

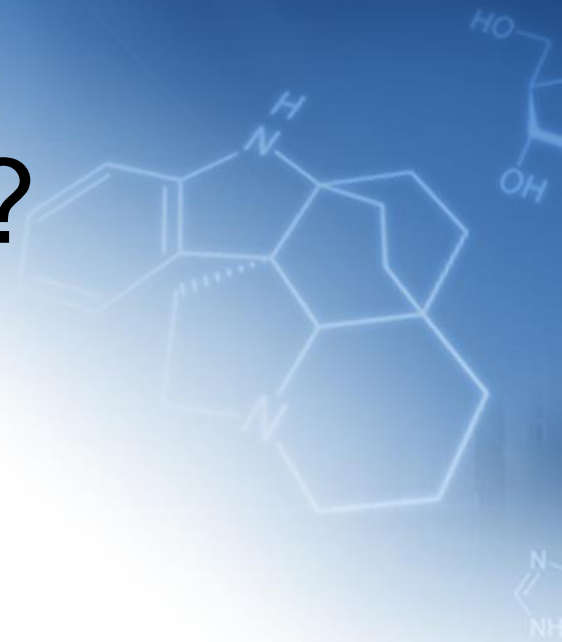


What Happens When the Lights Go Out?

A Strategy for Water Protection

Tim White – *Marquis & Lord*

What's In Store?



- When will it happen?
- Statutory Provisions
- “Water Safety Plan” - WHO
- The impact of water storage
- Emergency procedures
- Preparations you can make

Electricity & Water

- Generators are unlikely to help
- You could pump yourself dry
- Can the water undertaking supply you?
- Blackout and drought together!
- Solutions require lateral thinking

When Will It Happen?

- **NOW**
- The problem is often not considered
- Low frequency localised events
- Two types of impact
 - Volumetric - no water
 - Quality Problems – storage/disinfection
- The number will increase

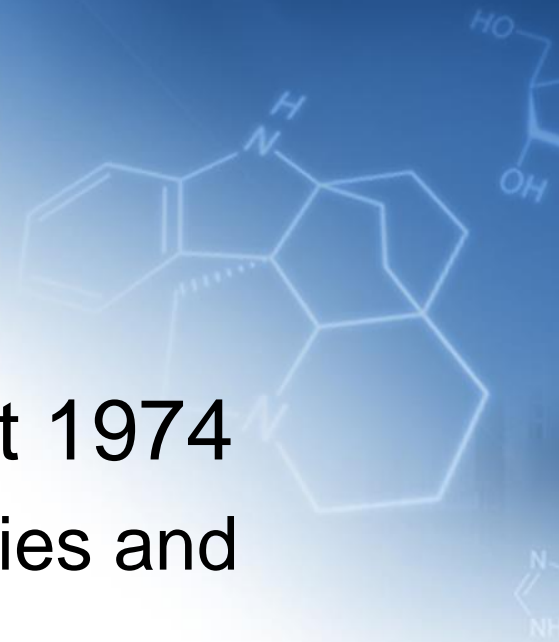
Evidence

- Bexhill, Sussex **16th and 17th March 2013**
 - Power failure caused water supply problems, South East Water
- Limerick County Council ordered a boil water notice - **Feb 13th 2014**
 - Electricity supplier warned of power cuts to water treatment plants, Belfast Telegraph
- Lincolnshire, Nettleham **Feb 18th 2014**
 - Broken pump, Lincolnshire Echo

Levels of Response

- Hospitals and other sensitive locations
 - Covered by statutory provision
 - They will struggle if the provider has no power
- **COMMERCIAL PREMISES ARE NOT PROTECTED TO THE SAME EXTENT BY STATUTORY PROVISION**
- Need to change our approach

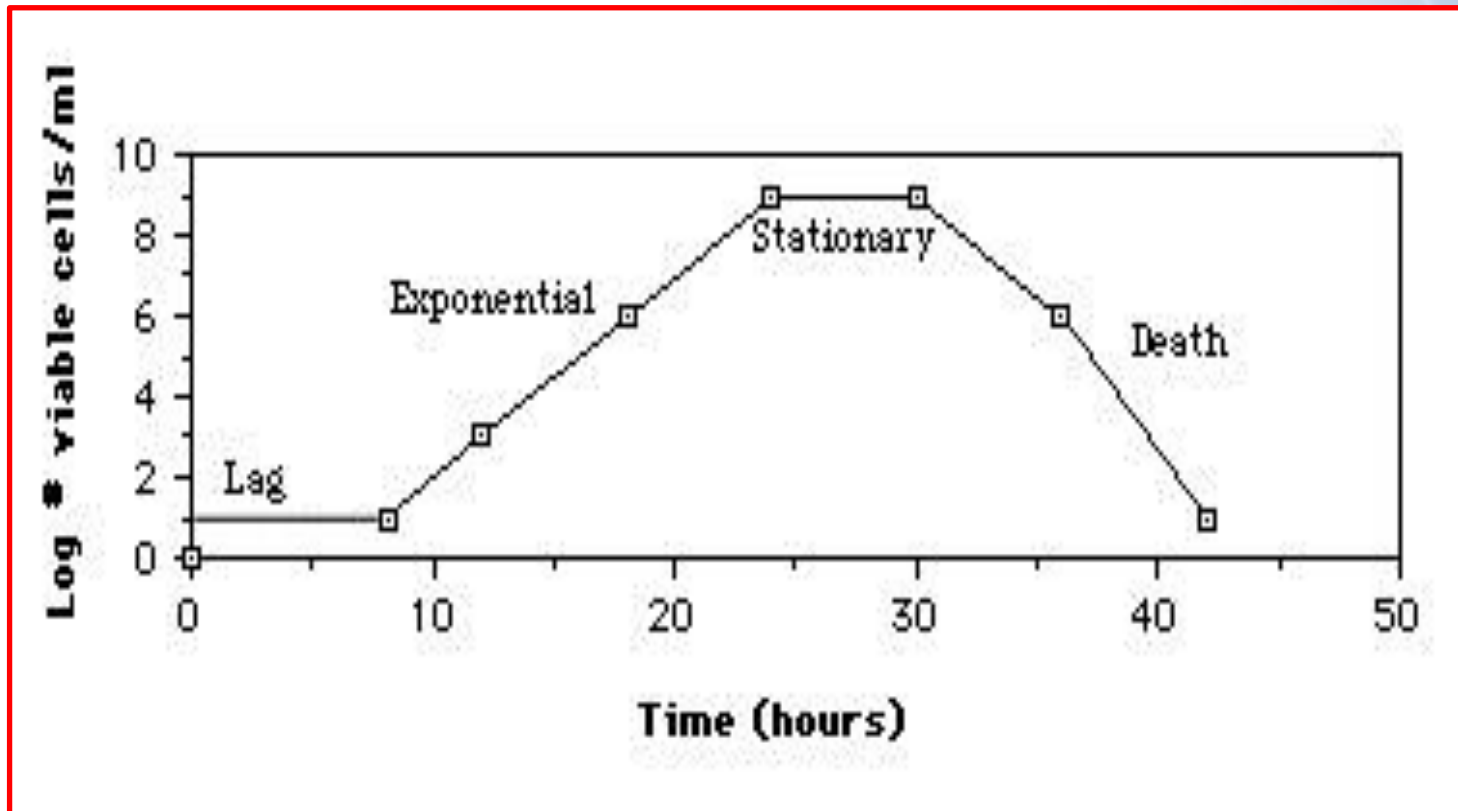
Why Change?



- Health and Safety at Work Act 1974
 - “provide suitable washing facilities and clean drinking water”
- Abdication of risk to water treatment companies because they are already engaged (***L8 obligations***)
- Limited resources if all customers call at same time

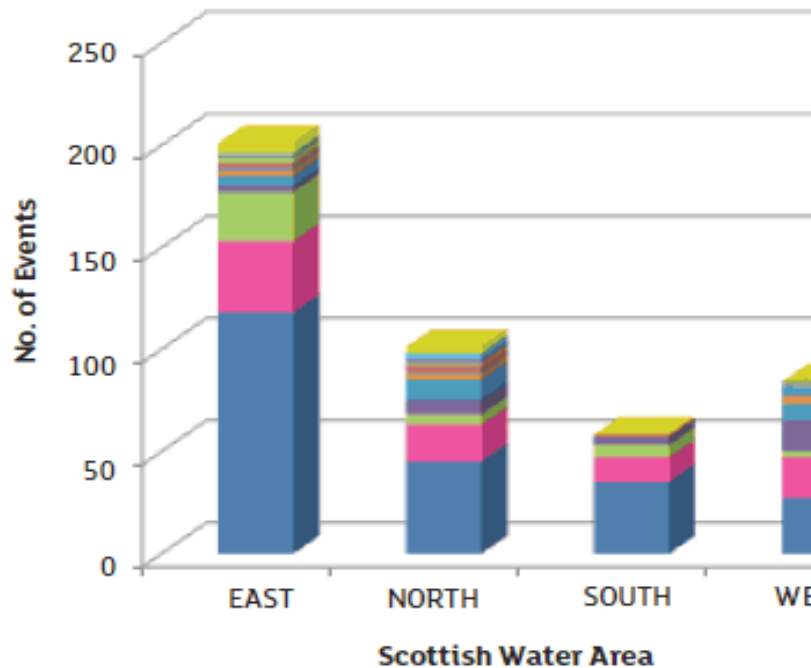
Some Technical Issues Microbiological Regrowth

- <http://textbookofbacteriology.net>



Occurrence Rate

- Scottish Water 2012



Microbiological incidents are by far the largest reason for event recording.

Bacteria are the primary reason water treatment is controlled by statute.

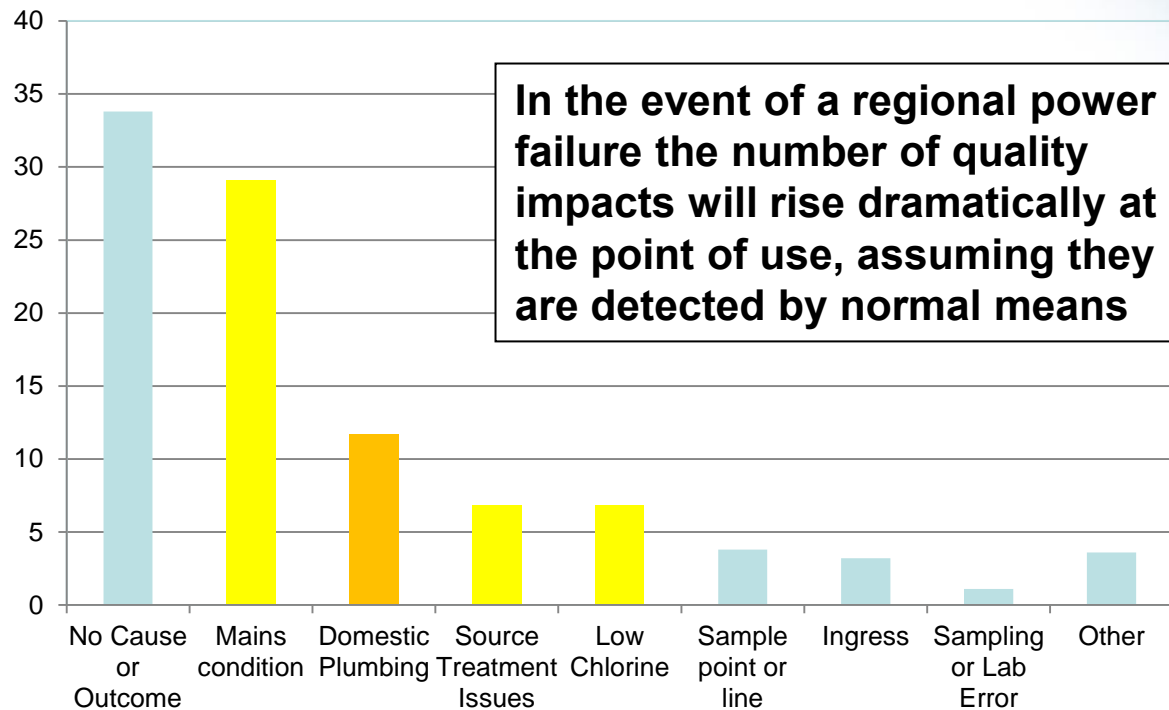
A CRUDE ESTIMATE

Based on recorded power outages for Scotland for 2012 we could potentially expect 8-9 bacteriological zone failures per blackout.

Reasons For Failure

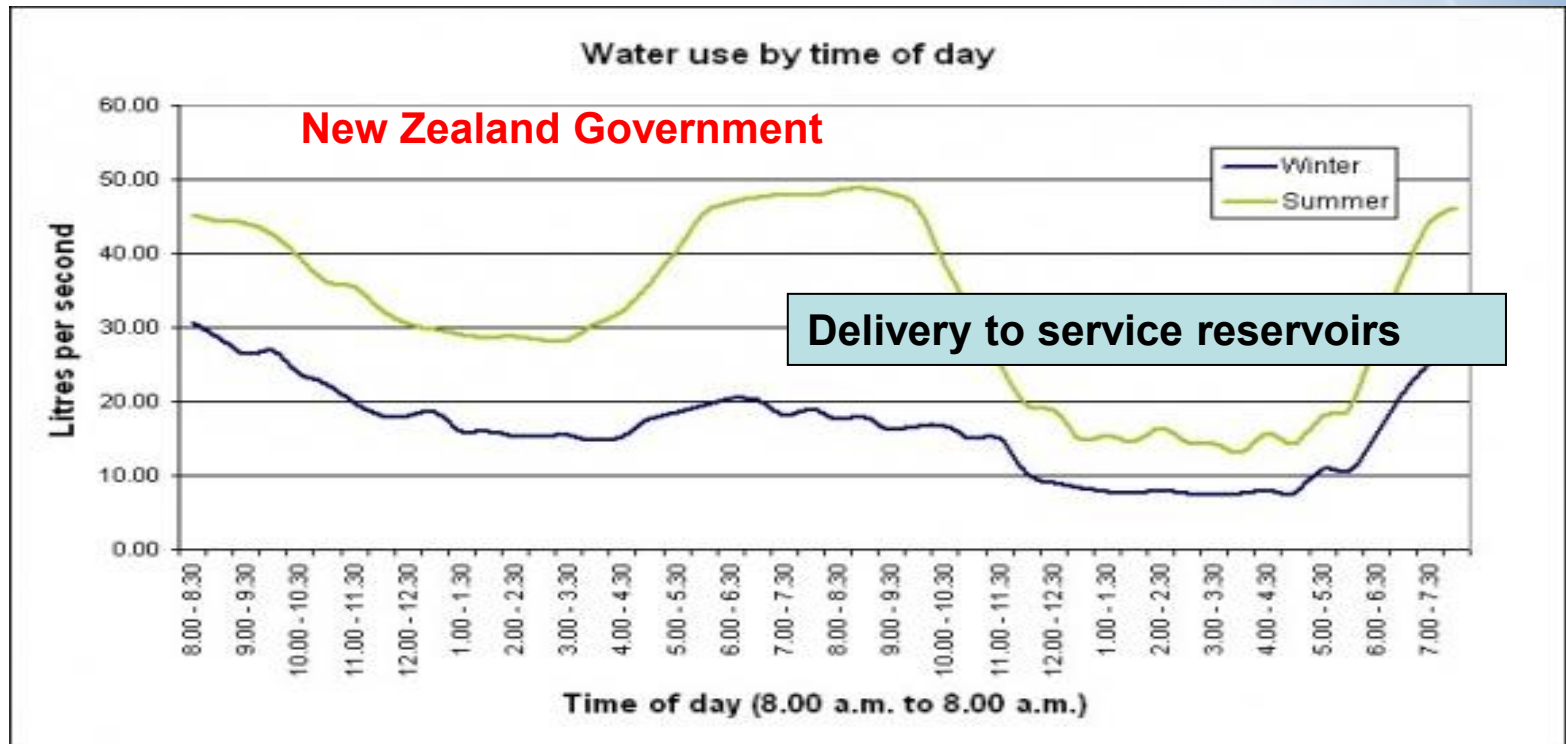
- Scottish Water 2008

% OF NETWORK EVENTS



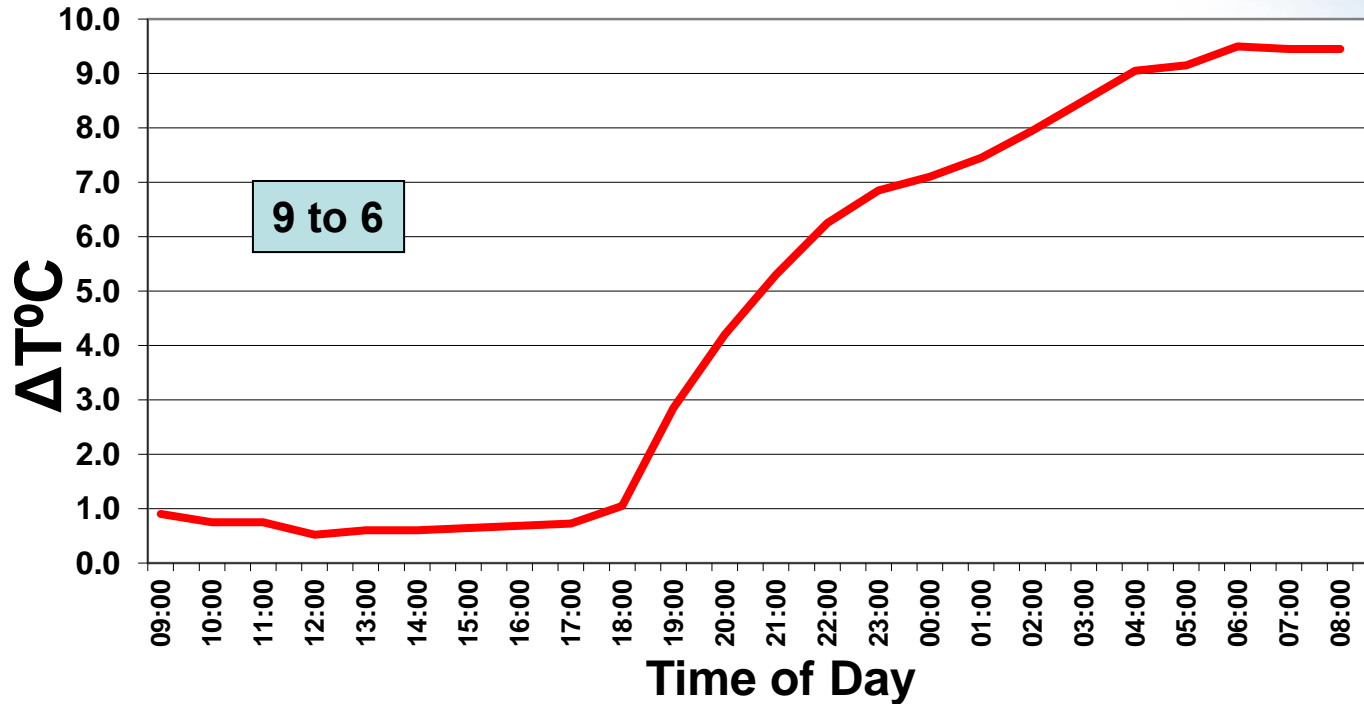
Use Patterns

- Regional consumption patterns

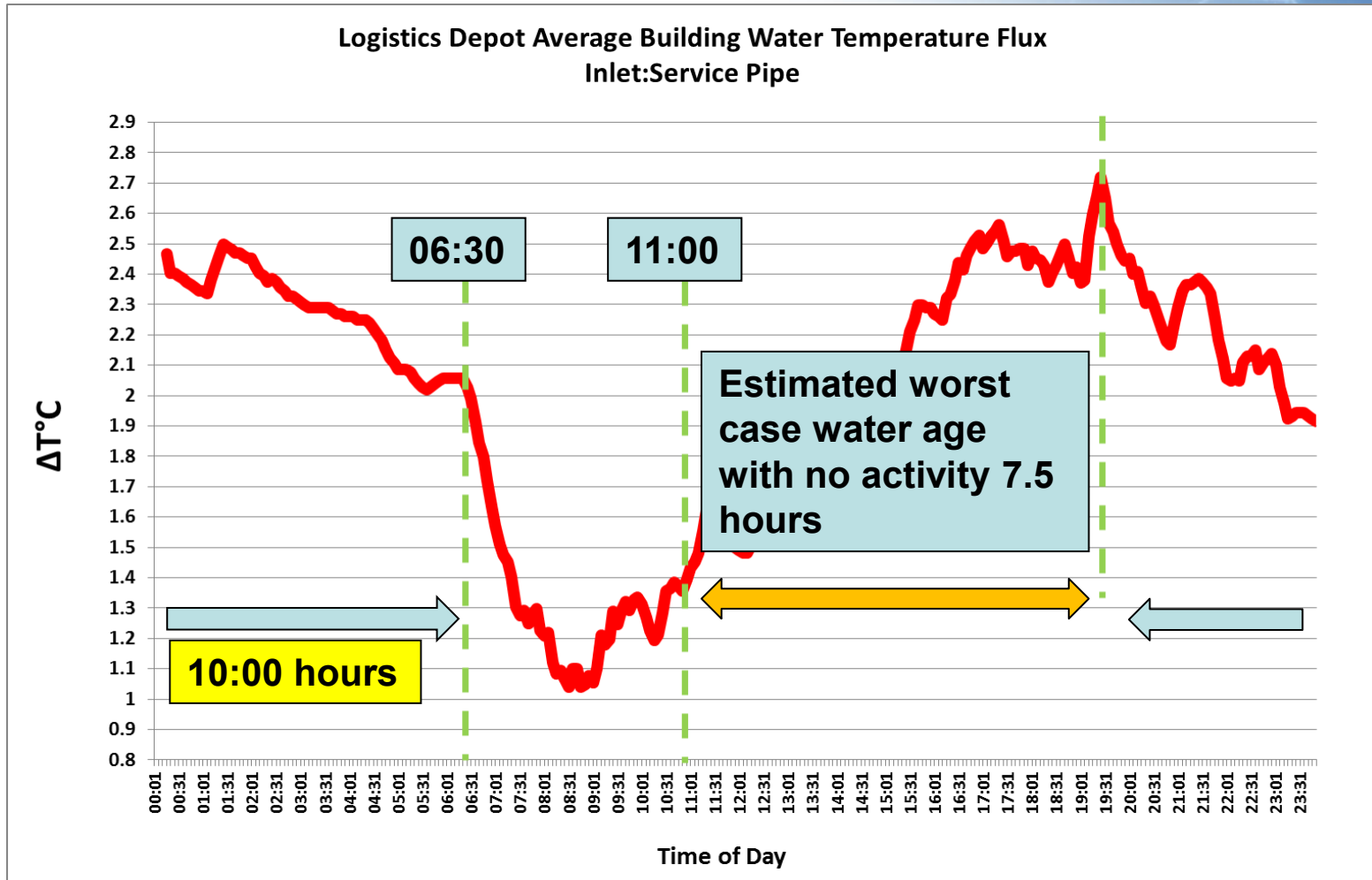


What Is Your Use Pattern?

Hospital Average Building Water Temperature Flux
Inlet : Service Pipe



Alternative Use Pattern

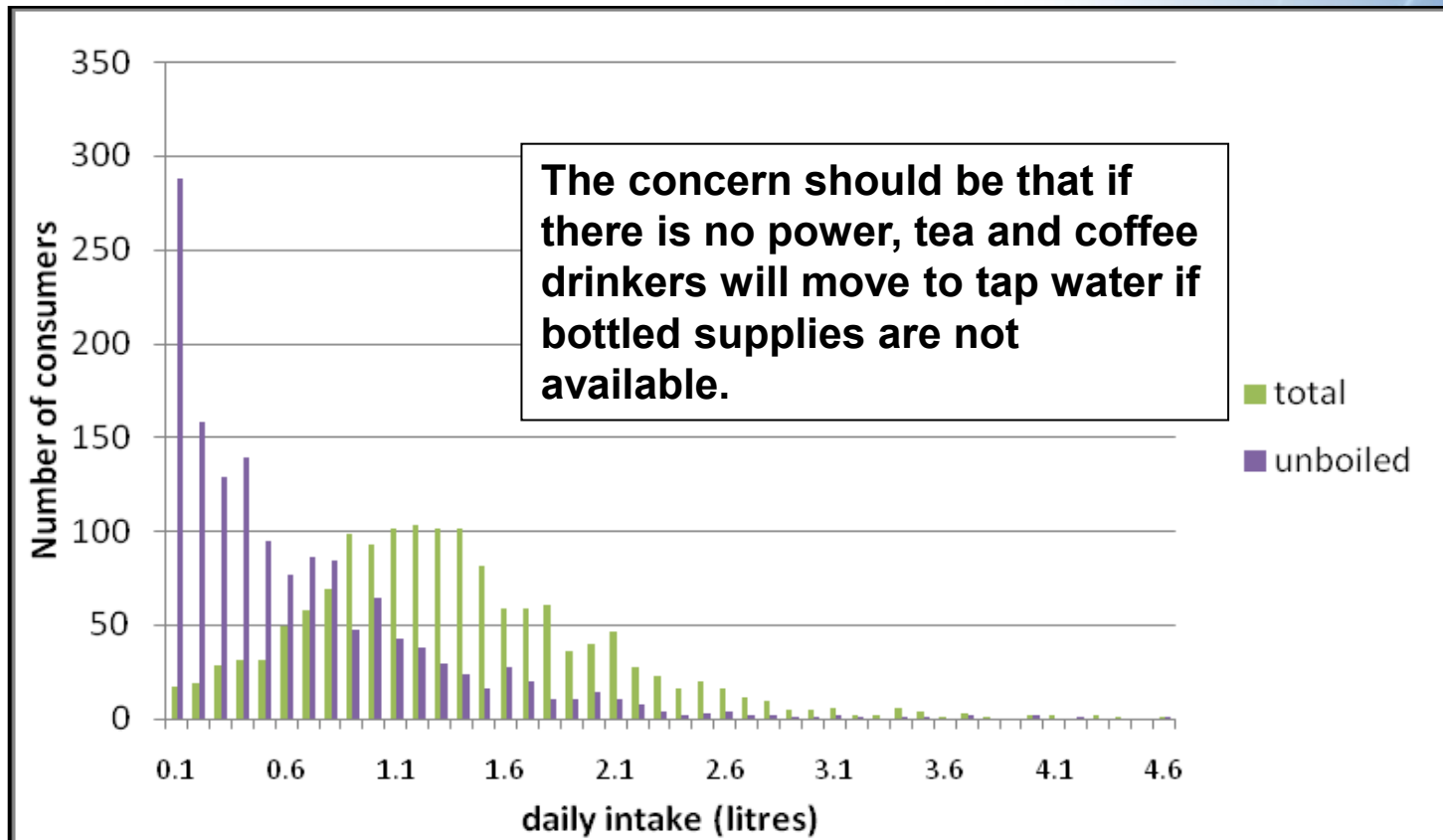


Social Problems

Use of Water for Drinking DWI (2008)

Daily Drinking Intake	Total (litres)	Un-boiled (litres)
Average	1.314	0.595
90 th percentile	2.178	1.403
95 th percentile	2.535	1.786
97.5 th percentile	2.941	2.106
Maximum	4.599	4.521

National Tap Water Consumption Study 2008

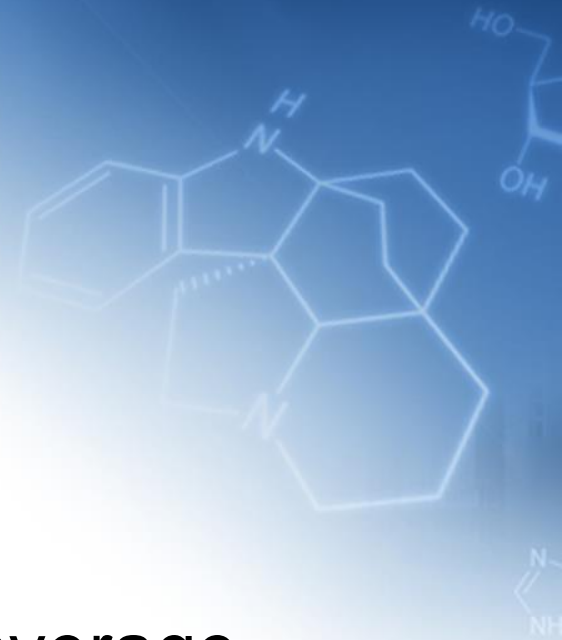


Tap Water Aversion

- This is a fact of life it does not matter how realistic it is; it is a socio-cultural problem
- Pressure on bottled water consumption has become intolerable in
- Shares in bottled water companies are subject of interest
- Contracts for reserve complex and rigorous



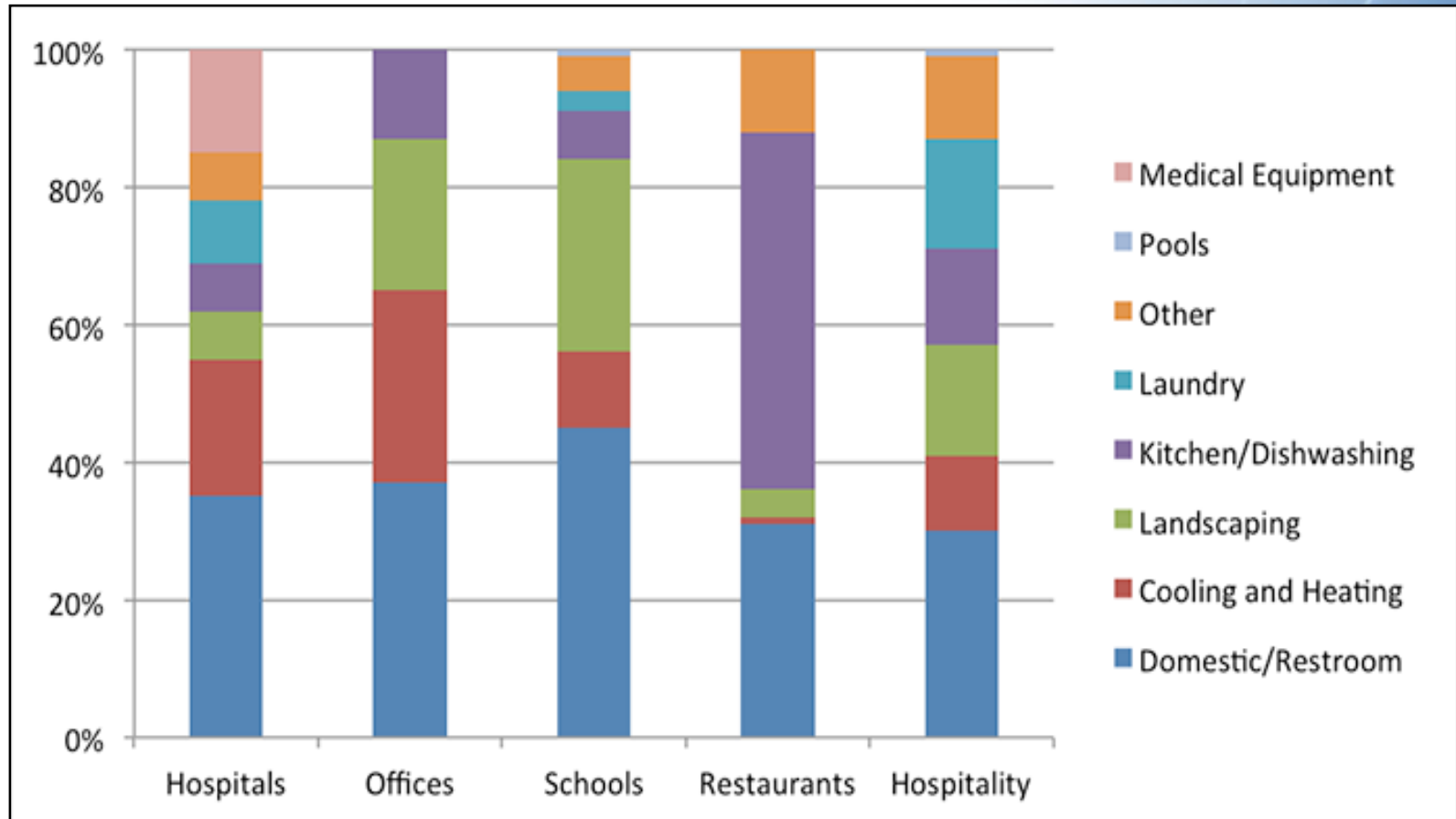
Other Uses



- Toilet Flushing
 - Average flush is about 6 L
 - It has been estimated that the average person flushes a toilet 7.65 time per day (46 L \approx 10 gal.)
 - Approximately 3 to 4 flushes/working day
- Food preparation
 - Variable impact influenced by building use

Patterns of Use

Uses of Water - US EPA

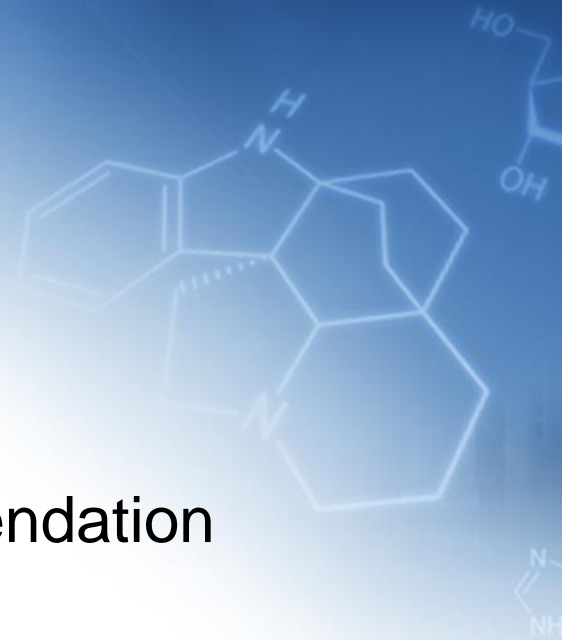


Guidance

- “The most effective means of consistently ensuring the safety of a drinking water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment **to consumer**” – DWI

<http://dwi.defra.gov.uk/stakeholders/water-safety-plans/>

Planning



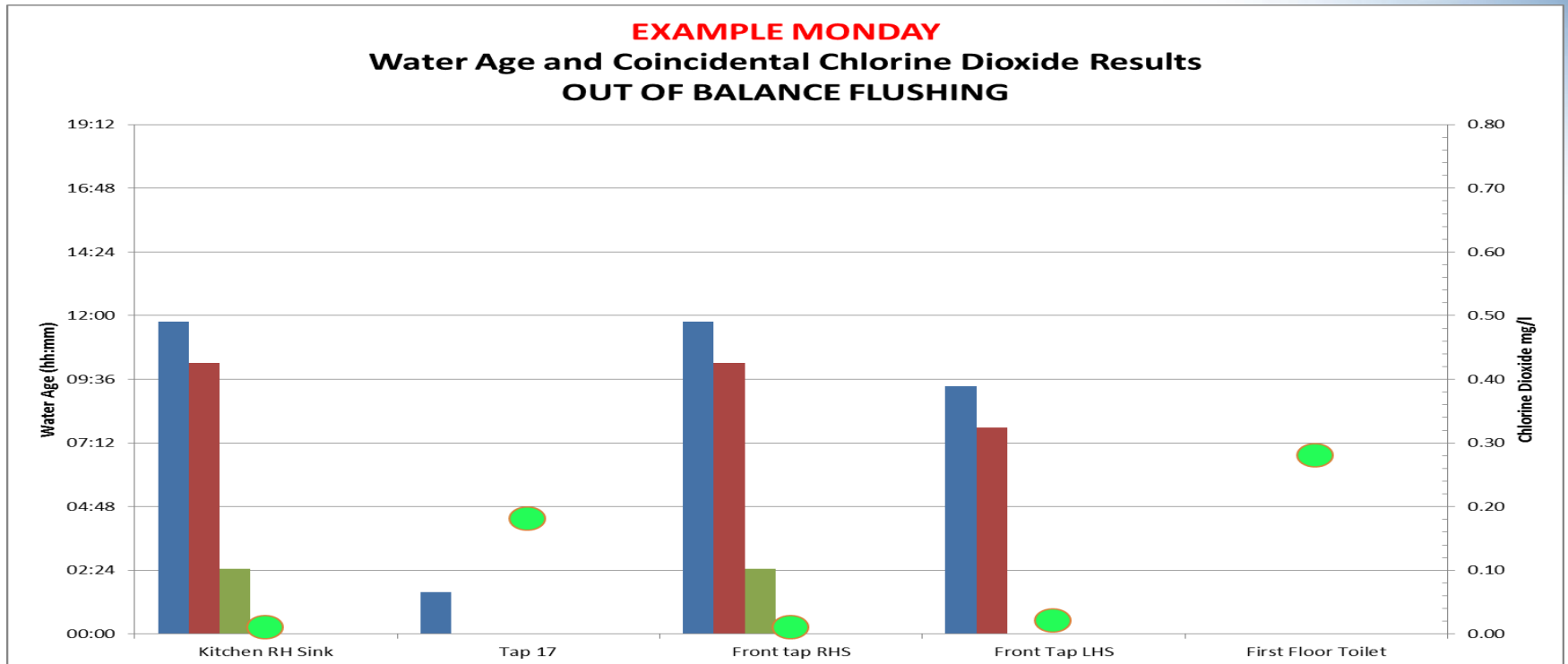
- Water Safety Plan
 - WHO and UK Government recommendation
- Emergency Procedures
 - Define your emergency – what can be tolerated
 - Know how people use the building
- Know your distribution system
- How often do ‘your’ emergencies occur?
 - You may be more vulnerable than you think

Your Emergency Plan

- Assess who else will be affected
 - Other buildings on the street
- Self challenge - is it robust enough?
- Has it been stress tested?
 - **Do you have a procedure for stress testing?**

Water Storage - Stagnation

- The concept of water age
- A powerful tool for quality management

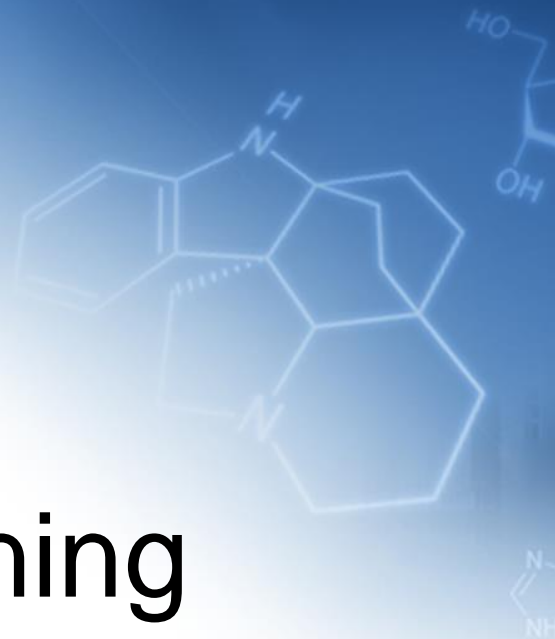


Strategies To Adopt

- Control abdication culture – case law
- Educate
- Introduce accountability beyond L8
- Understand your system
 - Go beyond the minimum
- Prepare a plan
- Test the plan
- Rehearse the plan

What Have We Seen?

- The problem is here
- Regulations are limited in ensuring supplies to commerce
 - It's your problem
- The impact of water storage - stagnation
- A management tool, Water Safety Plans
- Preparations you can make



Thank you for listening

Tim White
Marquis & Lord