Durpro

….*Providing Clear Solutions*

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Durpro has been filtering liquids for 30 years.

Our expertise:
Filters
Self-Cleaning Filters
Reverse Osmosis
Ozone
Disolved Air Flotation
Roll Media Filters

DRINKING WATER

OZONE BASED SYSTEM

FOR POTABLE WATER DISPENSING SYSTEMS

We will discuss

- Design Choices
- System Operation
- System Maintenance

WHAT WERE THE GOALS?

- Develop an affordable system to produce 1000 usgpd to be installed in a building where town people could come and fill their containers.
- The system should to have low maintenance cost.
- The system would be chlorine free.

THE GOALS CONTINUED.....

- The system would be automatic.
- Water dispensing would automatically shut down if water was not safe.
- More than one barrier for each identified problem.

THE GOALS CONTINUED.....

- Simple tests would be sufficient to monitor the system.
- Critical components would be NSF approved.

DEFINE THE PROBLEMS

- Suspended solids
- Organic Color ... THM precursor, aesthetics
- Bacteria
- Giardia and Cryptosporidium
- Other... Ca, Fe,... heavy metals
- pH

WHERE TO START

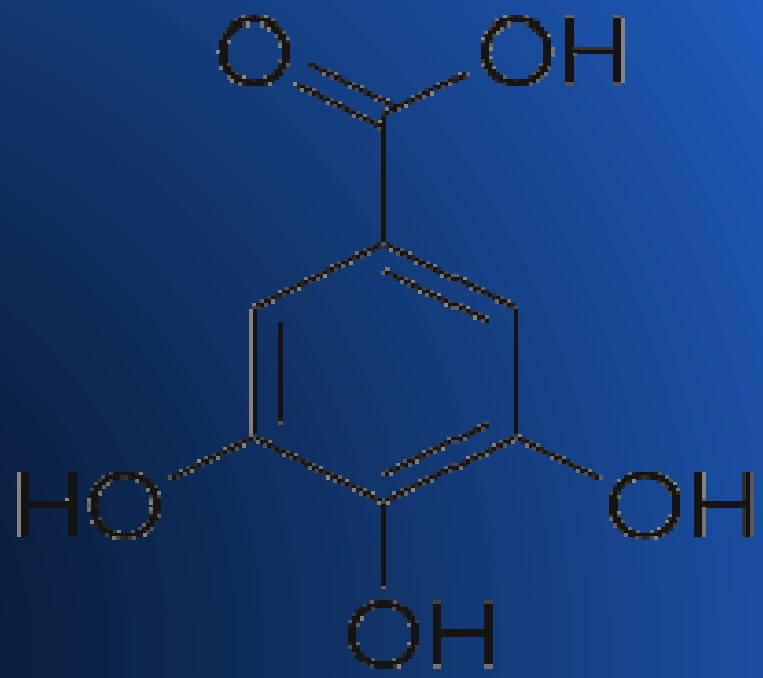
- COLOR REMOVAL DETERMINES THE SYSTEM
- CHOOSE THE HEART
- THEN BUILD THE SYSTEM AROUND THE HEART.

START WITH COLOR

- .....BEFORE.....AFTER

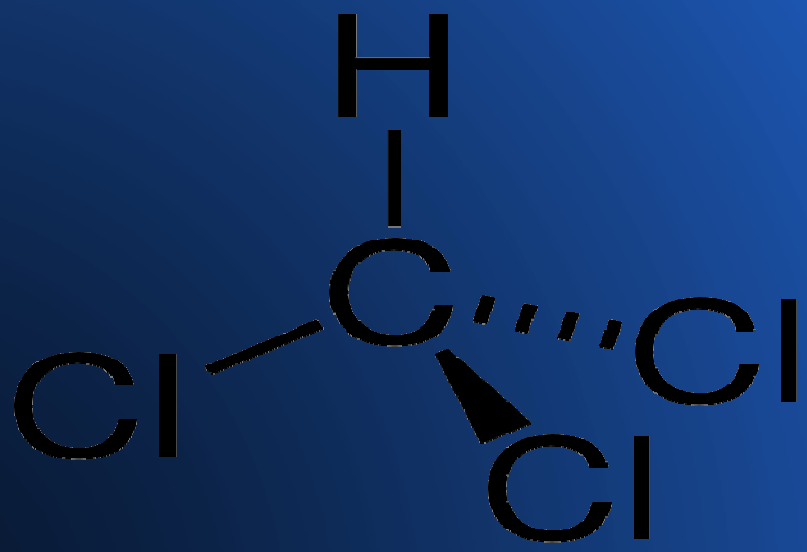
WHAT IS ORGANIC COLOR

- GALLIC ACID



WHAT ARE THM'S

- CHLOROFORM IS A GOOD EXAMPLE



BREAKING APART THE MOLECULES

- THE USE OF AN OXIDANT BREAKS APART THE MOLECULES
- ADDING CL, CLO2, or OZONE
- SOME OXIDANTS ARE MORE POWERFUL THAN OTHERS.

STRENGTH OF OXIDANTS

Oxidant	Reduction potential (V)
OH^-	2.80
O	2.42
O_3	2.07
HOCl	1.49
Cl_2	1.36
H_2O_2	0.87
O_2	0.40

Treating Organic Color

- Add enough ozone
- Reverse Osmosis
- Resin

Ozone vs RO ..... Color

- Both will remove Color and THM Precursors
- Note: To remove color is easy … to get the THM precursors is more difficult

Suspended Solids

- Mostly broken down organic material
  - Some towns have some pre-filtration
  - Others do not, or have only coarse filtration

Ozone vs RO .... Suspended Solids

- Ozone will not break down or clog up but some ozone will be wasted
- RO requires good pre-treatment or the membrane will clog and require replacement.
- Treatment depends on the water quality.

Ozone vs RO ..... Iron, Ca etc

- Ozone produces a solid precipitate which needs to be removed... Filters
- RO membranes will clog up and require changing in small systems.

Ozone vs RO … Bacteria

- Ozone will kill all Bacteria and Cysts as the water is treated
- RO will generally remove Bacteria and Cysts. The bad part is the bacteria do accumulate in the membranes. The spores pass through and get into the tank and pipes.

COMPONENTS OF THE SYSTEM

- PRE-TREATMENT
- OZONE PRODUCTION
- RESERVE
- POST-TREATMENT

PRE-TREATMENT

- BACKWASHABLE CARBON FILTER
  - REMOVES SUSPENDED SOLIDS
  - REMOVES SOME LIGHT ORGANICS
  - REMOVES CHLORINE AND THM'S
- FILTER CARTRIGE

POST-TREATMENT

- CARBON FILTER
- FILTER CARTRIDGES
- ULTRA-VIOLET

Cartridge Filtration
GE Osmonics Cartridges

-Depth Filters

-Pleated filters

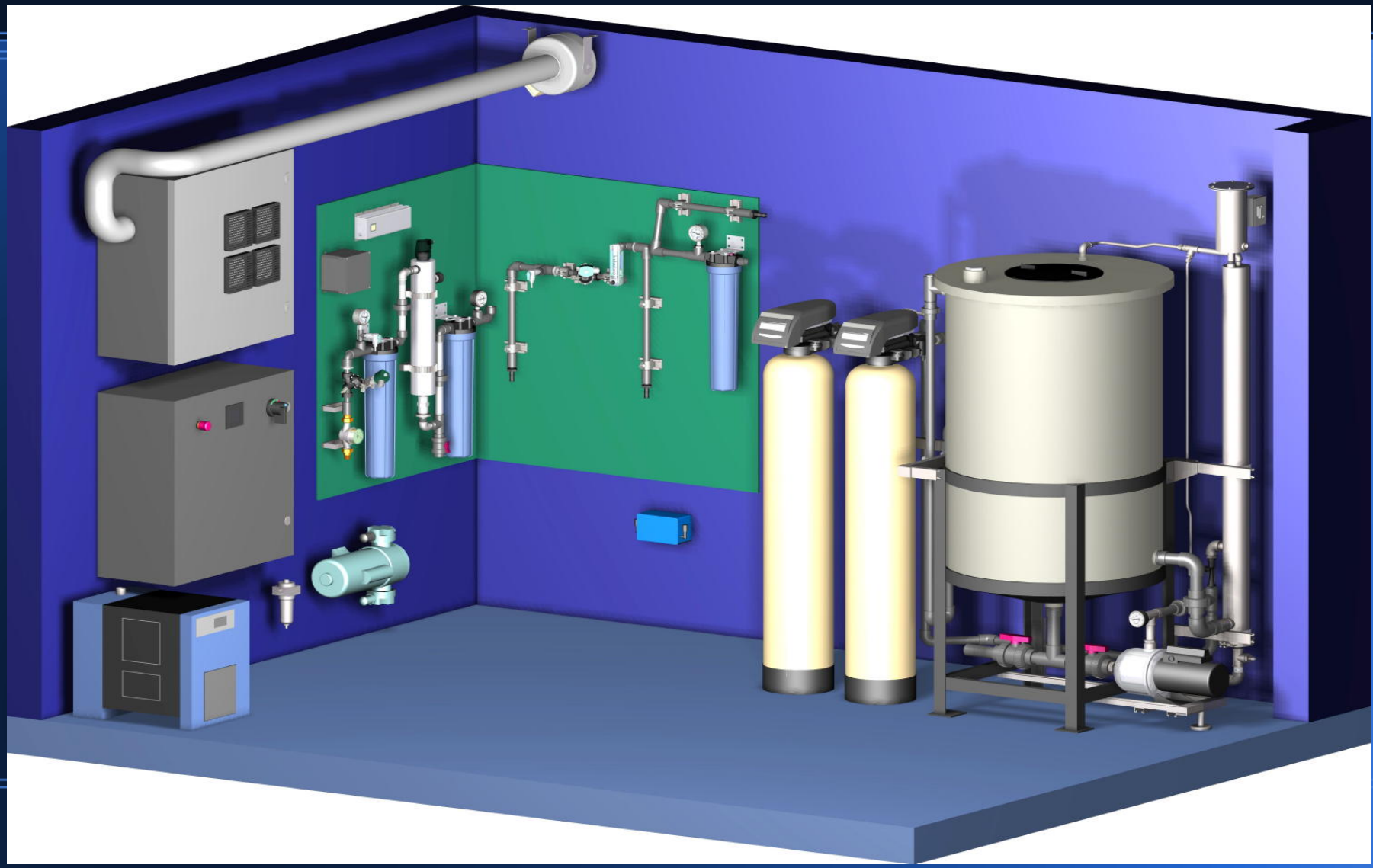
-Carbon filters

-High flow large diameter filters

PRE AND POST TREATMENT

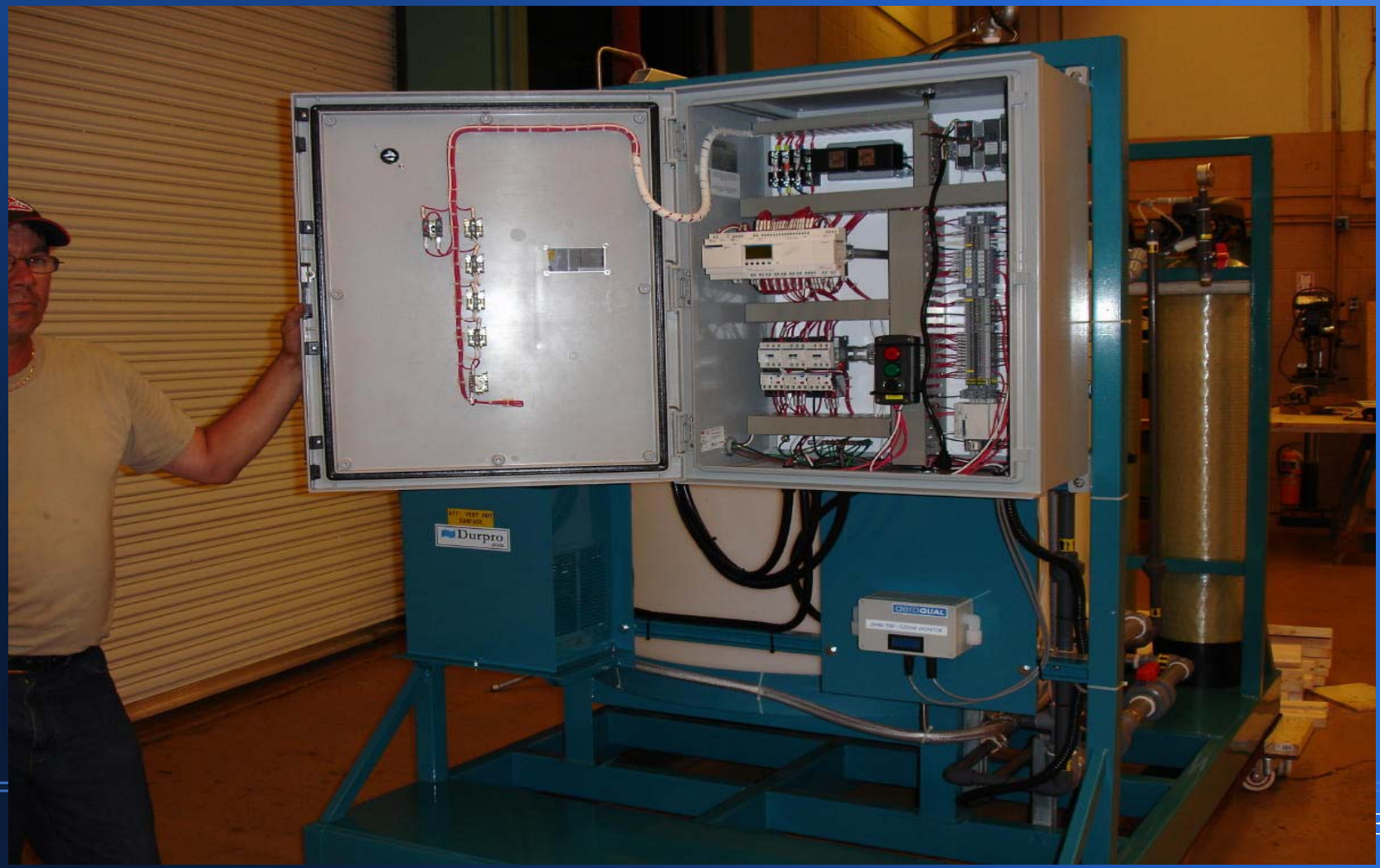
SKID MOUNTED

NON-SKID MOUNTED



REACTOR

CONTROLS



OPERATING THE SYSTEM

- PROGRAMMED TO WORK ALONE ONCE THE SYSTEM HAS BEEN SETUP
- MONITORS VARIOUS PARAMETERS
- DETECTS FAULTS AND STOPS THE SYSTEM IF REQUIRED

OPERATOR KNOWLEDGE

- OPERATORS SHOULD UNDERSTAND THE SYSTEM COMPONENTS AND HOW THEY INTERACT WITH THE CONTROLS

MAINTENANCE

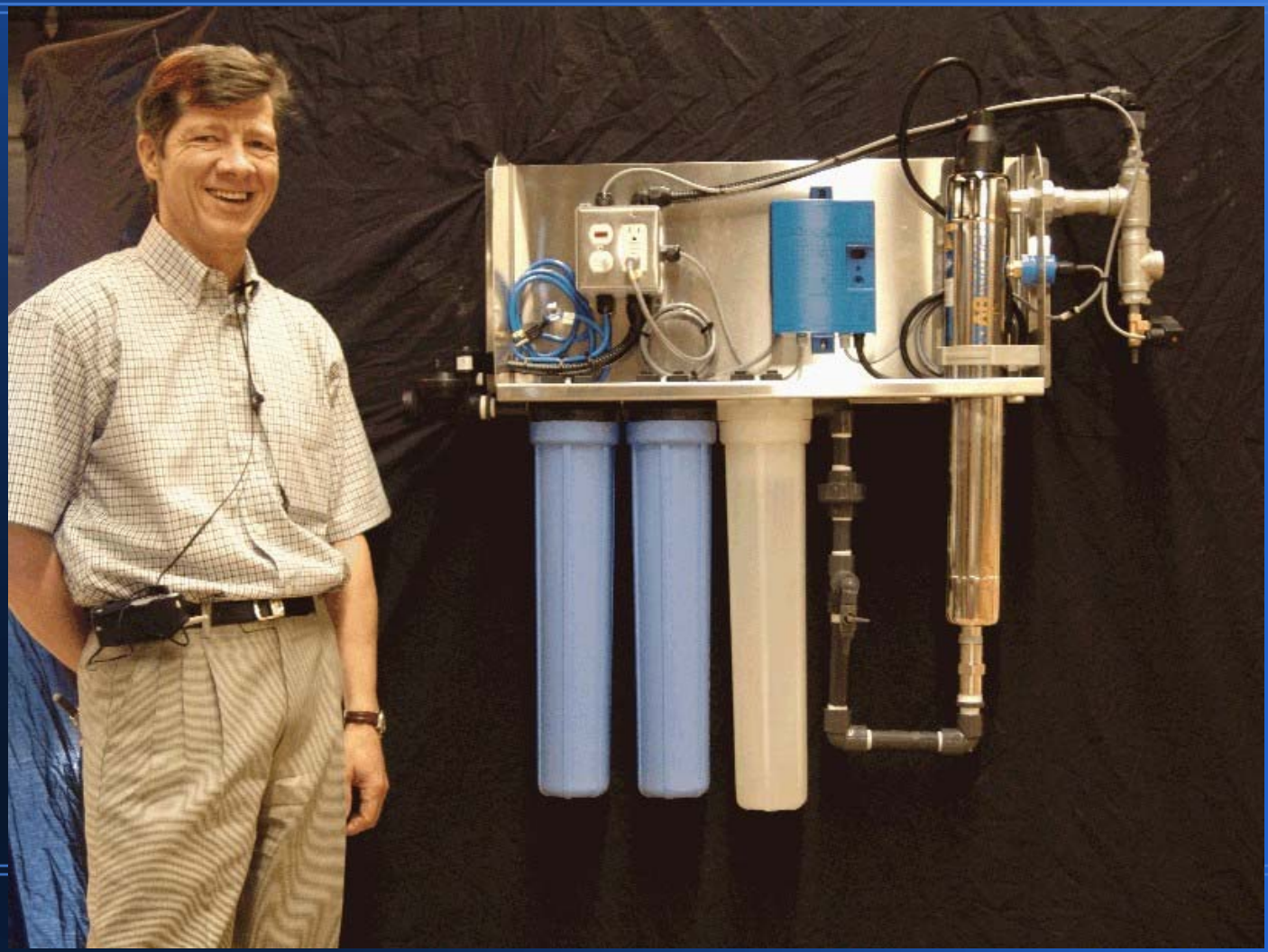
- CARBON FILTERS .... YEARLY
- UV LAMP .....YEARLY
- UV QUARTZ .....4 YEARS
- OZONE MONITOR .....YEARLY
- CARTRIDGES .....AS REQ'D
- MECHANICAL, COMPRESSOR, PUMP

MAINTENANCE

- REACTOR ..... 12 YEARS
- OXYGEN (DRY AIR) ..... 8 YEARS

PUMP

4 GPM FILTER-UV Multi-barrier Potable Water Station



1 GPM RO WATER SYSTEM

THE END