Water Purification

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Your own sustainable water supply

Overview

1) Who is Watertiger?
2) Contaminant Classifications
3) Treatment Technology Examples
4) Keeping your water fresh
5) Conclusion – what should I remember?
6) Q & A

Contaminant Classifications

- Primary concern = HEALTH
  - Bacteria, viruses, cysts, chemicals, metals, etc.
  - Health Canada Limits for drinking water:
    - Total Coliforms at   < 1   CFU/100ml
    - E. Coli (FC) at   < 1   CFU/100ml
    - HPC or background count   < 200   CFU/100ml
- Secondary concern = AESTHETIC
  - Taste, Odour, Colour, staining, turbidity, etc.
  - Health Canada publishes recommended Limits

What's in *your* water?
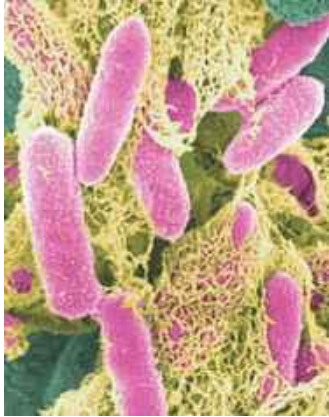
E. Coli?

Metals?

Moss, Leaves, Branches, Tannins?

Chemicals?

Pollutants?

Giardia (Beaver Fever)?

WATERTIGER™

Your total water solution

What's in *your* water?

- Common well water variables include:
  - Iron/Manganese/H_2S
    - Staining of plumbing, laundry, etc.
    - Hemochromatosis (excess buildup of Iron in organs)
  - Hardness
    - Scale formation on fixtures, reduced appliance efficiency, increased soap and detergent usage
  - Dissolved Metals/Elements (e.g. Arsenic, Aluminum, Fluoride etc.)
    - Health concerns: neurological disorders, skin disorders, Organ failure, etc.
  - Bacteria (Total coliforms, Faecal coliforms, etc.)
    - Health concerns, Gastrointestinal illness
 - Many more!

What's in *your* water?

- Common surface water (or shallow well) variables include:
  - Bacteria, parasites, cysts
    - Health concerns, Gastrointestinal illness
  - Tannins, Algae and Organics
    - Staining of fixtures and appliances
    - Interference of disinfection equipment
  - Iron/Manganese/H_2S
    - Staining of plumbing, laundry, etc.
    - Hemochromatosis
  - Many more!

What's in *your* water?
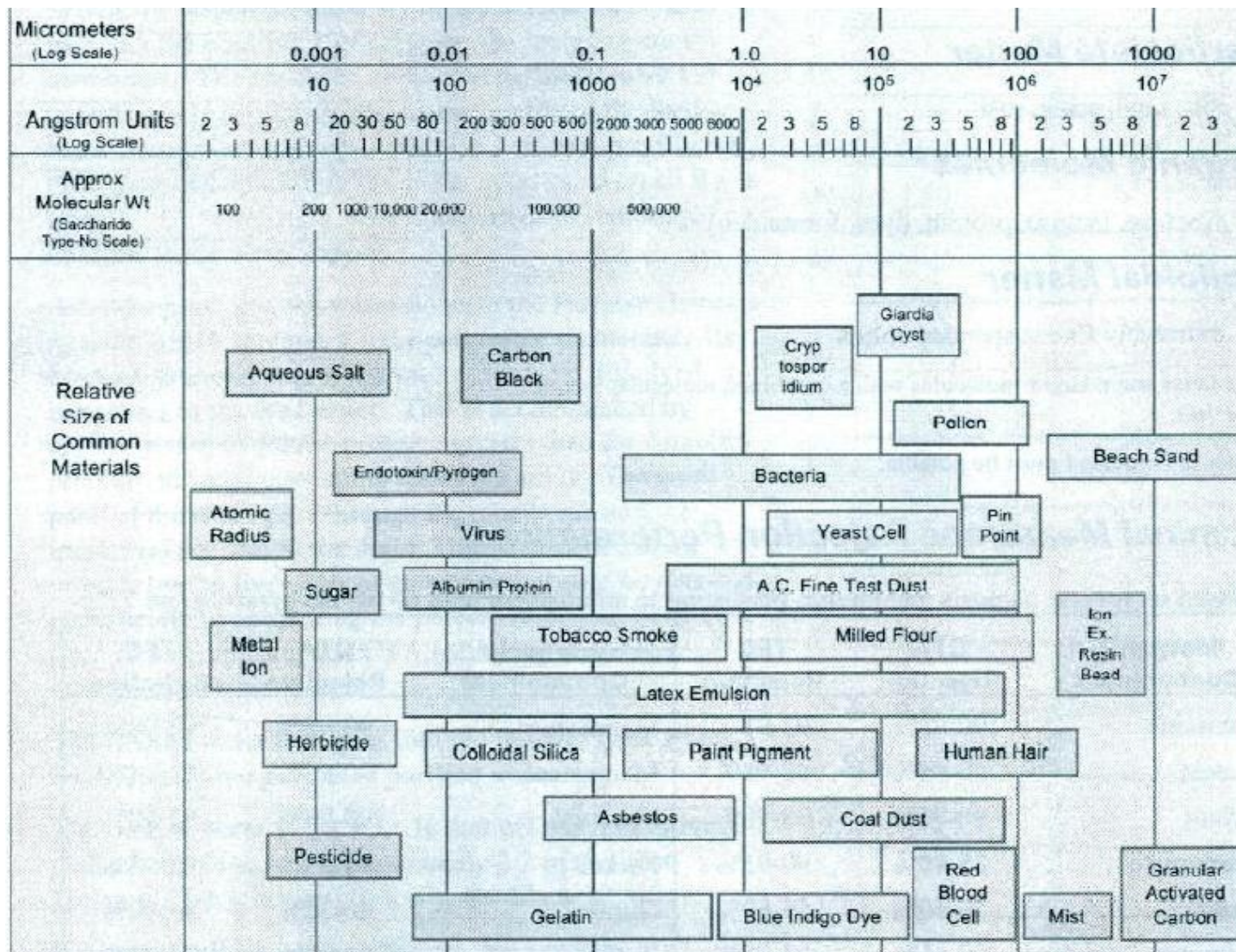
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Common Technology

Just a few examples:
- Ultraviolet Disinfection(UV)
- Ultrafiltration
- Greensand
- Biofiltration (Slow Sand Filters)

Ultraviolet Disinfection

UV Disinfection…

– Is effective against bacteria, viruses, parasites, cysts

– Requires no chemicals, does not change palatability of drinking water

– Lowest $$ disinfection technology

– Immediate action – no additional contact time needed

– Compatible with all other forms of water treatment

– Can alleviate the need for a boil-water advisory
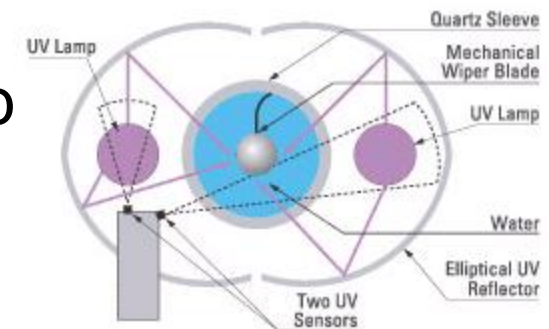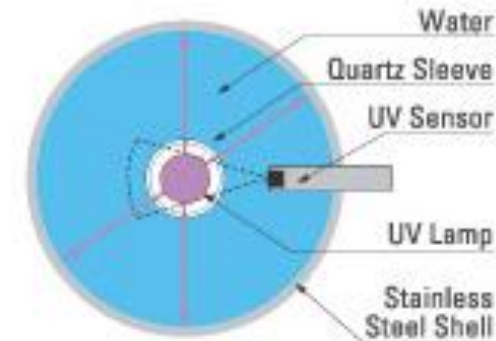
Ultraviolet Disinfection How does it work?

- Water passes through a stainless steel chamber or quartz "sleeve"

- UV light penetrates the DNA of microbes in the water and alters it in such a way that it cannot reproduce – effectively killing it

- The water must be clear enough (i.e. high enough UVT) to allow the UV light to penetrate

- A five micron prefilter is required to remove any particles large enough to "shade" the microbes from the UV light (minimum pretreatment)

- NSF 55 Class A certified units for public water systems

Water
Quartz Sleeve
UV Sensor
UV Lamp
Stainless Steel Shell

Quartz Sleeve
Mechanical Wiper Blade
UV Lamp
UV Lamp
Water
Elliptical UV Reflector
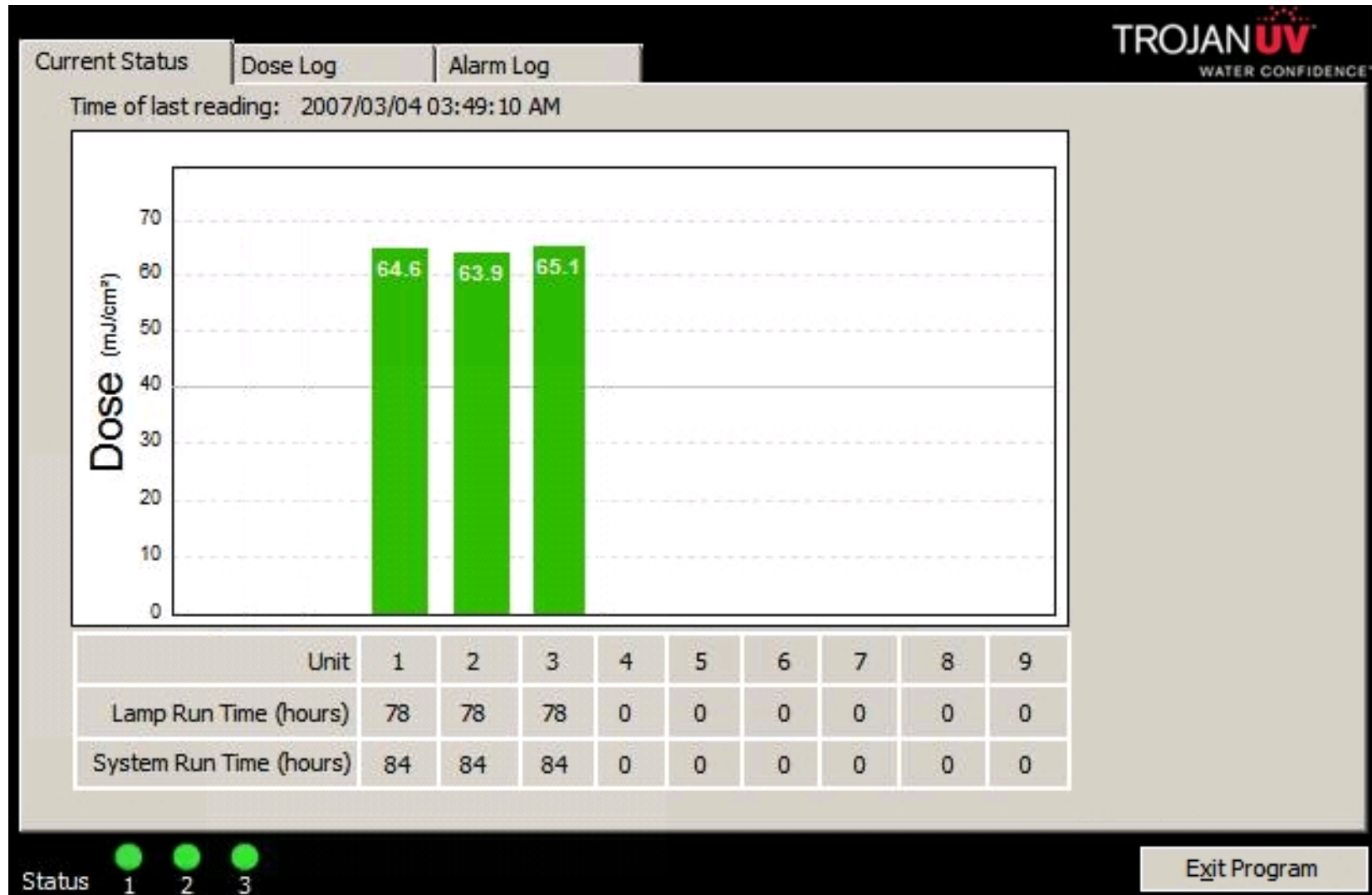Two UV Sensors
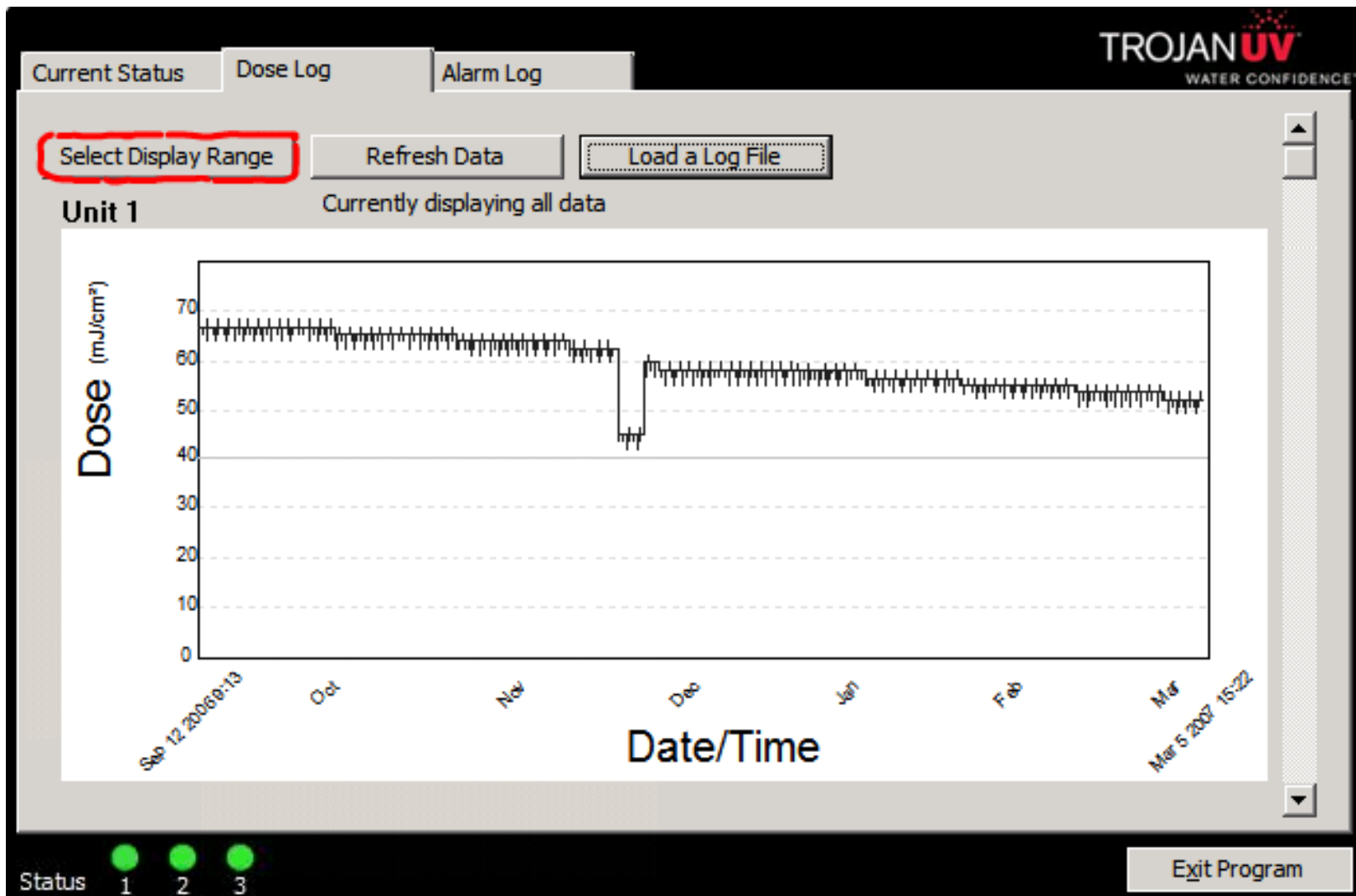
Ultraviolet Disinfection

Monitoring + Protection

- – Real-time UV dose displayed (calculated on peak flow rate)
- – Remote or wireless monitoring
- – Maintains a history log of operating conditions
- – Download operational info to any computer or store on digital storage card (same as any digital camera)
- – Automatic shutoff via solenoids in the event of an alarm condition

Logging Data

Logging Data

Logging Data

Ultrafiltration (UF)

- Fine membrane physical filtration to 0.01 microns

- Periodic backflush (not constant waste stream) eliminates waste water concerns of RO

- Integral monitoring components to measure TMP and fouling, initiates cleaning

- Can be used to reduce TOC/DOC for THM formation control (possibly with coagulation first)

- >4 log removal of bacteria, virus, parasite

Ultrafiltration (UF)

Greensand

- Designed for removal of Iron, Manganese, H_2S
- Oxidizes and filters out contaminants
- Requires regeneration (automatic) with Pot Perm
- Requires pH of 7.0 or higher
- Alleviates staining from Iron/Manganese
- Removes corrosive H_2S

WATERTIGER™

Your total water solution

- Layers of sand and gravel or carbon provide a physical barrier for contaminant removal

- Biological water treatment uses naturally occurring, harmless bacteria to consume harmful bacteria, organic and inorganic material

- Ideal for rain, well, lake, pond, river, or dugout systems

- Modular for different water conditions:
  – BioSand, BioCarbon, Ozone Pretreatment

Slow Sand Filters: Major Benefits

- Natural Processes
  - No chemicals or disposable filter cartridges. Ideal for those whose lifestyles and values embrace the environment.

- Innovative approaches
  - Pretreatment and Maintenance procedures ensure low Total Cost of Ownership with little maintenance, and often no maintenance $$$

- System Flexibility for variable water conditions

- No minimum flow requirements and little waste water (less than 10% waste water of rapid media filters)

Slow Sand Filters

Slow Sand Filters

- – Gravity fed system
- – Ideal fit for rainwater catchment
- – Useful for low-moderate levels of certain well contaminants
- – Manual cleaning process takes minutes
- – No maintenance costs!
- – Sizes from 120 L/hr to 10 GPM

Biofiltration: Uganda

Water source

Biofiltration: Uganda

Gravity flow

Biofiltration: Uganda

Before and after

BioSand Filters: Mainstream

Mainstream BioSand filters

- – Canadian developed for extreme water conditions

- – Modular with BioSand, BioCarbon, Ozone pre-treatment

- – No chemicals or disposable filter cartridges

- – Extremely effective at removing high levels of bacteria, organics and inorganics, including up to 97% removal of Arsenic

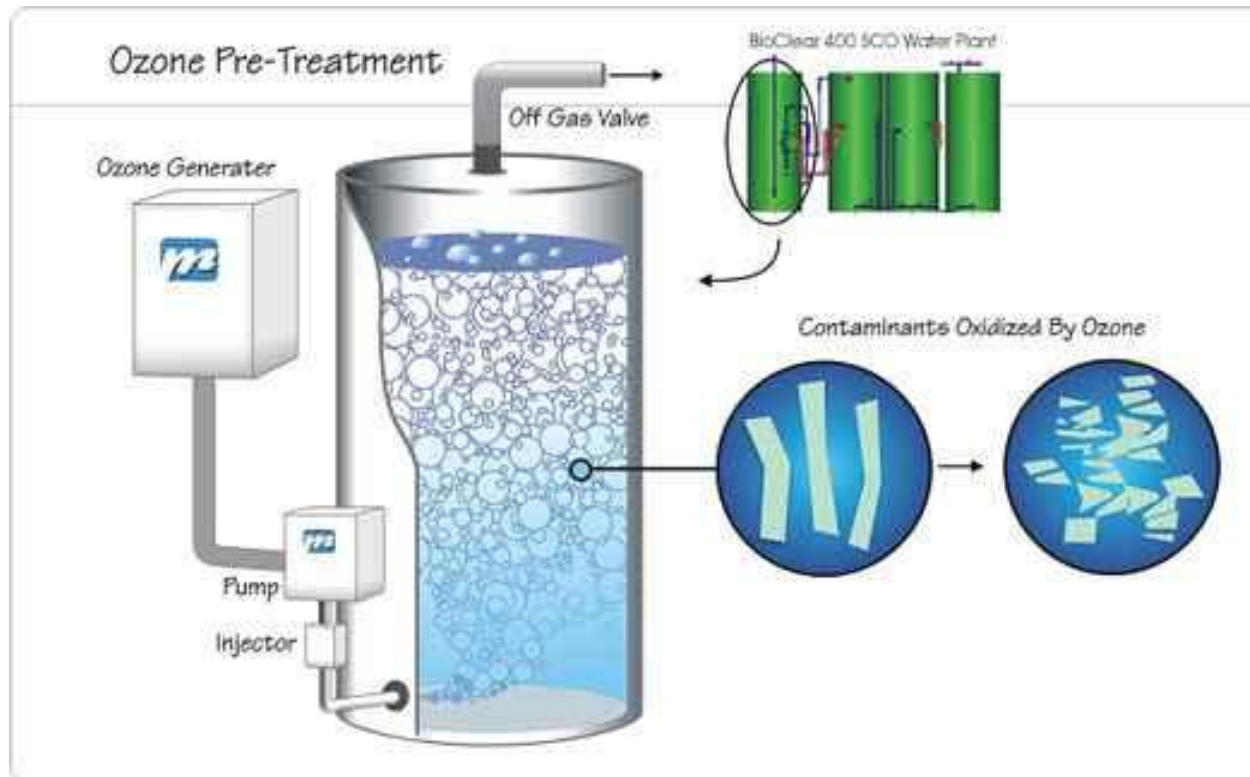# BioSand Filters: How Does it Work?

Ozone Pre-Treatment

For treatment of taste and odour problems and in highly contaminated water. Allows the BioSand and BioCarbon filters to more completely remove a wider range of contaminants.
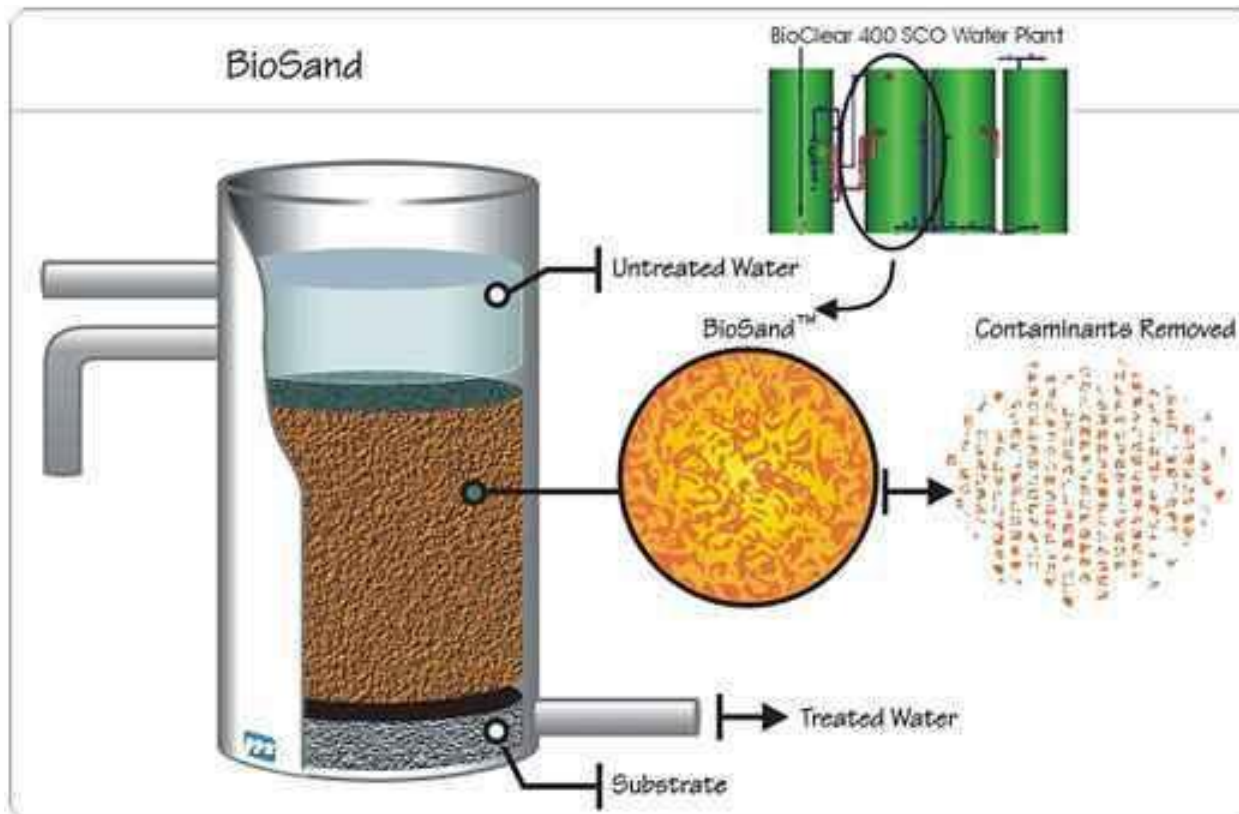
BioSand Filters: How Does it Work?

BioSand

For treatment of Iron, Manganese, Parasites, Colour, Cysts, Arsenic, Lead, Mercury & Turbidity
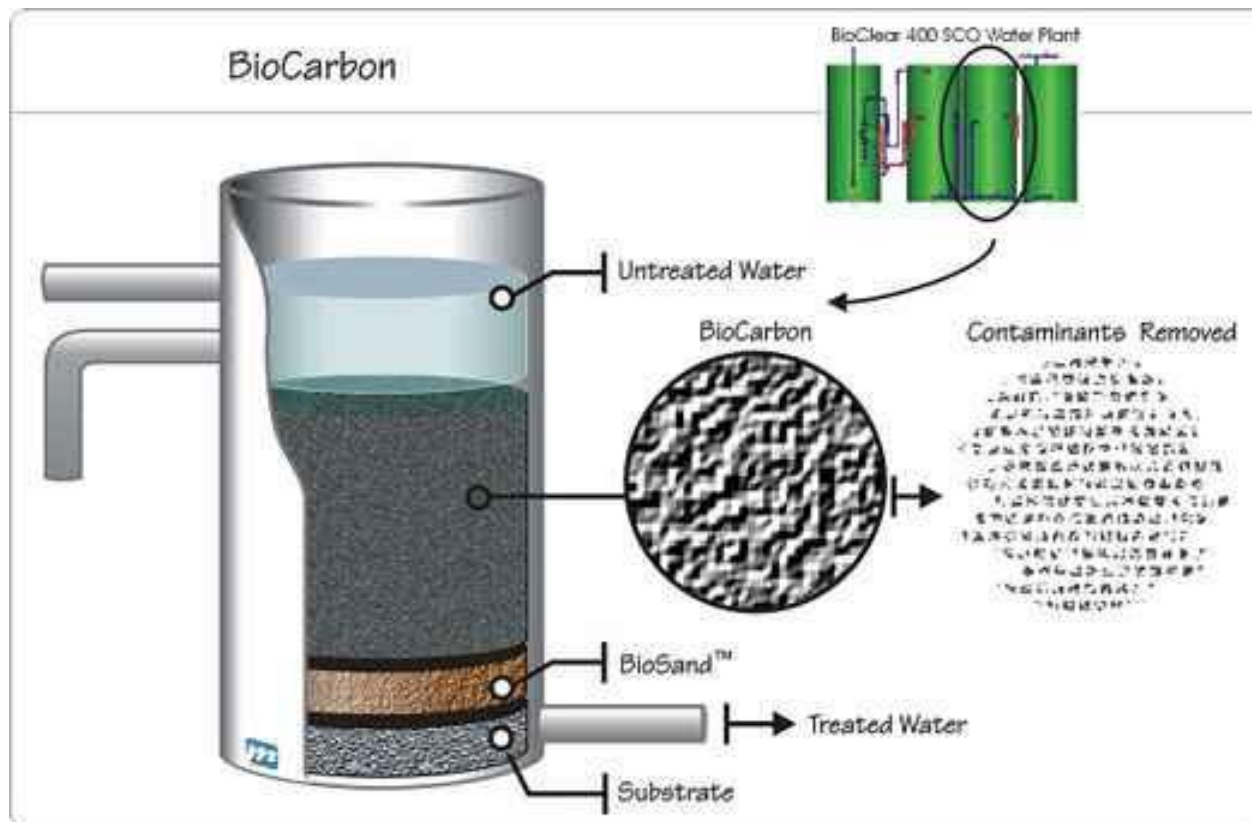
BioSand Filters: How Does it Work?

BioCarbon

For treatment of Dissolved Organic Carbon, Tannins, Pesticides, Iron Bacteria, Colour and Odours

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