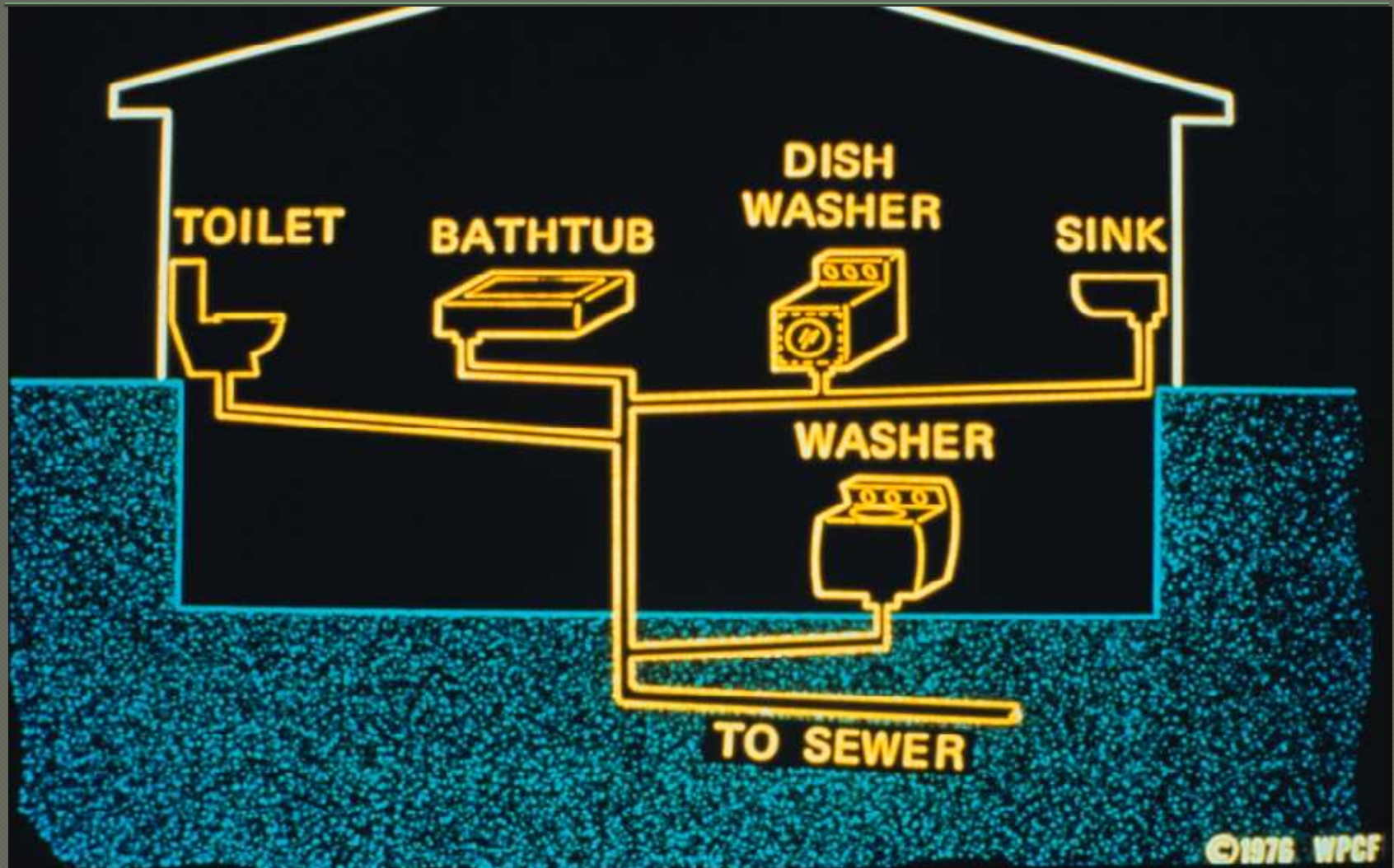
- Organic (biological oxygen demand (BOD) and its impact on the environment)
- Inorganics

○ Chemicals

- Cleaners
- Water treatment
- Medications



All wastewater must be treated



Septic Systems Are Not Mysterious!



Anatomy of a **Legal** System

○ **Plumbing:**

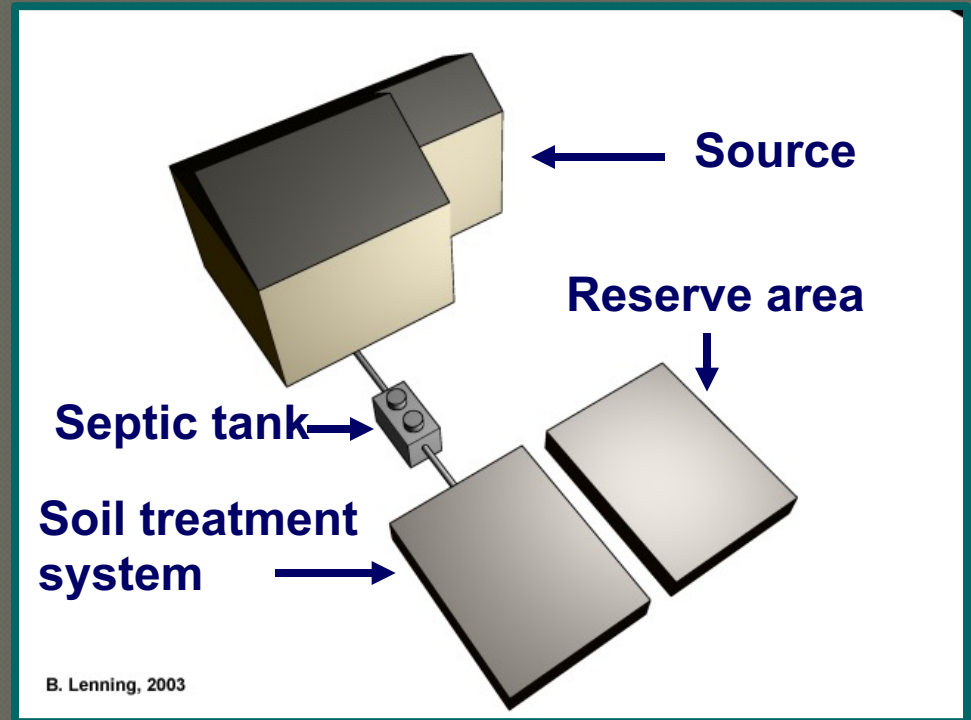
- Wastewater collection

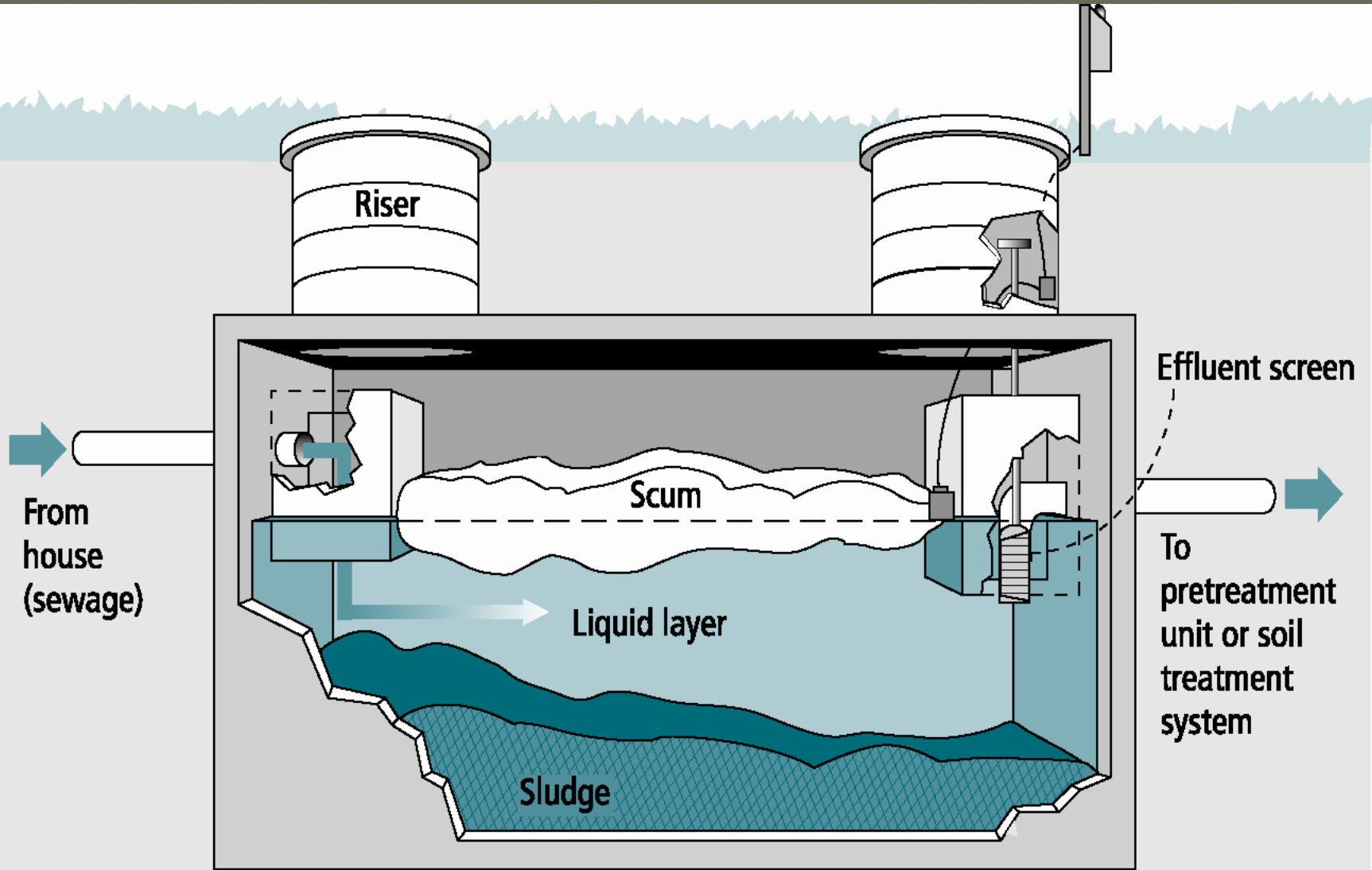
○ **Septic tank:**

- Primary treatment

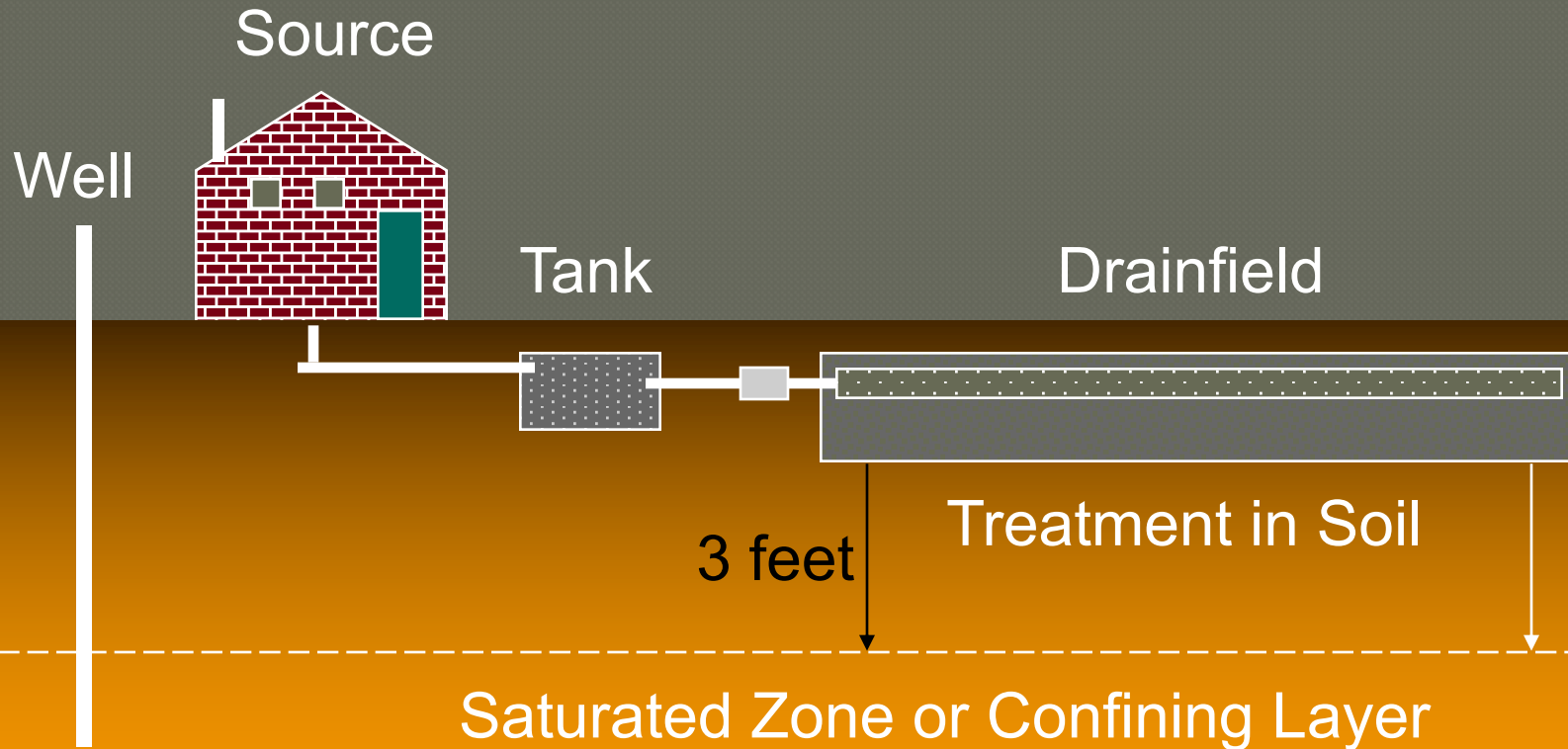
○ **Soil treatment system:**

- Final treatment and dispersal



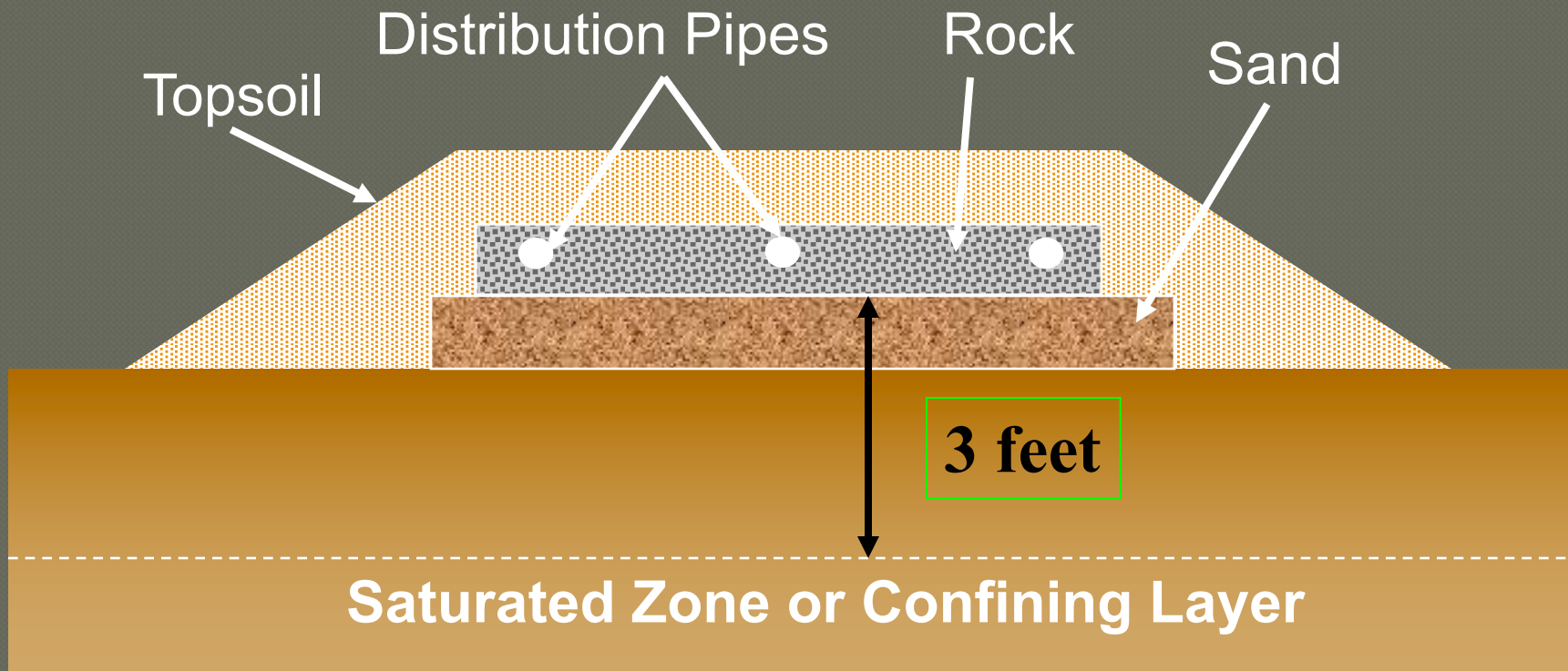


Conventional System Components



Uses soil absorption to dispose of treated water.

Mound Drainfield



Uses soil absorption to dispose of treated water.

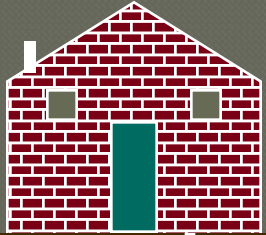
Types of Systems:



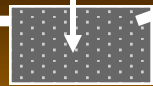
Mound System

Slightly more “advanced”: electricity required

Source



Pump
Tank



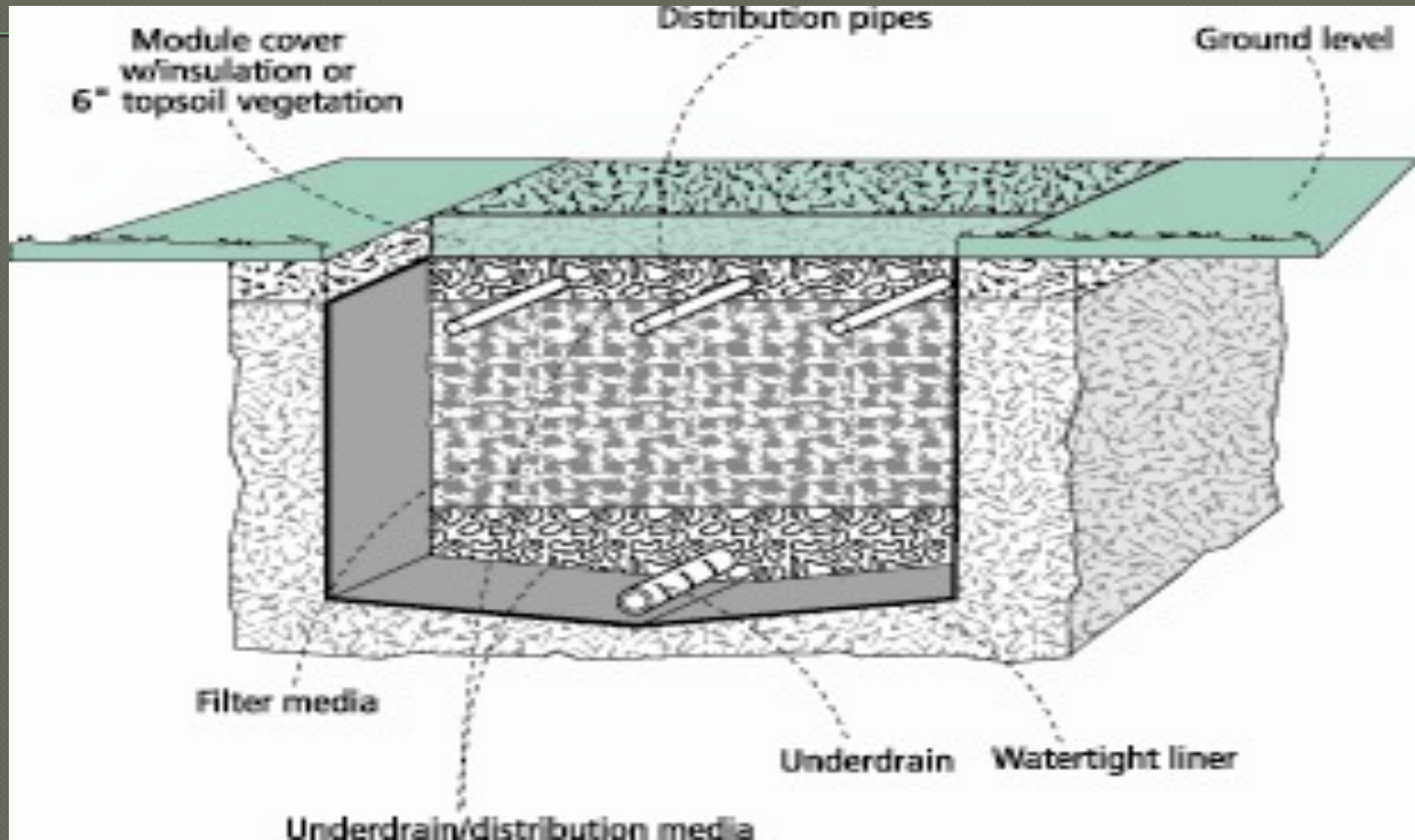
Sand

Septic
Tank



Soil

Typical Sand Filter



- Use clean, coarse sand and washed rock.
- Discharges treated water to surface legally.

Peat Filter



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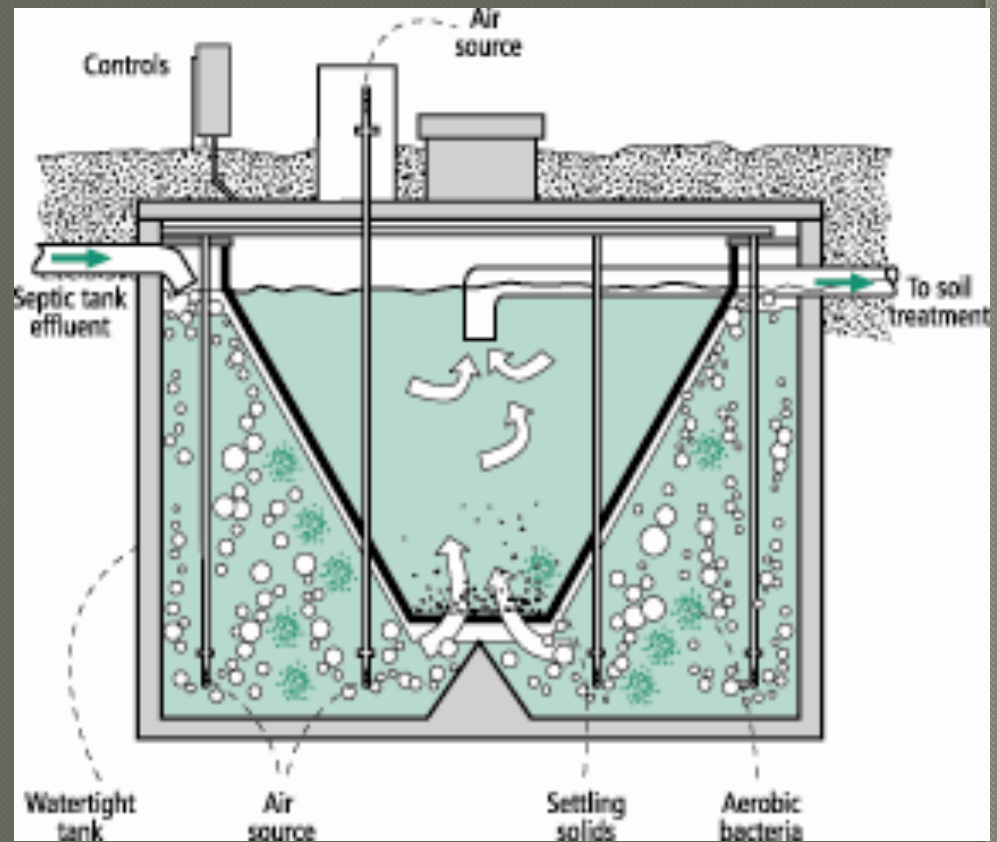
Peat Filter

Textile Filter

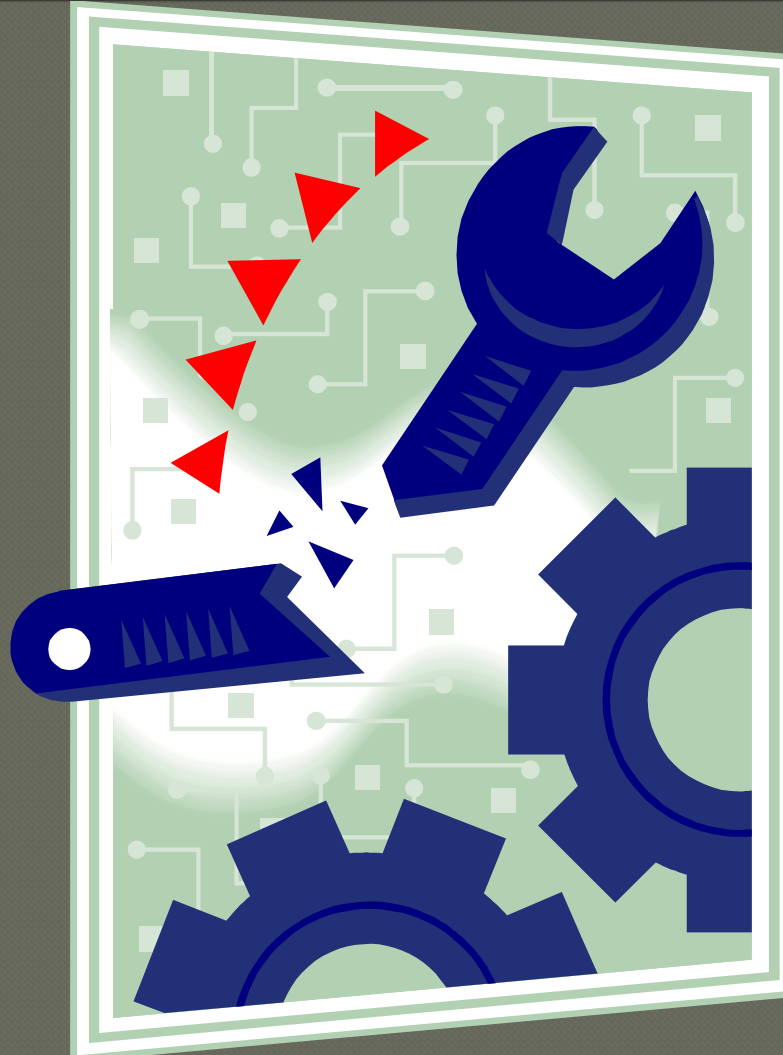


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Aerobic Treatment Unit



Septic System Problems:



What Kind of System is Bad failing)?

- Backup into home
- Leaky tanks
- Untreated water surfacing to ground.
- Inadequate vertical separation to saturated zone or confining layer



System Failure: Leaky Tanks



System Failure: No treatment! An **imminent** health threat!

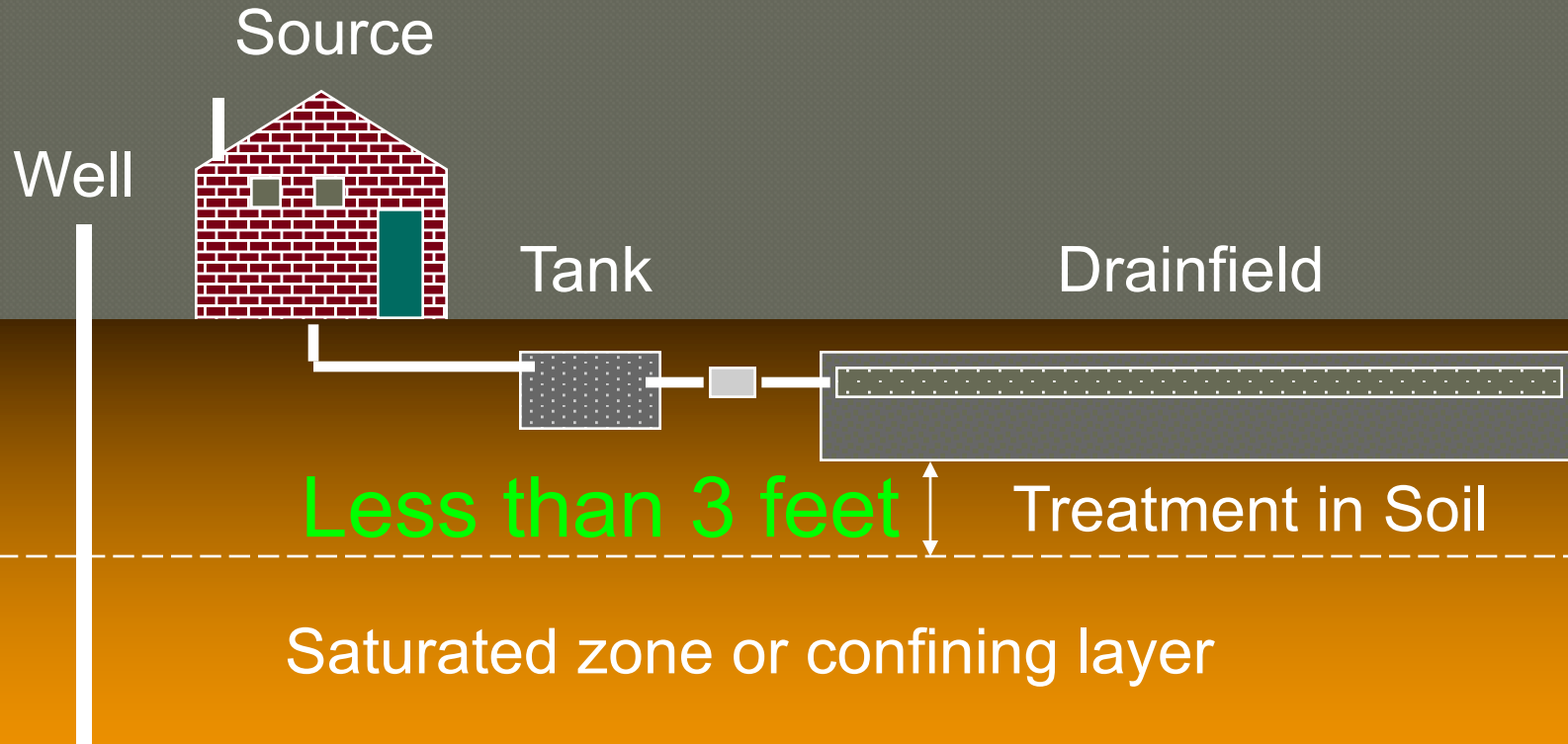


System Failure: Surfacing Systems

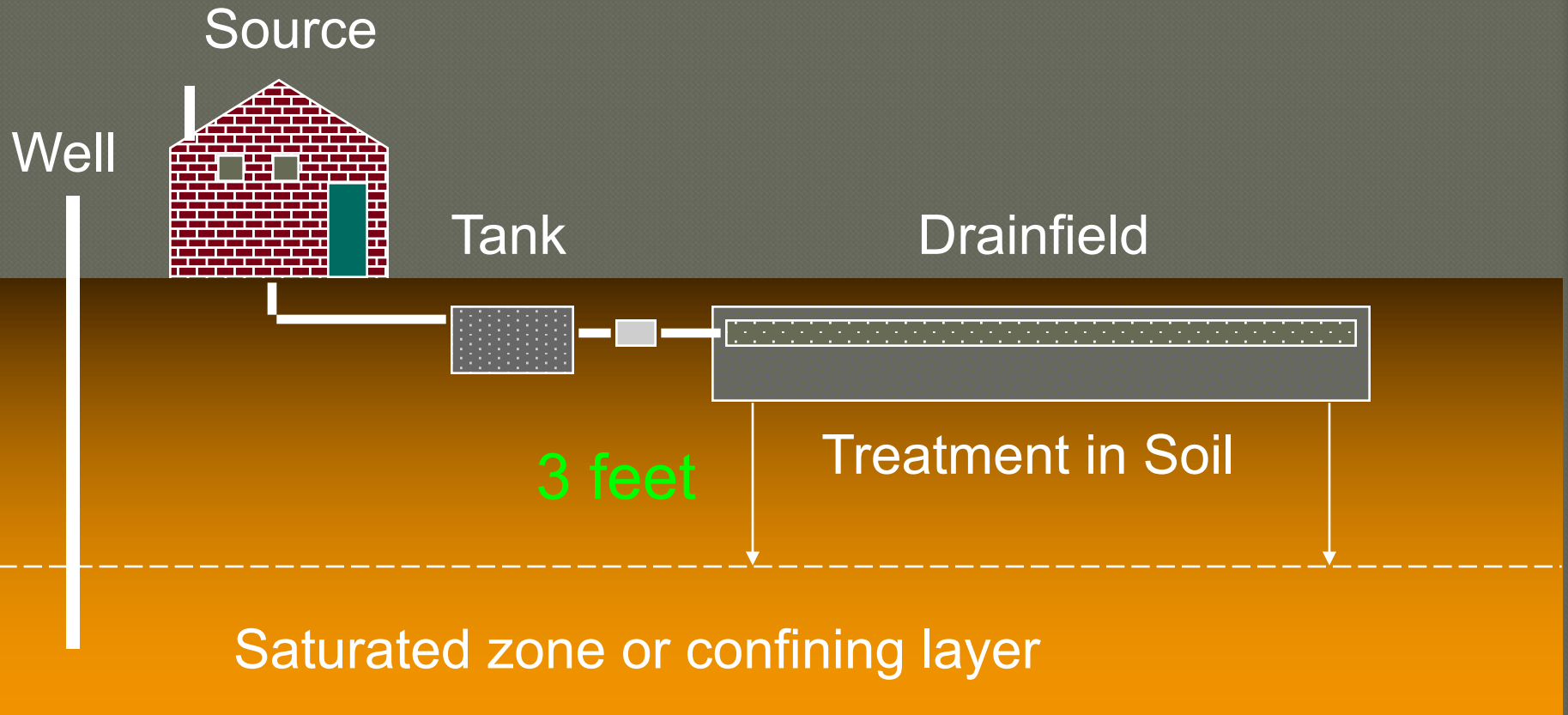


WET SPOT

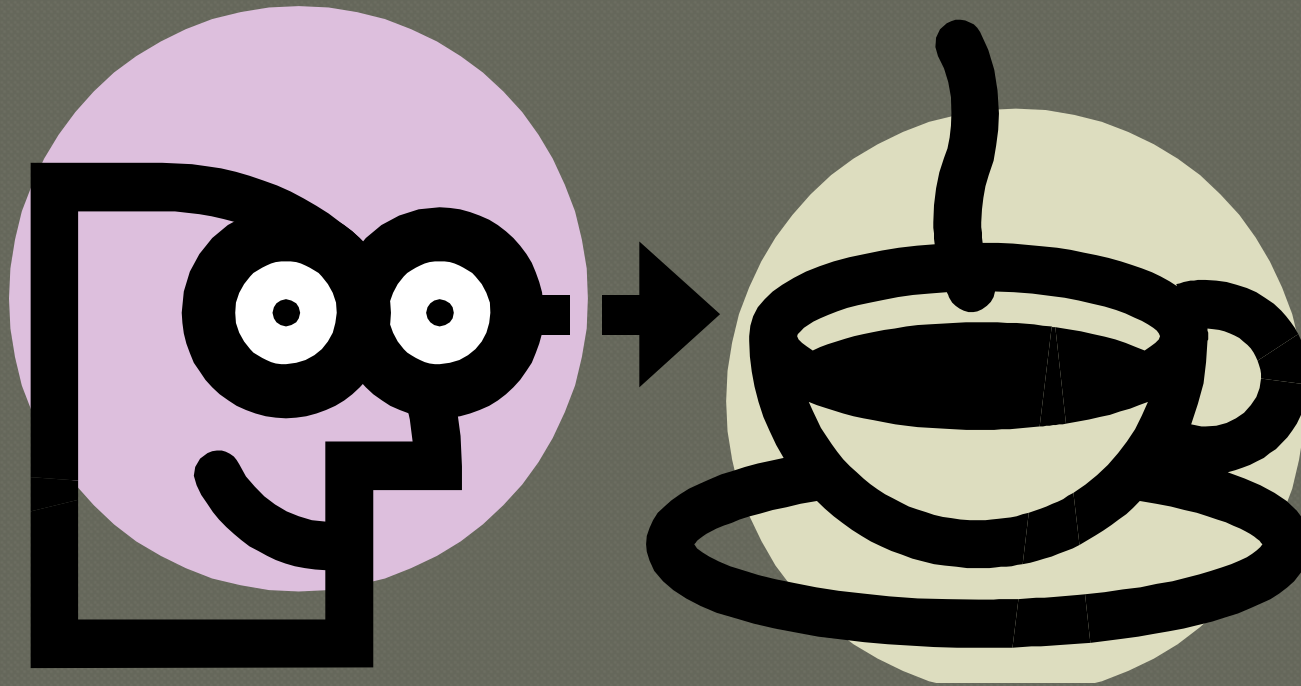
System failure: Inadequate Vertical Separation



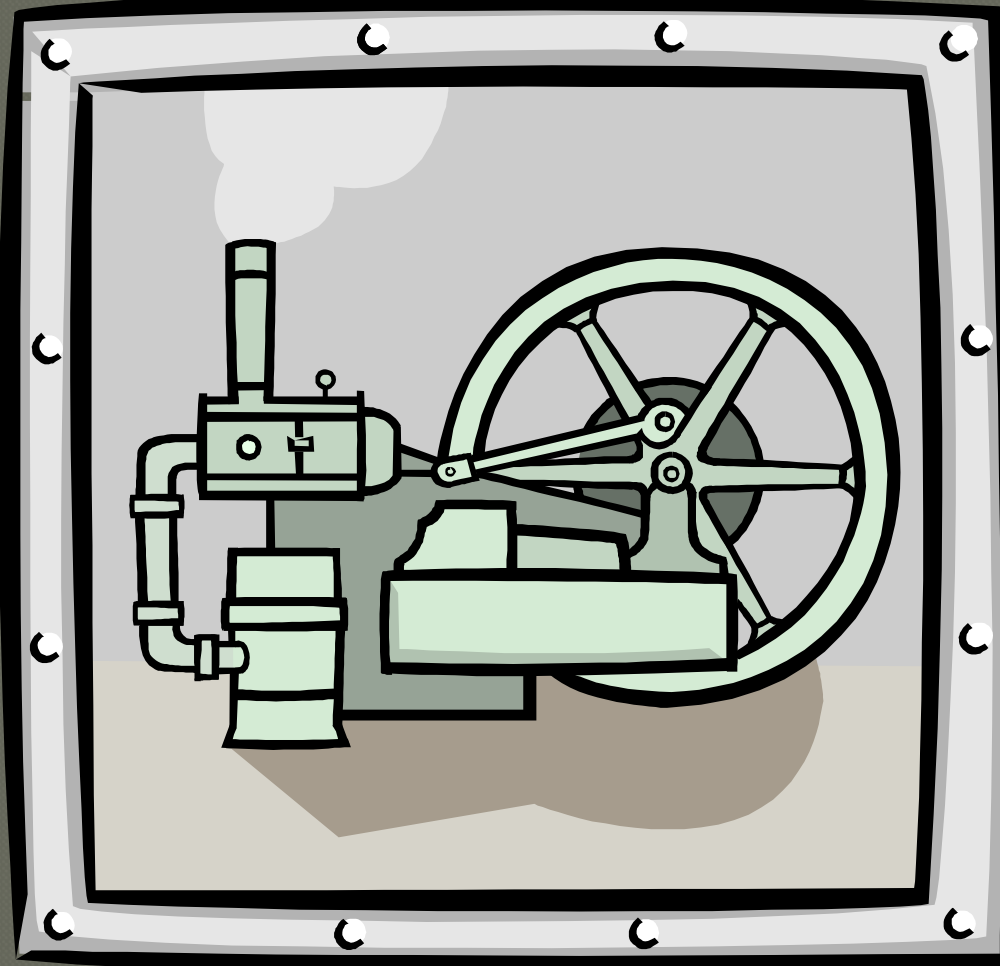
Compliant System Components



BREAKTIME

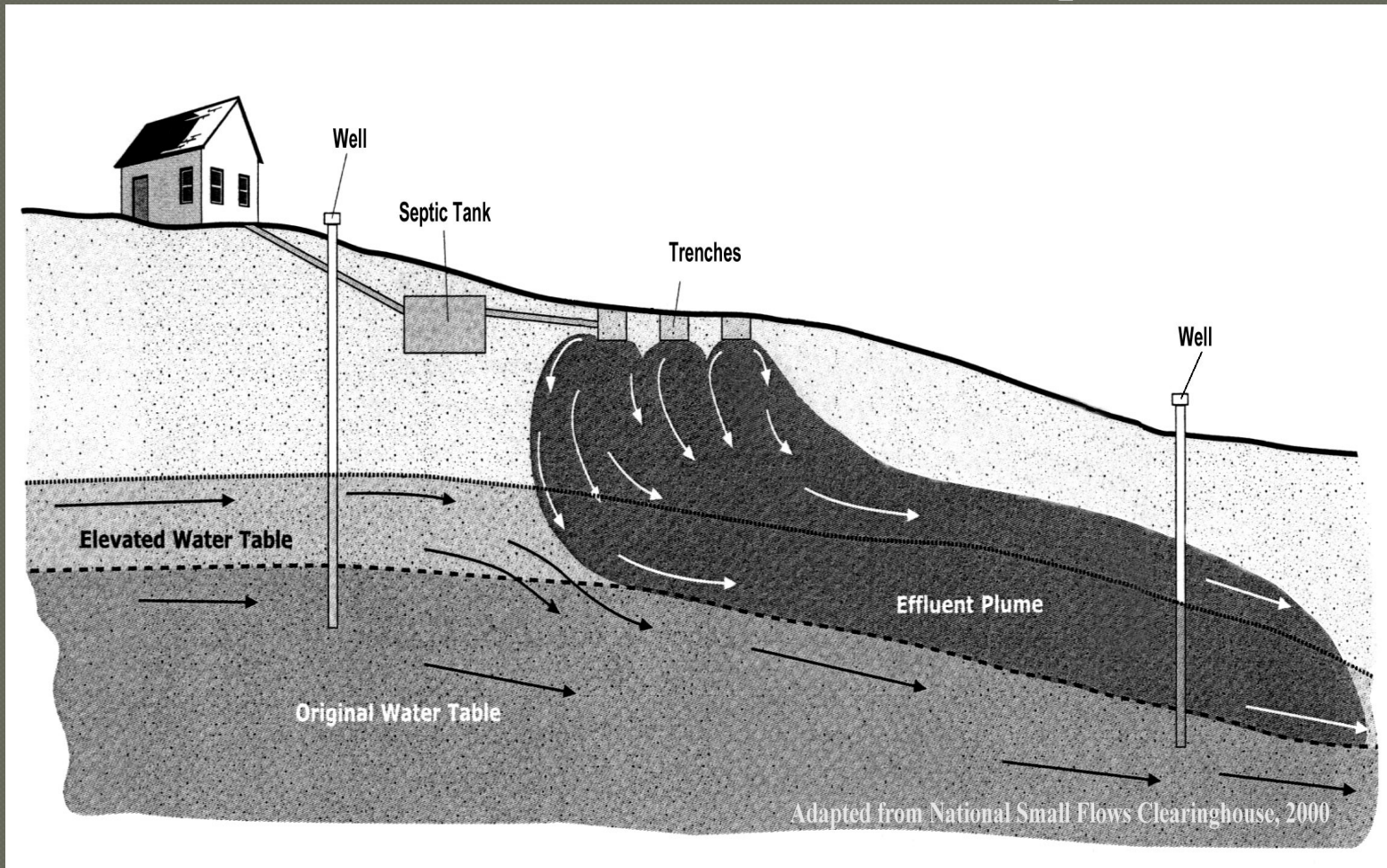


How Do Septic Systems Work?



Where are pathogens treated?

Tank? Soil? How do they die?

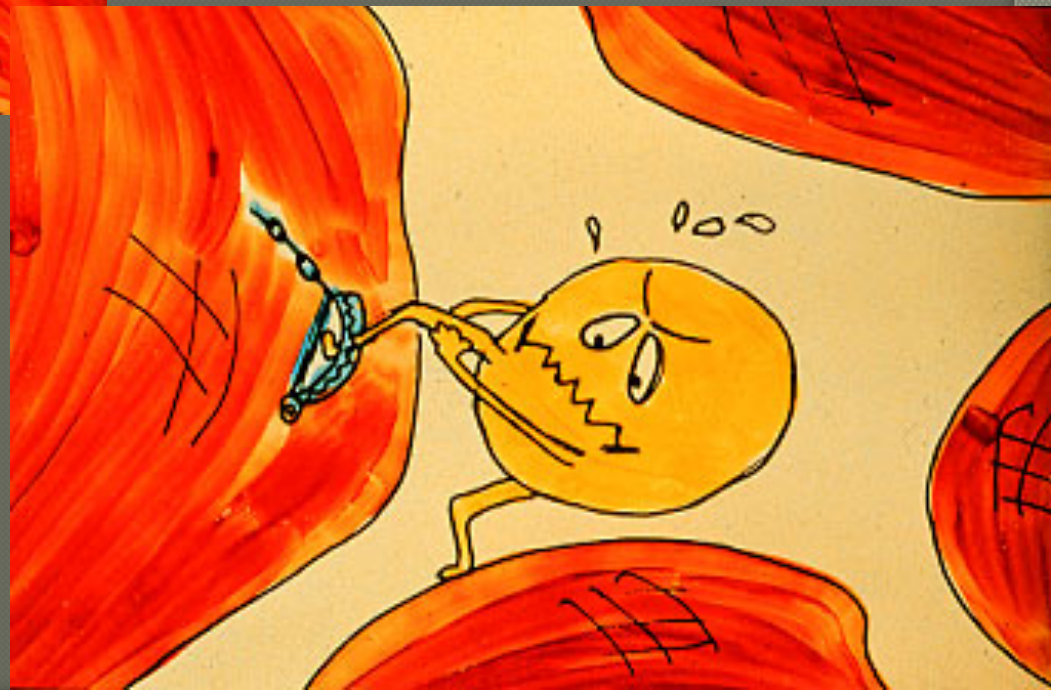


Pathogens - captured by the soil



Soil is Sticky

Electrical charges





Aerobic Soil bacteria snacks!

Held long enough to starve!



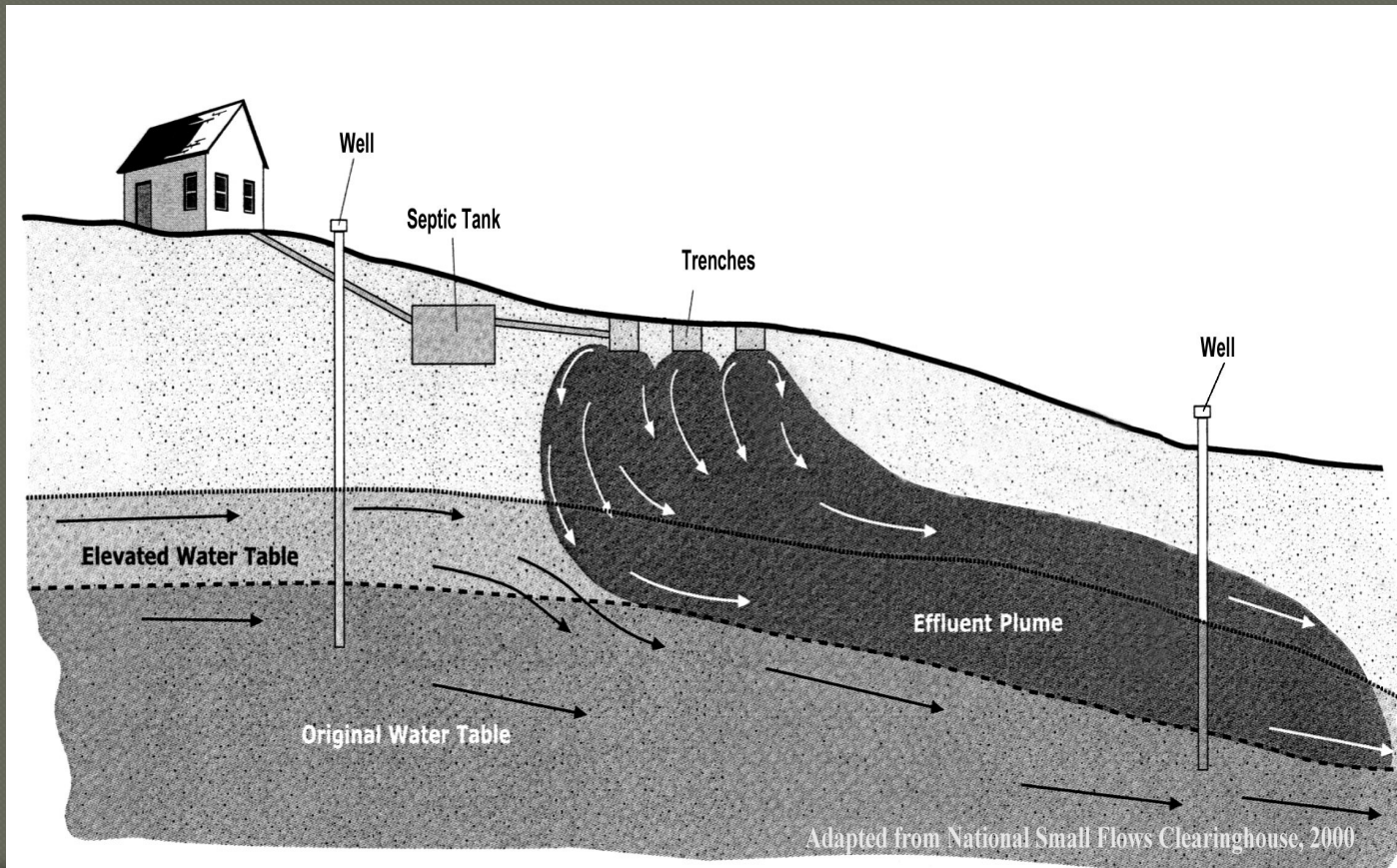
Treatment Performance of Soil: Fecal Coliform Removal

Source: Onsite Sewage Treatment Program Manual

| Component of Sewage: | Raw Sewage | Septic Tank Effluent | One Foot of Soil Treatment | Three Feet of Soil Treatment |
|--|--------------------------|----------------------|----------------------------|------------------------------|
| Fecal Coliform (colonies/100 ml; less than 1/2 cup) | 1 million to 100 million | 1,000 to 1 million | Backgrd. - 100 | Backgrd. |

Where are **nutrients** treated?

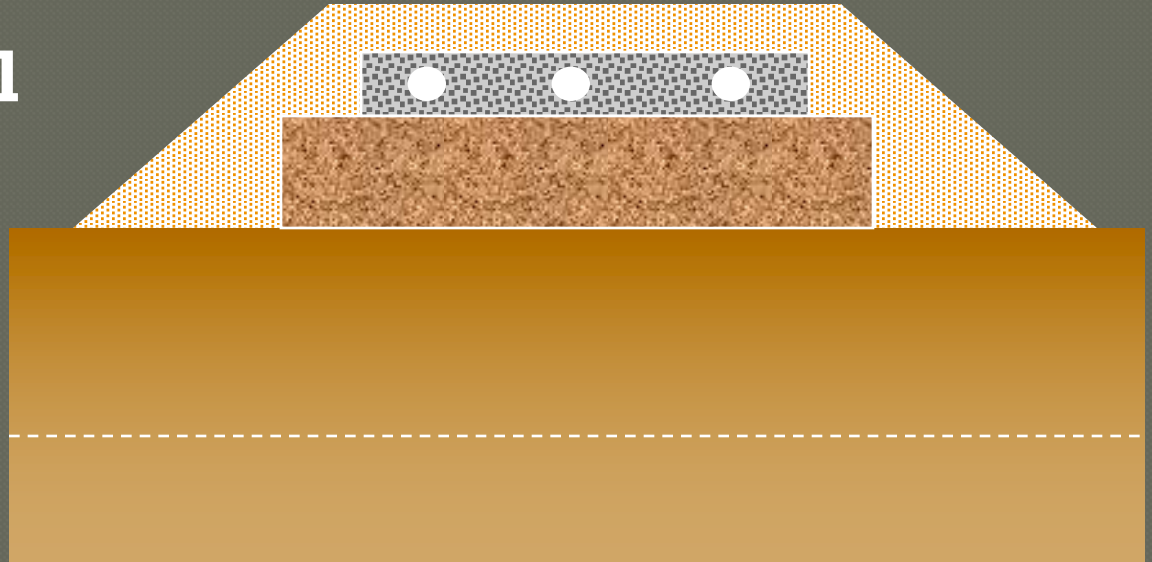
Tank? Soil? What happens to them?



Where are nutrients treated?

○ Phosphorus

- **Soil:**
 - **Attach to soil particles**

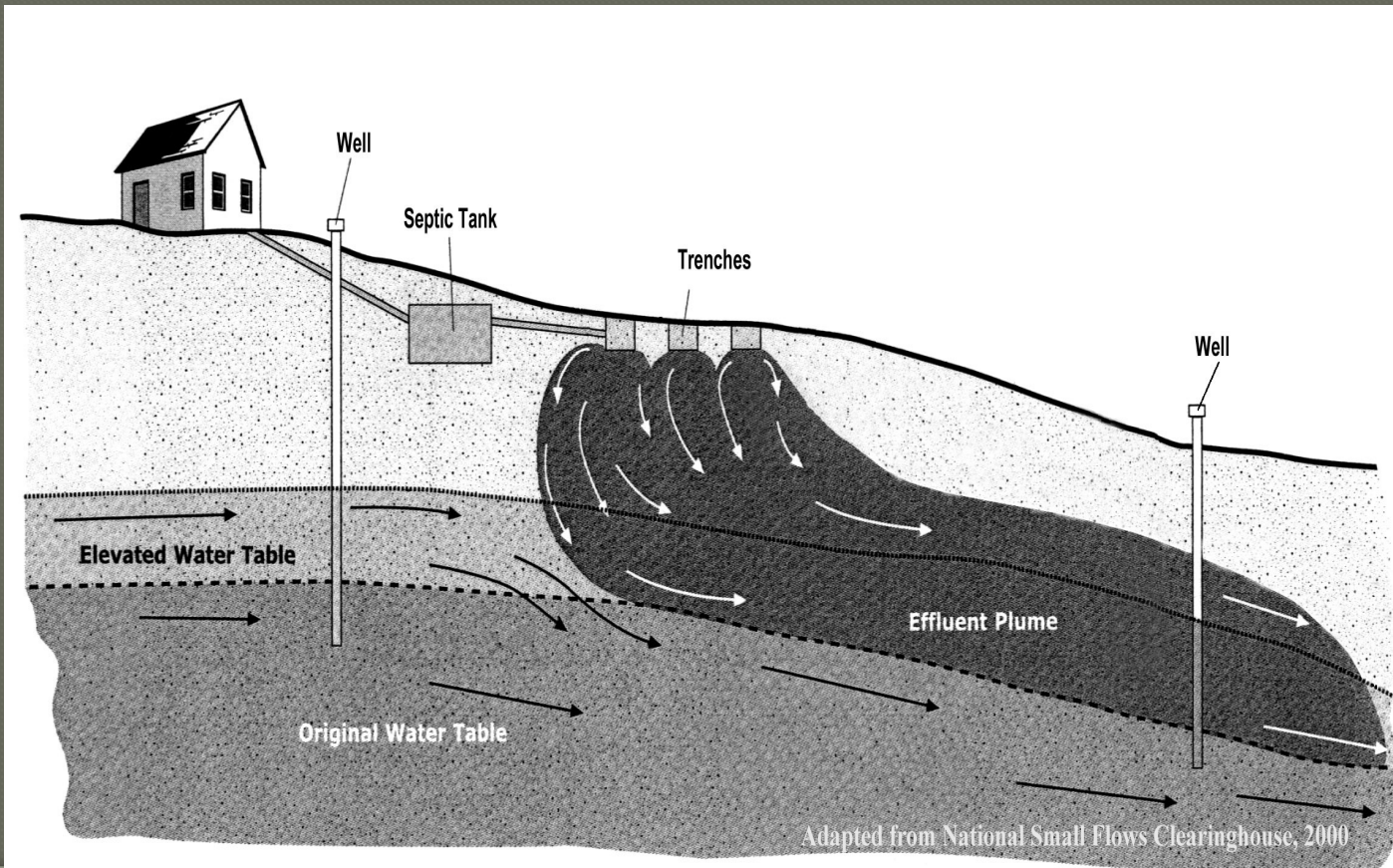


○ Nitrogen

- **Soil:**
 - **Lost to air**
 - **Dilution**
 - **Used by plants**

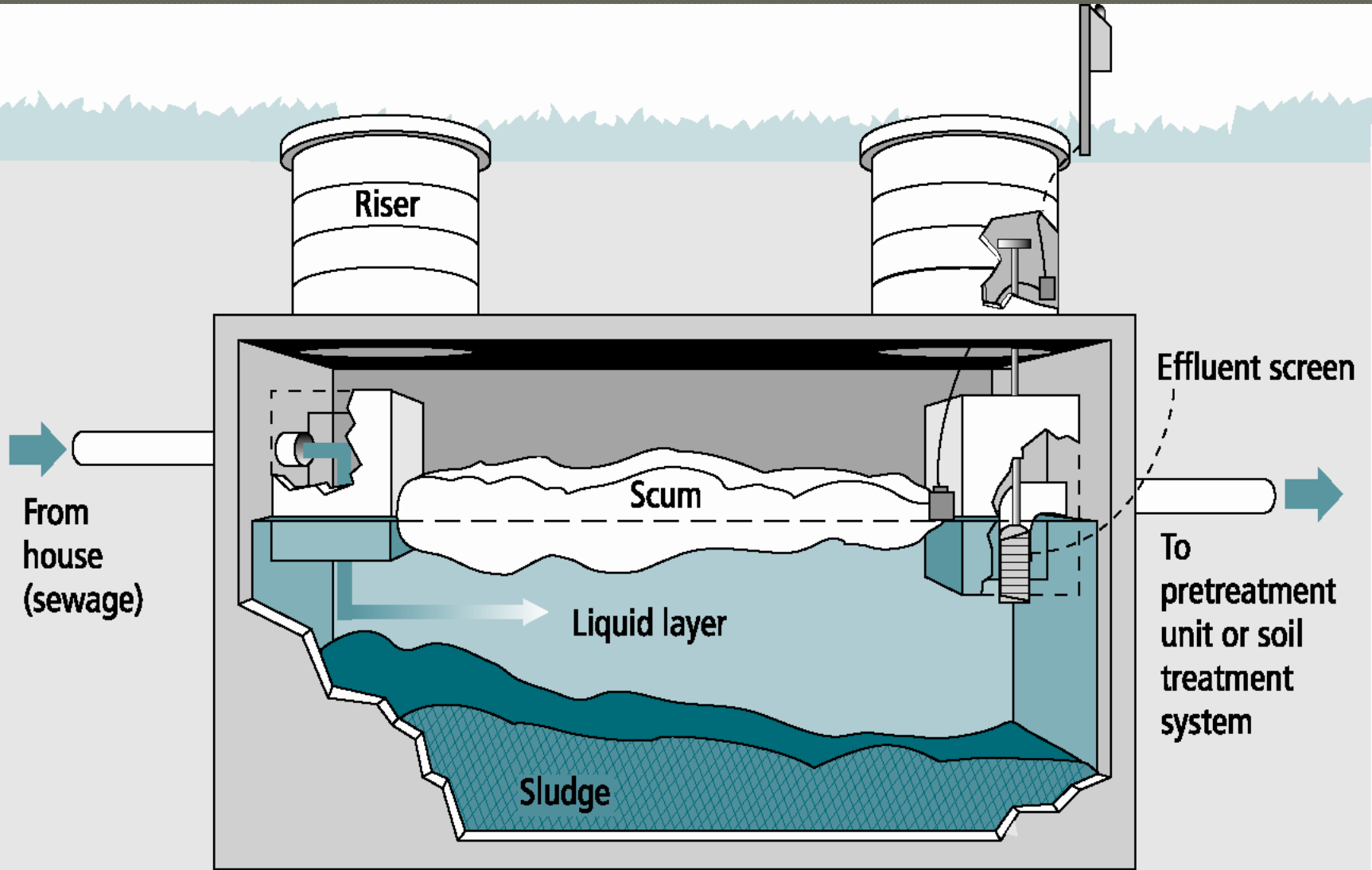
Where are **solids** treated?

Organics and Inorganics
Tank? Soil? What happens to them?



Septic Tank: Primary Treatment

- ◎ **Job of tank: catch the solids**
 - Decompose organic solids
 - Store inorganic solids
- ◎ **Layers in tank**
 - Scum layer: floating soap, grease, toilet paper, etc
 - Liquid layer: water, liquid, and suspended solids
 - Sludge: heavy organic and inorganic materials in the bottom of the tank
- ◎ **Anaerobic bacteria** breakdown organic solids



Where are chemicals, cleaners, & medications treated?

2 issues:

1. Not many are destroyed in tank or soil treatment
2. Can destroy good tank and soil bacteria



Common Causes of Problems

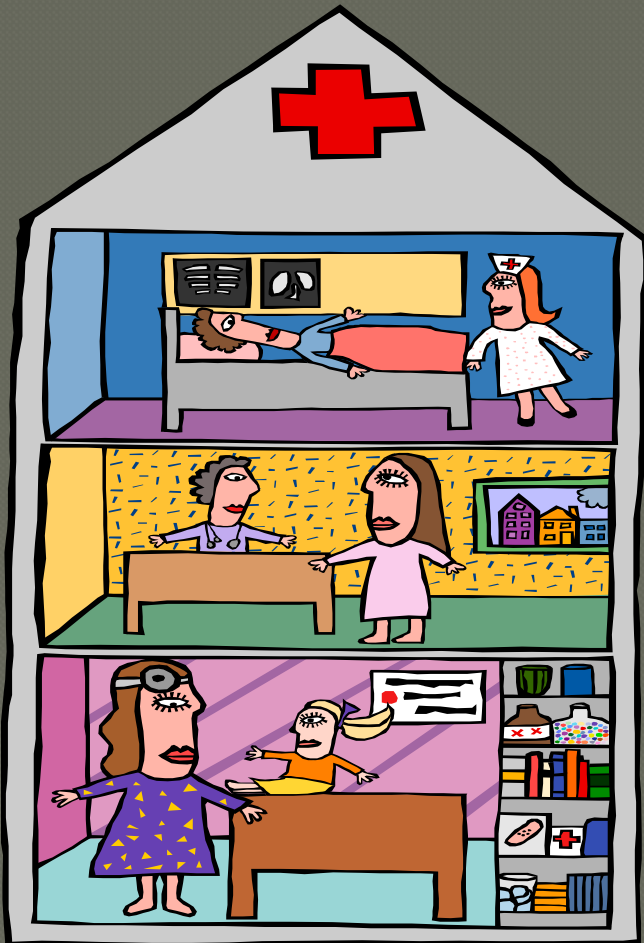


- Overloading the System
 - Water
 - Organics
- Lack of maintenance
- Excessive chemicals
- Wrong choice of system design

Maintenance and Management



Home Management tips



- Minimize water use
- Tank pumping
- Bathrooms
- Kitchen
- Laundry
- Other water using devices
- Soil treatment system
- Freezing
- Landscaping

Where does wastewater come from?

◉ Water use (per cent of total)


- **Bathroom**
 - Toilet = 27%
 - Bathing = 17%
- **Laundry** = 22%
- **Kitchen** = 17%
- **Leaks and other** = 17%



Tank Pumping

- Removes sludge and scum layers
- Must be done by licensed “Commercial Septic Tank Cleaner”
- Only allow cleaning from manholes. Never from inspection pipes



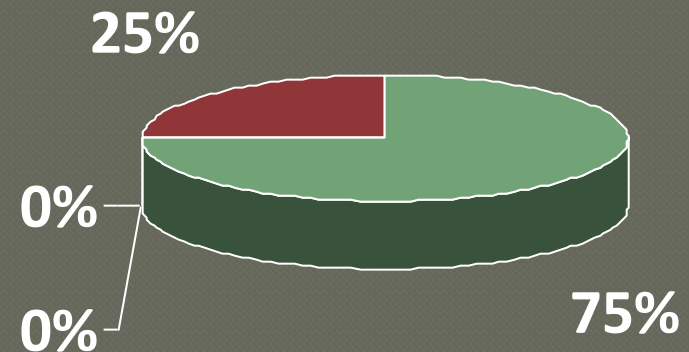
A close-up photograph of the rear of a white truck. The central feature is a large, white cylindrical tank. On the front of the tank, there is a humorous warning message in blue and red text. Below the tank, several thick, green corrugated hoses are bundled together and run across the back of the truck. At the bottom of the frame, a California license plate is visible. The background shows a blurred view of trees and a clear sky.

CAUTION:
Vehicle may be Transporting
Political Promises!

CALIFORNIA
P00 PMPR

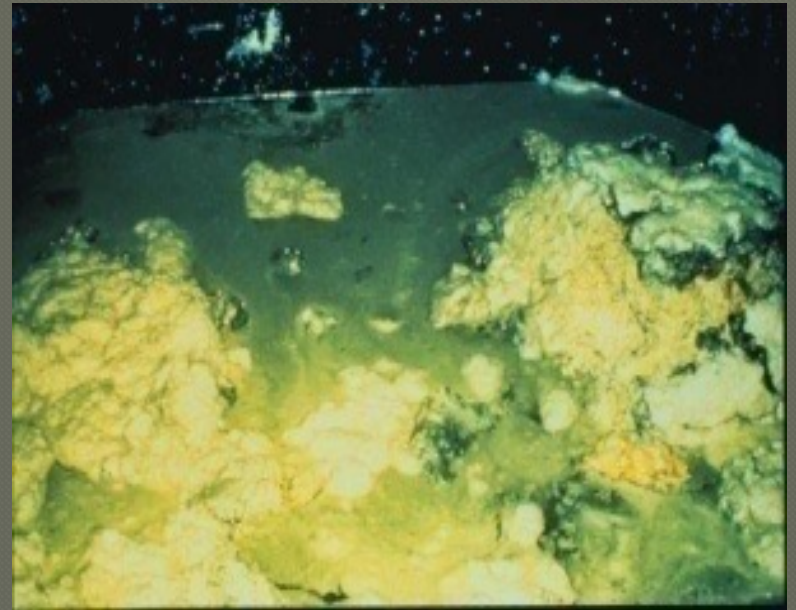
When was your septic tank last pumped out?

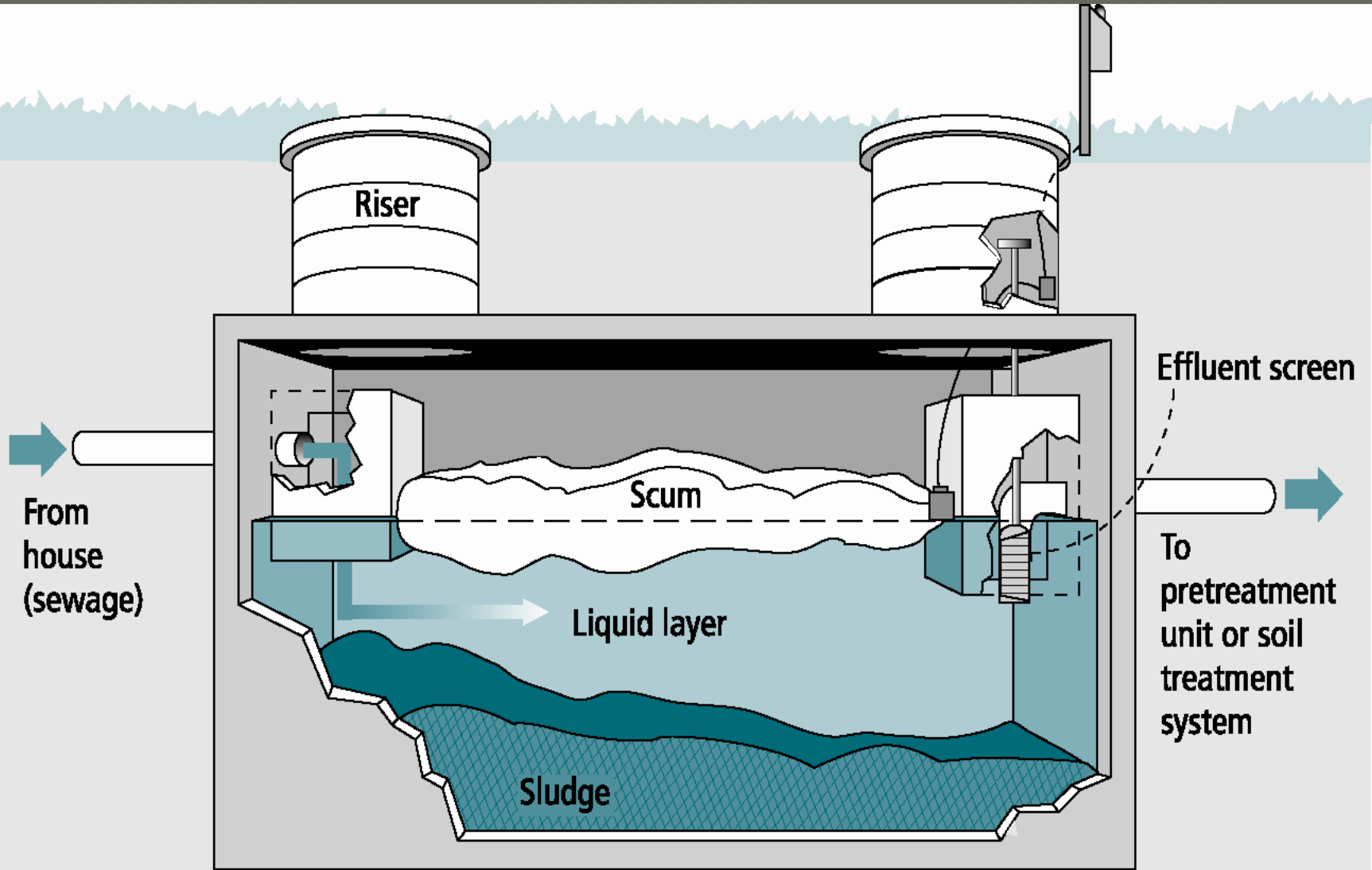
1. 1 to 3 years ago
2. 3 to 7 years ago
3. More than 7 years ago
4. Never



Tank Pumping Continued

- Remove all scum sludge and liquid from the tank
- Flushing and backflushing liquids is required
- Check baffles and structural integrity of tank
- Recommended every 3-5 years





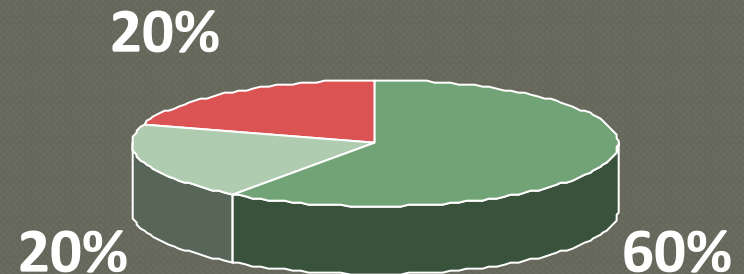
How Often?

- As needed – scum or sludge build up (+1/3)
- Impacted by water & product use
- Rule of Thumb
 - Every 3 to 5 years – (See “Get Pumped” handout)
 - New home or remodel: 1st 3 months – finishing materials are toxic
 - New owners – start on maintenance program



Do you use Additives in your septic system?

1. Yes – (store bought)
2. Yes (home remedy)
3. No – they could be harmful!



Additives: *Not needed!!*



- **Starters** - Bacteria are abundant in existing wastewater
- **Feeders** – Wastewater contains a lot of food for bacteria
- **Cleaners** – Unnecessary and potentially hazardous

***Never* add these products to your system! They can actually damage your soil treatment system. - (SEE EPA HANDOUT)**

How to Hire a Pumper

- ◉ Word of mouth - referrals
- ◉ List of licensed pumpers from IDNR
- ◉ Response to interview questions over the phone. Do you:
 - Pump through the manhole?
 - Backflush?
 - Recommend additives?
 - How much will it cost?



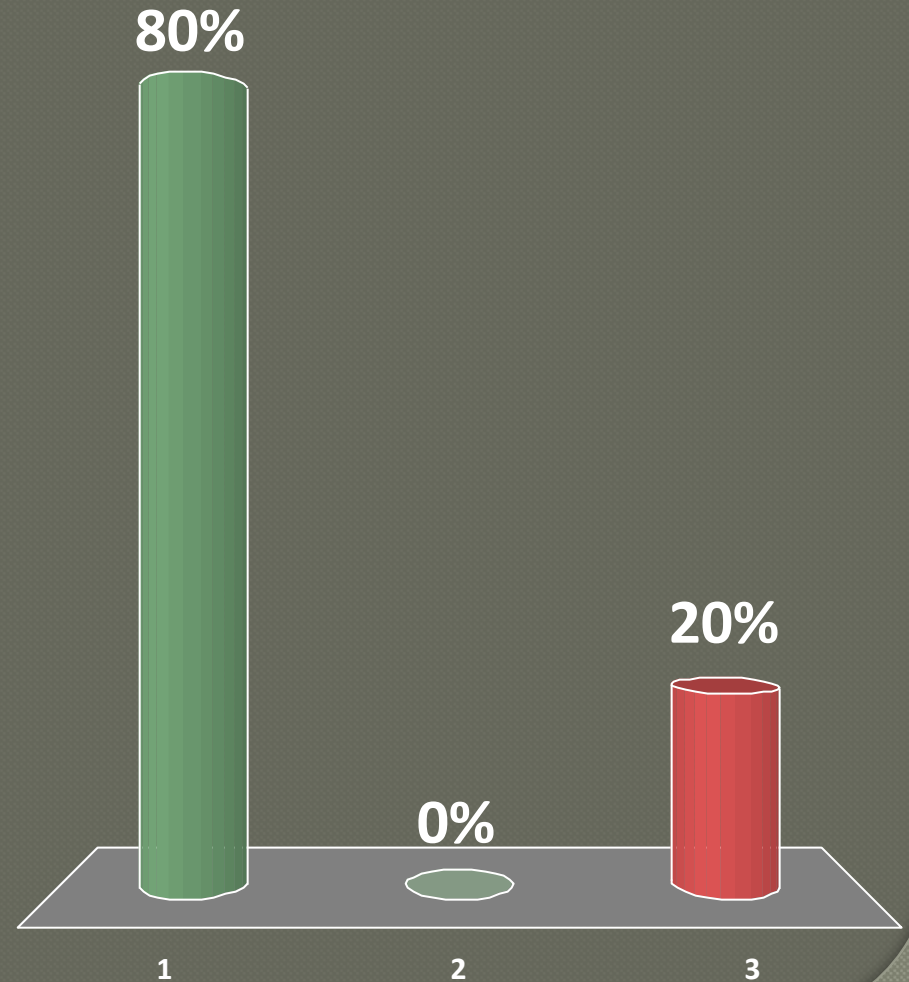
Screens and Filters?

- Effluent filter on tanks:
 - Prevents suspended solids from leaving the tank
 - Requires maintenance**
- Washing machine lint filters:
 - prevent lint from entering system

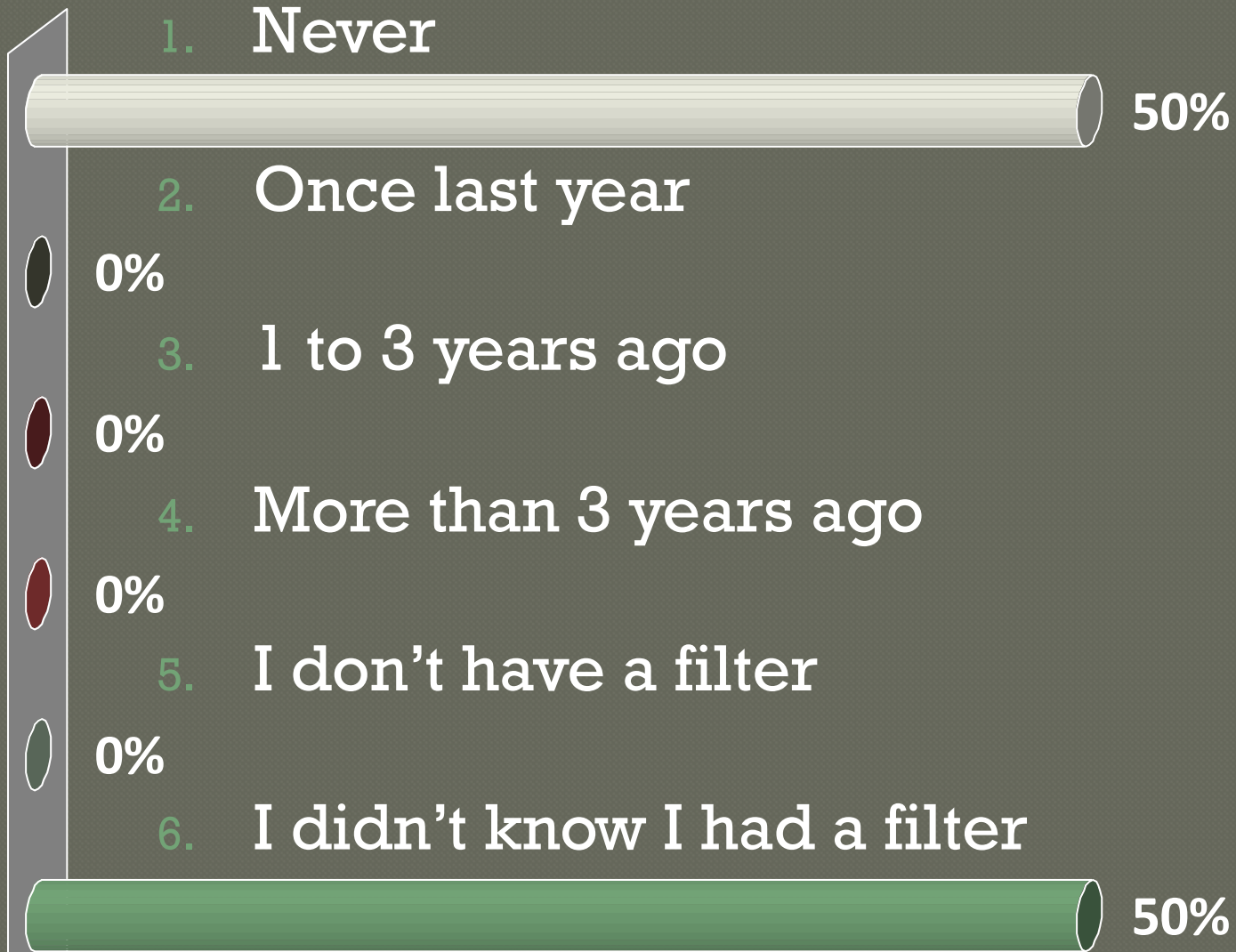


Do you have a filter on your septic system?

1. Yes
2. No
3. Don't Know



I last cleaned my filter:



Toilet Issues

- Low flow – High quality
- Leaking problems
 - Gaskets & “running”
- Toilet paper – any is fine
- No other products
 - Tissue, napkins, butts (cigarettes), hair, cotton balls
- Cleaners
 - NOT Automatic – Tidy Bowl man
 - Small amount with “elbow grease”



○ Leaks

○ Low flow

○ Cleaners

- Shower-clean type hard on system – introduce cleaners everyday.

○ Anti-bacterial soaps

○ Shaving, bath oils hard on system



Bathing

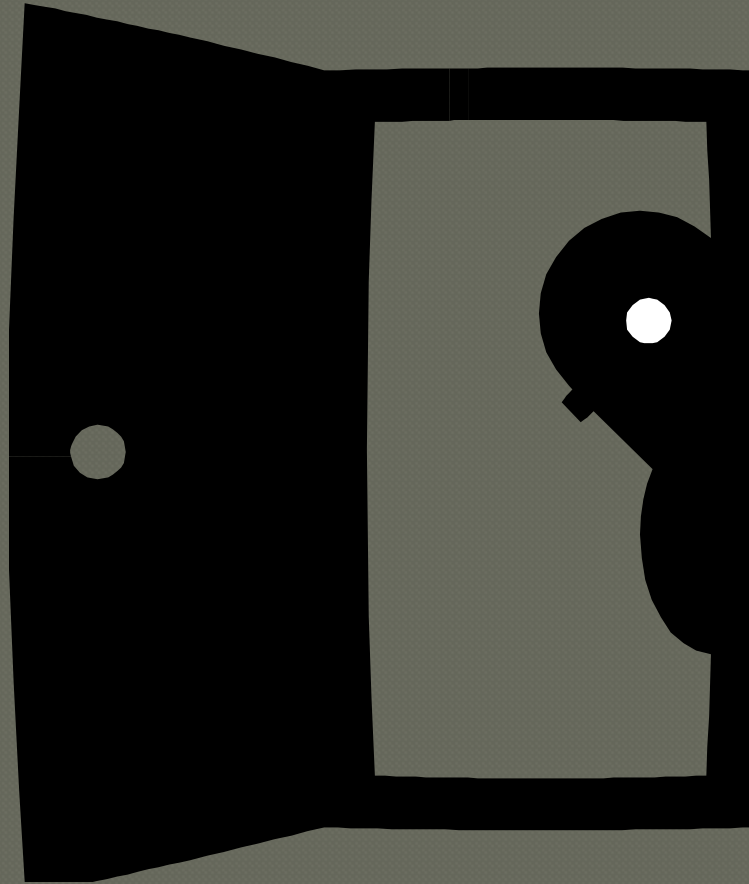


Schedule Laundry

- Spread out loads –
 - Think even
 - throughout week
 - throughout day
- Use low water level setting for small loads
- Keep lint out of system



What About...?



Soaps

○ Powdered – Not recommended

- Inorganic fillers
- Fine particles
- Clay as filler

○ Recommend Liquid

- Filler - water
- Only amount needed

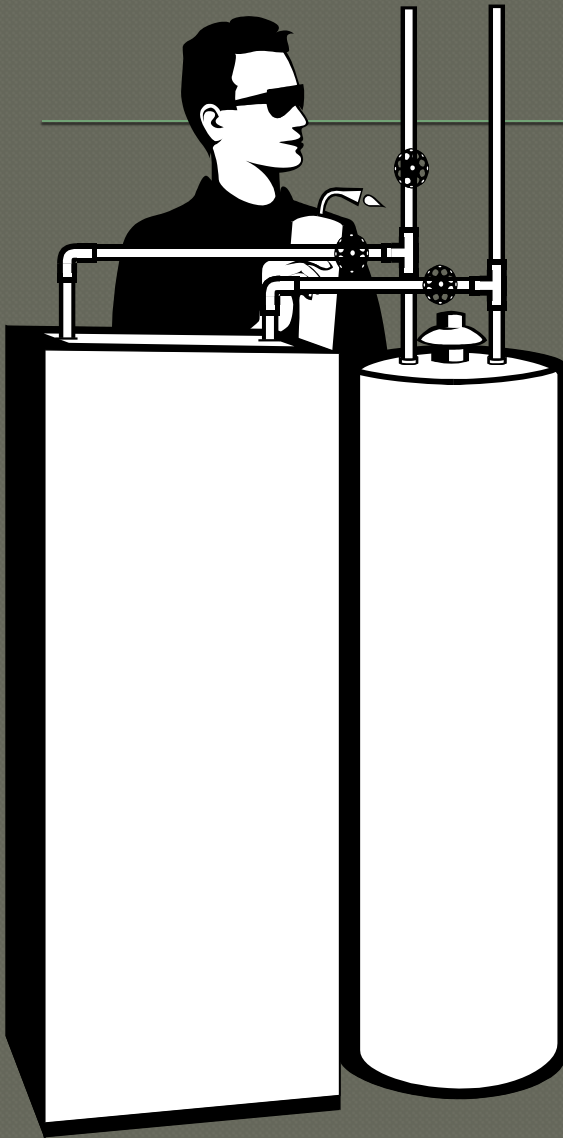
○ Detergents w/ bleach

- Bleach – limit to ‘as needed’

○ Limit use of liquid fabric softeners



Water softener recharge water



- 2 Opposing opinions
- Research not yet conclusive
- Principle: minimize water use – volume vs timed recharge

Other Sources of Water That Can Overload a System (and don't need treatment)

- ◉ Sump pump/tile line discharge
- ◉ Lead or other water filters
- ◉ Dehumidifier discharge
- ◉ High efficiency furnace discharge
- ◉ Rain Gutter runoff
- ◉ Dripping faucets/"running toilets"
- ◉ Any other sources?

Odors

Outside:

- Pump tank– solves most
- Still? Raise vent stack
- Charcoal filter on stack

Inside:

- Plumbing problem
- May be frozen vent or dry trap



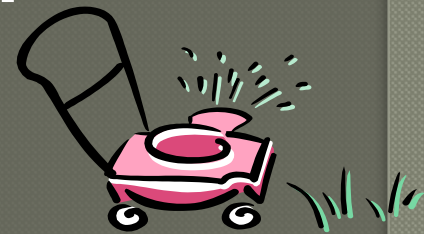


Continual traffic is a problem

MAY 9 2001

Soil Treatment System Maintenance

- Compaction is **BAD** – keep traffic off system
- Establish vegetative cover –
 - Grass, mow regularly, no fertilizer, no deep rooted plants near system. Watch for gophers!
- Inspection pipes can be cut to ground level after finished grade is established



Soil Treatment System Maintenance

- **Replace** cracked or missing inspection pipe caps
- **Channel** rain and snow melt runoff away from drainfield
- **Inspect** regularly for changes









Freezing of Septic Systems

Causes of Freezing – lack of cover, compaction, irregular system use, leaking plumbing, cold air into system, poor drainage

Remedies – figure out why and where; fix the problem (or use tank as a holding tank)

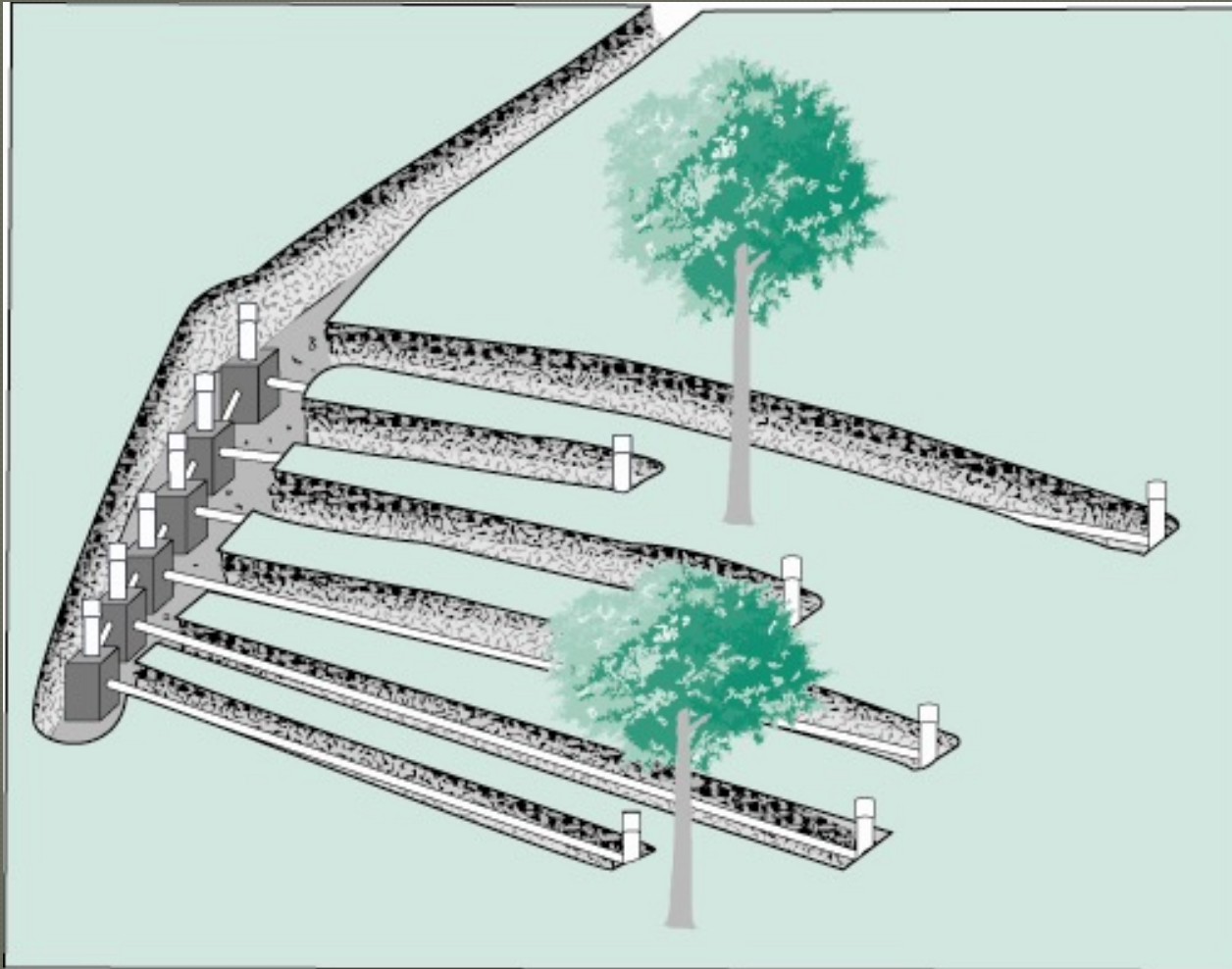
Prevention – Let your grass grow, mulch (or styrofoam), fix leaks



Landscaping



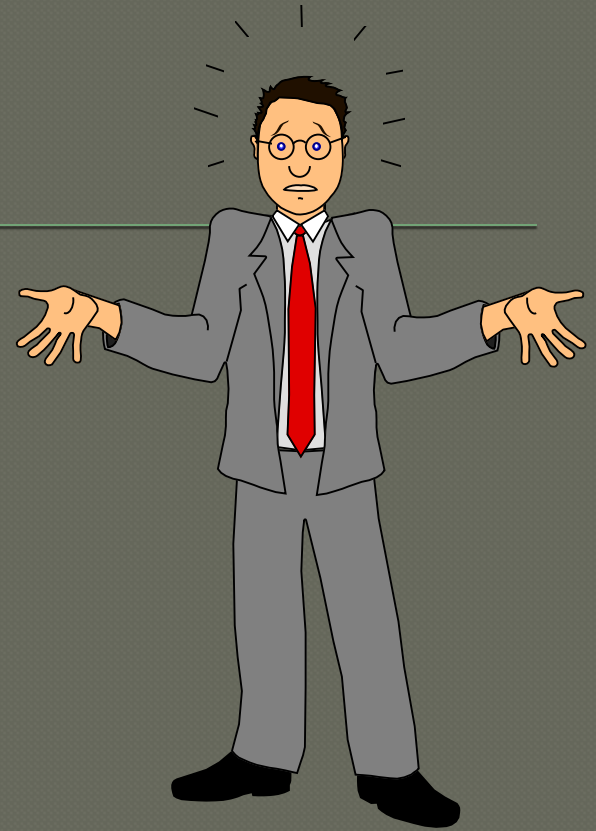
Installation Flexibility







Questions?



Evaluation



Location Convenience

| | | |
|----|-----------|-----|
| 1. | Very Poor | 0% |
| 2. | Poor | 0% |
| 3. | Fair | 0% |
| 4. | Good | 40% |
| 5. | Very Good | 40% |
| 6. | Excellent | 20% |

Presentation Information

| | | |
|----|-----------|-----|
| 1. | Very Poor | 0% |
| 2. | Poor | 0% |
| 3. | Fair | 0% |
| 4. | Good | 0% |
| 5. | Very Good | 80% |
| 6. | Excellent | 20% |

The Speaker

| | | |
|----|-----------|-----|
| 1. | Very Poor | 0% |
| 2. | Poor | 0% |
| 3. | Fair | 0% |
| 4. | Good | 0% |
| 5. | Very Good | 60% |
| 6. | Excellent | 40% |

I learned:

- | | | |
|----|----------------------------|-----|
| 1. | Nothing. | 0% |
| 2. | A few bits of information. | 0% |
| 3. | A little. | 0% |
| 4. | Quite a bit. | 80% |
| 5. | A lot. | 20% |
| 6. | I'm overwhelmed. | 0% |

I will come to other presentations?

- | | | |
|----|-------------------------------|-----|
| 1. | No Never | 0% |
| 2. | Maybe, depending on topic. | 60% |
| 3. | Yes, I like these seminars. | 40% |
| 4. | For Sure – wouldn't miss one. | 0% |

Seminar - Overall Rating

| | | |
|----|-----------|-----|
| 1. | Very Poor | 0% |
| 2. | Poor | 0% |
| 3. | Fair | 0% |
| 4. | Good | 20% |
| 5. | Very Good | 60% |
| 6. | Excellent | 20% |

Remember - there is a pot of gold at the end
of every rainbow!



THANK YOU!

Please return the response card
before leaving.



For Future Questions:

- Call Mike Salati -515-433-0506 (office)
- Check our website – www.co.boone.ia.us

