



# WATER TREATMENT

PETER GREEN – RM ASSOCIATES



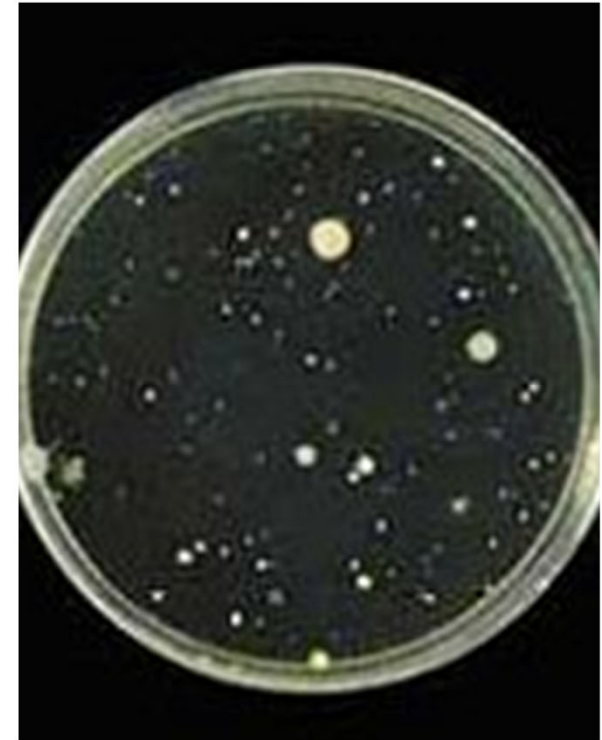
# WATER QUALITY

- DRINKING WATER QUALITY IN NORWAY GOVERNED BY;
- REGULATIONS ON WATER SUPPLY AND WATER INTENDED FOR HUMAN CONSUMPTION  
(DRINKING WATER REGULATIONS)
- EFFECTIVE FROM 2017



# WATER QUALITY – WHAT SHOULD WE EXPECT

- E.COLI 0 COUNT/100ML
- CLOSTRIDIUM PERFRINGENS 0 COUNT/100ML
- COLONY COUNT @22°C  
<100CFU/ML  
NO ABNORMAL CHANGE



# WATER QUALITY – WHAT SHOULD WE EXPECT

COLOUR –

NORWEGIAN FOOD SAFETY AUTHORITY

<20MG/L PT

TURBIDITY –

NORWEGIAN FOOD SAFETY AUTHORITY

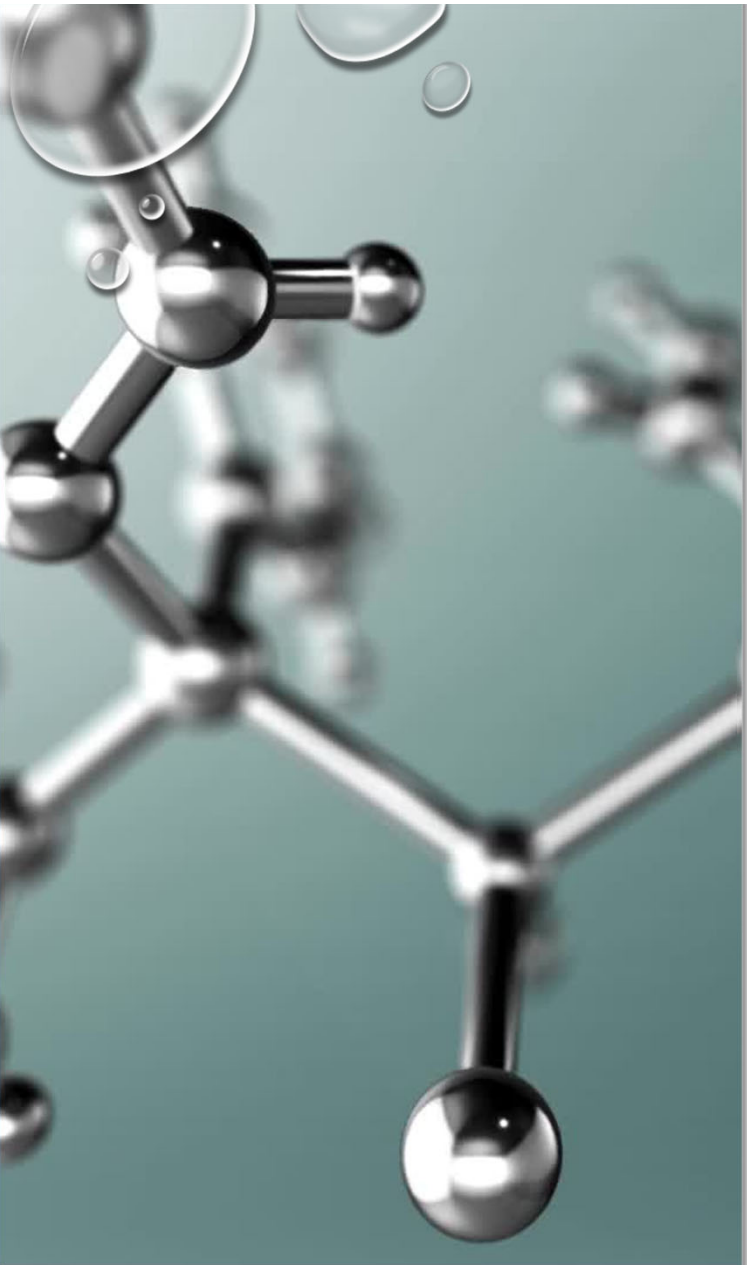
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# DO WE NEED TO TREAT?

- ARE THE STANDARDS MAINTAINED BY THE WATER SUPPLIER GOOD ENOUGH?
- WOULD WE EXPECT TO MANAGE THE WATER QUALITY IN A WELL DESIGNED BUILDING?





# PARTICULATES

- ADHERING TO NORWEGIAN STANDARDS CAN STILL CREATE PARTICULATES

FALL OUT OF HUMIC MATERIAL



# APPROACH FOR PARTICULATE REMOVAL



## Settlement

The introduction of water storage tanks can provide an environment for particulates to settle out

Increase need to clean the tank out



## Filtration

The physical removal of particulates  
Comes in a range of filter sizes – which one to use??

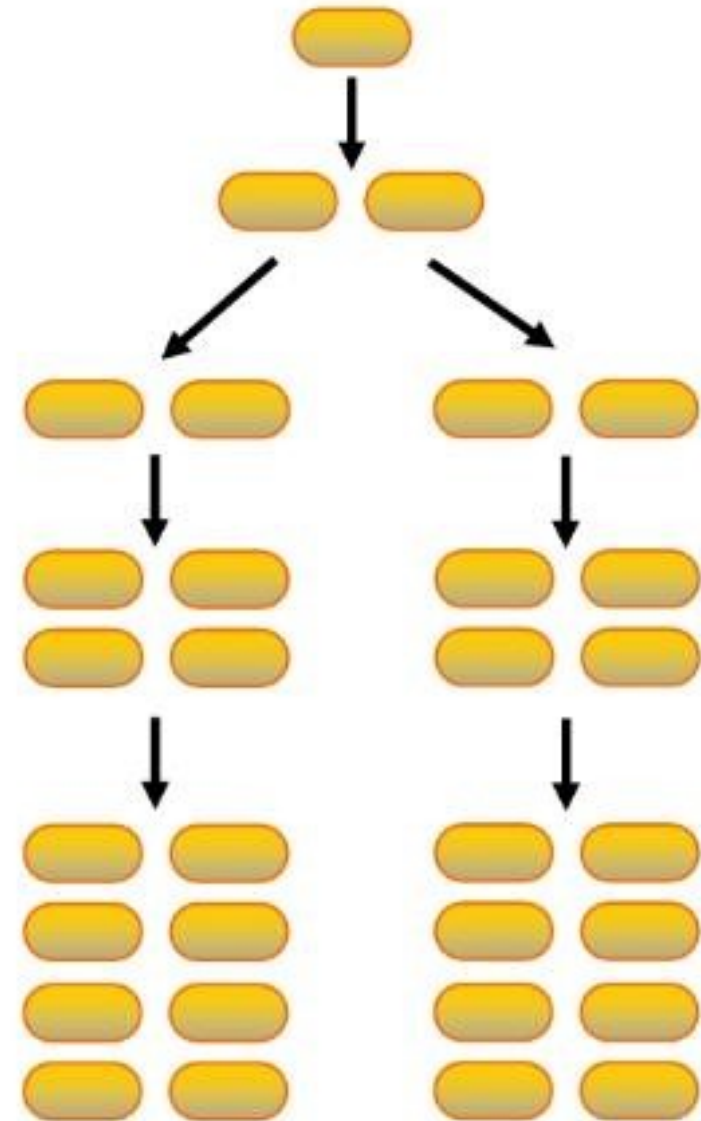
Need to maintain

Potential for fine particles still to pass through to the distribution

# BACTERIAL CHALLENGE

- IS THERE A PROBLEM?
- NOT ALL CHALLENGE ORGANISMS MONITORED
- LOW NUMBERS MAY ALWAYS BE PRESENT

## Exponential Growth





# BACTERIAL CHALLENGE – HOW TO REDUCE RISK

Good design

Responsible users

Effective system management





# SUPPLEMENTARY TREATMENTS

- WHAT IS A SUPPLEMENTARY TREATMENT?
- A PRODUCT OR PROCESS USED TO KILL BACTERIA
- NORMALLY USED WHERE WE LACK CONFIDENCE IN THE WAY WE OPERATE A DOMESTIC WATER SYSTEM.
- MUST BE SAFE TO THE END USER

# SUPPLEMENTARY TREATMENTS



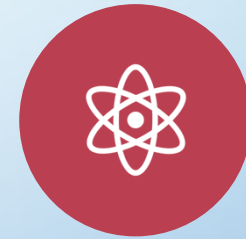
ULTRA VIOLET –  
UV



CHLORINE



CHLORINE  
DIOXIDE



SILVER/COPPER  
IONISATION

# ULTRA VIOLET

- USES ULTRAVIOLET LIGHT TO KILL BACTERIA
- FOR – EFFECTIVE AGAINST WIDE RANGE OF CHALLENGE ORGANISMS
- AGAINST –
- NEEDS 5M FILTRATION AS PARTICULATES ALLOW HIDEOUT
- ONLY KILLS WHAT PASSES THROUGH



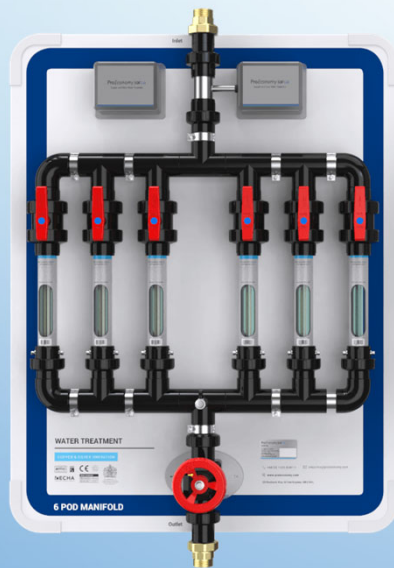
# OTHER APPROACHES

- DISPERSIVE – GET INTO AND AROUND THE SYSTEM
- ONLY GIVES PROTECTION TO THE WHOLE SYSTEM **IF** TAPS/SHOWERS ARE **USED**
- CARRY ADDITIONAL OPERATIONAL RESPONSIBILITY



# OTHER APPROACHES

- NEED ADDITIONAL EQUIPMENT



# CHLORINE - PROS

- CONTACT KILLER
- EASY TO USE
- EASY TO MONITOR AND CONTROL
- CAN DOSE OVER A LARGE RANGE – UP TO 5PPM
- COST EFFECTIVE
- BIOFILM REMOVAL???



## CHLORINE - CONS

pH sensitive, works best  $<7.8$

Heat sensitive

Can produce by products

Biofilm Removal??



# CHLORINE DIOXIDE - PROS

- CONTACT KILLER
- NOT PH DEPENDANT
- EASY TO CONTROL, EASY TO MONITOR??
- BREAKS DOWN SOME CONTAMINANTS IN THE WATER
- ACKNOWLEDGED BIOFILM REMOVAL PROPERTIES



## CHLORINE DIOXIDE - CONS

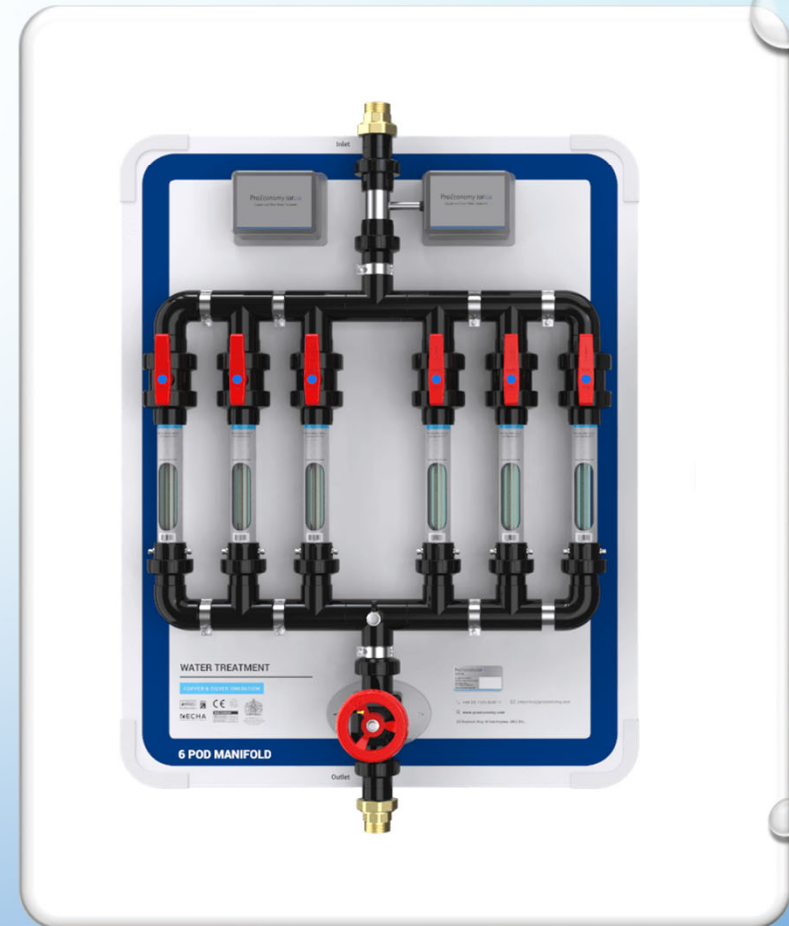
Fairly unstable, has to be generated on site

Can be driven out of the water especially in the hot

Generates other by products which can limit useful range

# SILVER/COPPER IONISATION - PROS

- ELECTROSTATIC POISON
- BETTER ENVIRONMENTAL PROFILE
- ACKNOWLEDGED BIOFILM REMOVAL PROPERTIES
- NO CHEMICAL HANDLING REQUIREMENT



## SILVER/COPPER IONISATION - CONS

Reliable on site monitoring and control not available

Expensive in use

Can be affected by corrosion



Thank you

Any questions ?

Presented by: Peter Green