

# World Plumbing Conference – Effective Water Risk Management, A Different Perspective



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**DATE:** 13/09/2019 **FACILITATORS:** Ryan Milne – Director



**EXCELLENCE THROUGH WATER.**

# WHAT WE DO

We are specialists in...



Legionella Management



Drinking/ Potable  
Water Management



Recycled / Wastewater  
Management



Water Quality Risk  
Assessment & Incident  
Management



Water Quality / Legionella  
Compliance



Exposure Risk Assessment



Assessment of Health  
Based Targets (HBTS)



CSSD Compliance



Water Efficiency

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# OUR CLIENTS

Some of our existing clients



RioTinto

serco



BHP



Berrington



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# Presentation Agenda and Objectives

## Water Risk Management – A Different Perspective

### ***Presentation Agenda:***

- Background – A Risk that Cannot be Ignored
  - Changing Landscape
  - A Plumbers Understanding of Water Hygiene
- Typical Challenges and Examples
- Looking Forward - What Does Good Look Like
- Questions

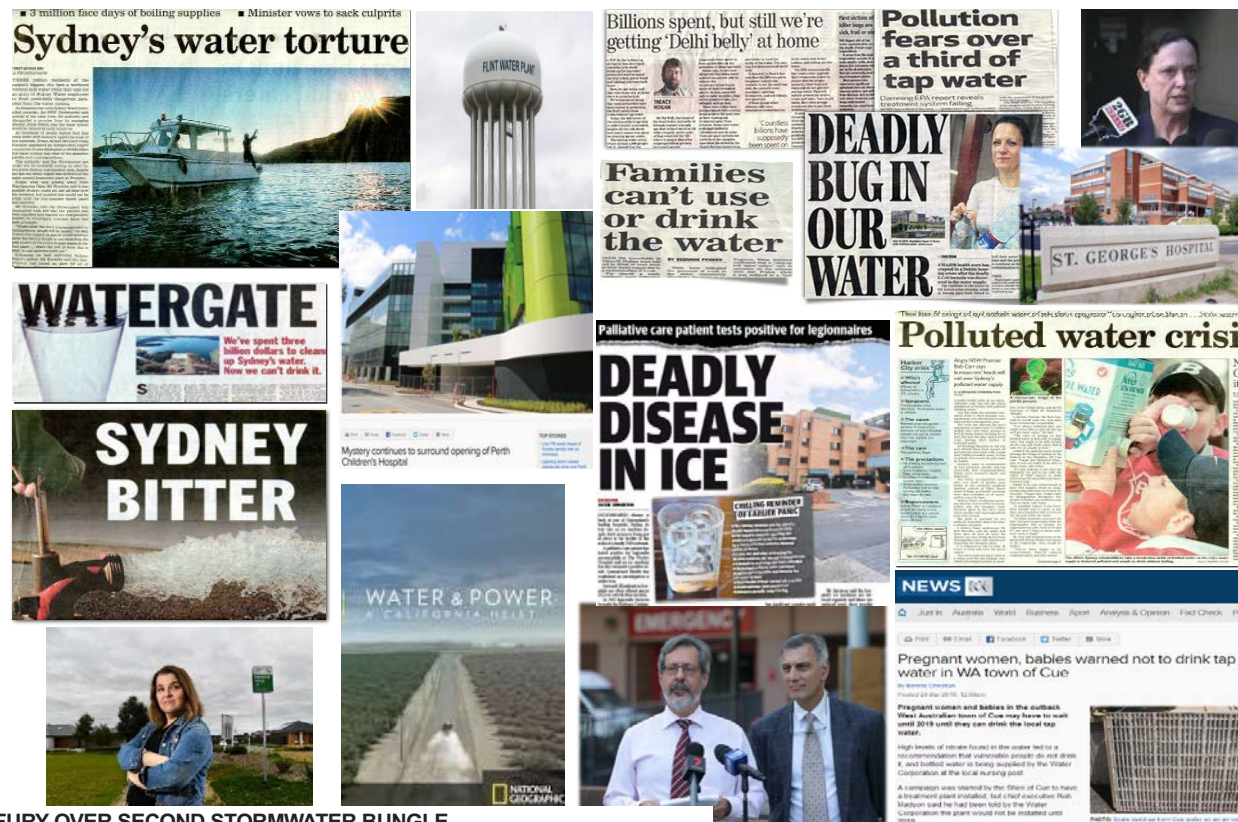




# Setting The Scene – Water and The Media

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## Changing Landscape



**GET IN TOUCH** **FURY OVER SECOND STORMWATER BUNGLER** Another recycled water blunder saw a Paralowie woman drink and bathe in recycled water, prompting calls for a statewide audit.

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# Setting The Scene – Why Control Water Quality ?

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Water Quality Can Impact Public Health

The main objectives of controlling water quality within distribution systems include:

1. **Protection of public health** (safety).  
i.e. complying with health guidelines
2. **Consumer satisfaction**  
i.e. complying with aesthetic guidelines
3. **Infrastructure / Maintenance Considerations**  
i.e. corrosive or scaling waters



Grieving mother warns of the deadly parasite lurking in our water  
By Natalie Ede on 10th November 2015



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# Setting The Scene – Water Quality

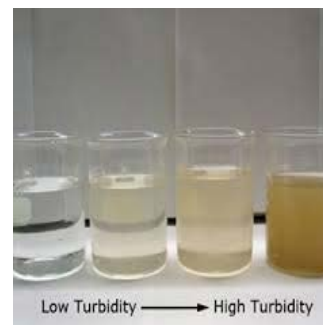
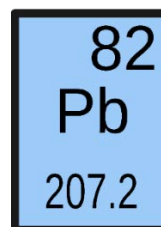
## Factors That Influence Water Quality

There are four main categories of quality-influencing factors:

- Microbiological species (**greatest risk**)
- Chemical compounds – inorganic and organic
- Physical/aesthetic factors affecting acceptability
- Radioactive species

Exposure to pathogens can be from systems other than drinking water - **Water quality needs to be fit for purpose – fit for intended end use**

**What is a typical plumber's understanding of water hygiene ?**



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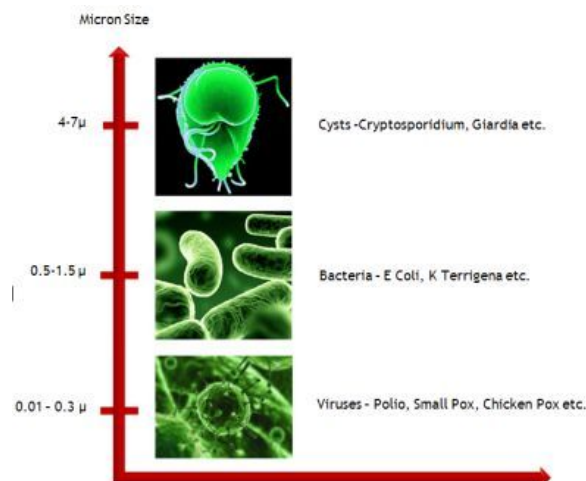
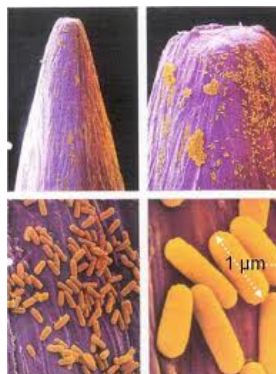
# Setting The Scene – Pathogens

## Water Quality Pathogens

Pathogens are micro-organisms that can cause disease.

Pathogens of particular concern include:

- Protozoa
- Bacteria
- Viruses



Organism	Disease	Transmission	Common clinical features ( <a href="http://www.diagnostics.com">www.diagnostics.com</a> )
<b>Viruses</b>			
Hepatitis A	Viral hepatitis	Ingestion of contaminated water	Flu-like symptoms, fever, headache, nausea, muscle aches, weakness, jaundice & abdominal pain
Hepatitis E	Viral hepatitis		Flu-like symptoms, fever, fatigue, nausea & vomiting
Adenovirus	Viral gastroenteritis		Watery diarrhoea, vomiting, headache, fever & abdominal cramps
Rotavirus	Viral gastroenteritis		Various
Calicivirus (incl. Norovirus)	Viral gastroenteritis		Watery diarrhoea, vomiting, headache, fever & abdominal cramps
<b>Bacteria</b>			
Vibrio cholerae	Cholera	Ingestion of contaminated water	Watery diarrhoea, vomiting, rice-water stools & muscle cramps
Aeromonas spp.	Aeromonas associated diarrhoea		Cellulitis, wound infection & acute diarrhoea
Salmonella spp. (incl. S. typhi)	Salmonellosis (incl. Typhoid)		Severe headache, vomiting, diarrhoea & abdominal cramps
Shigella spp.	Shigellosis		Diarrhoea, fever & nausea
Campylobacter spp.	Campylobacteriosis		Diarrhoea, abdominal pain & fever
Escherichia coli	Gastroenteritis		Watery diarrhoea, abdominal pain, mild fever & anaemia
Yersinia spp.	Yersiniosis		Fever, diarrhoea and abdominal pain
Helicobacter pylori	Gastritis		Heartburn, nausea & vomiting
Mycobacterium spp. (not M. tuberculosis)	Varies		Varies, includes wound infections, skin disease & ulceration
Leptospira spp.	Leptospirosis	Ingestion of or skin contact with contaminated water	Fever, joint pain, headache and chills
Pseudomonas spp.	Varies		Varies, includes wound infections, skin disease & ulceration
<b>Protozoa</b>			
Giardia spp.	Giardiasis	Ingestion of contaminated water	Diarrhoea, abdominal pain, nausea, vomiting, fever, chills & weight loss
Cryptosporidium spp.	Cryptosporidiosis		Watery diarrhoea, nausea, vomiting & mild fever
Cyclospora spp.	Cyclosporiasis		Watery diarrhoea, vomiting, nausea, stomach cramps & fever
Entamoeba histolytica	Amebiasis		Diarrhoea, abdominal pain & fever
Acanthamoeba spp.	Varies	Ingestion of or skin contact with contaminated water	Severe eye pain, red eye, blurred vision & excessive tearing
<b>Fungi</b>			
Microsporidium spp.	Microsporidiosis	Ingestion of contaminated water	Watery diarrhoea, weight loss, malnutrition & weakness
Zygomycosis spp.	Zygomycosis		Pain around the eye, facial pain, headache & nausea

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# Setting The Scene – Water Quality

## Aesthetic Awareness

Typical aesthetic issues include:

- Colour
- Taste
- Odour
- Feel

Australian Drinking Water Guidelines (ADWG) has aesthetic guideline values.

Should we investigate aesthetic concerns?



# Typical Water Risk Management Challenges – Plumbing Perspective

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The top 5 risks associated with the supply of water from a plumbing and potential public health perspective include:

- 1. Complacency** (“We have never had anybody get sick from our drinking water” / “We never detect any E.coli”)
- 2. Lack of awareness and understanding** of potential pathogens (raw and treated water) and impact of actions to water quality
- 3. Lack of awareness / inadequate management of disinfection residuals** (barrier to end points / point of use)
- 4. Insufficient preparedness** for adverse water quality incidents (e.g. bursts and repairs)
- 5. Inadequately updated** Management Plans and supporting procedures.



Awareness is key to mitigating the above risks

# Typical Water Risk Management Challenges – Plumbing Perspective

In general (based on our audits and evaluations) licenced **plumbers are not routinely set up to succeed**. Other challenges include:

- **General lack of awareness and understanding of applicable Water Quality Guidelines** (typically focused only on plumbing code)
- **Not trained or aware of sample collection protocols** / requirements (e.g. AS 2031 or AS 5667)
- **Ill equipped to interpret water quality results or understand their significance**
- **Corrective actions are often delayed or not performed effectively** (e.g. super-chlorination, chlorine contact times and neutralisation)
- **System commissioning challenges** (requirements, effectiveness, timeframes, impacts to water quality)
- **Lack of understanding of the importance of operational monitoring results** (lead vs lag indicators)
- **Lack of awareness of importance of effective record keeping**

1. Other?





# Challenges – Examples - Training & Awareness

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# Challenges – Examples - Training & Awareness

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# Challenges – Examples – Training & Awareness

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# Challenges – Examples – Training & Awareness

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# Challenges – Examples - Training & Awareness

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# Challenges – Examples - Training & Awareness

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# Challenges – Examples – Training & Awareness

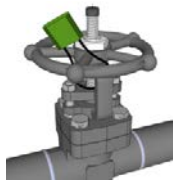
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# Challenges – Examples – Training & Awareness



**THE AGE Victoria**  
April 14, 2015  
Vorsprung durch Technik

Victoria News Traffic Conditions State Election 2014 AFL News Quizzes

You are here: Home > Victoria >

## School drinking fountain connected to recycled water

April 14, 2015 ☆ Read later

Henrietta Cook

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**Water Cart Hire - Perth**  
Drinking Water - Dust Control - Roads Domestic & Commercial - Statewide!

Almost every school has a drinking fountain that no student dares touch.

That's now certainly the case at St. Peters College's Cranbourne East campus, where students have been unintentionally drinking from a fountain connected to recycled water from a sewerage treatment plant for more than a year.

The fountain's water supply was disconnected on April 1 after a thirsty maintenance worker drank from the bubbler and noticed the water did not taste right.

Authorities were alerted and discovered that recycled water from the Eastern Treatment Plant was connected to the fountain. The incident is now being investigated by the Victorian Building Authority.

**IF YOU DRINK FROM THE GIRLS' TAP YOU GET GIRL GERMS!**  
... AND THE BOYS' TAP HAS BOY GERMS!  
YOU'RE BOTH RIGHT

Illustration: Matt Golding. Illustration: Matt Golding

super using  
scientist  
report 184

## Investigation of the potable water contamination incident at Ranger mine March 2004

Supervising Scientist

Australian Government  
Department of the Environment and Heritage  
Supervising Scientist

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# What Does Good Look Like - Delivery of Safe Water

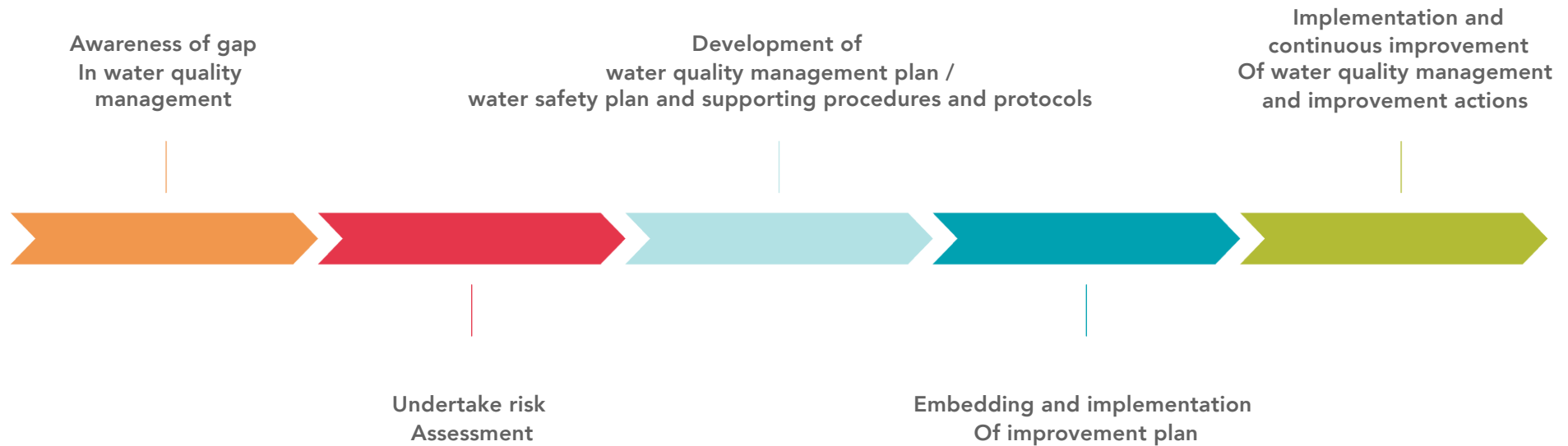
The delivery of safe , good quality and reliable water (fit for purpose) requires:

- **Understanding water quality risks to consumers / users** (awareness)
- **Implementing barriers** to control those risks
- **Monitoring and response** to ensure continuous barrier operation
- **Understanding legal and duty of care** obligations.



# Effective Water Quality Management – It's a Journey

Where Are You on the Journey ?



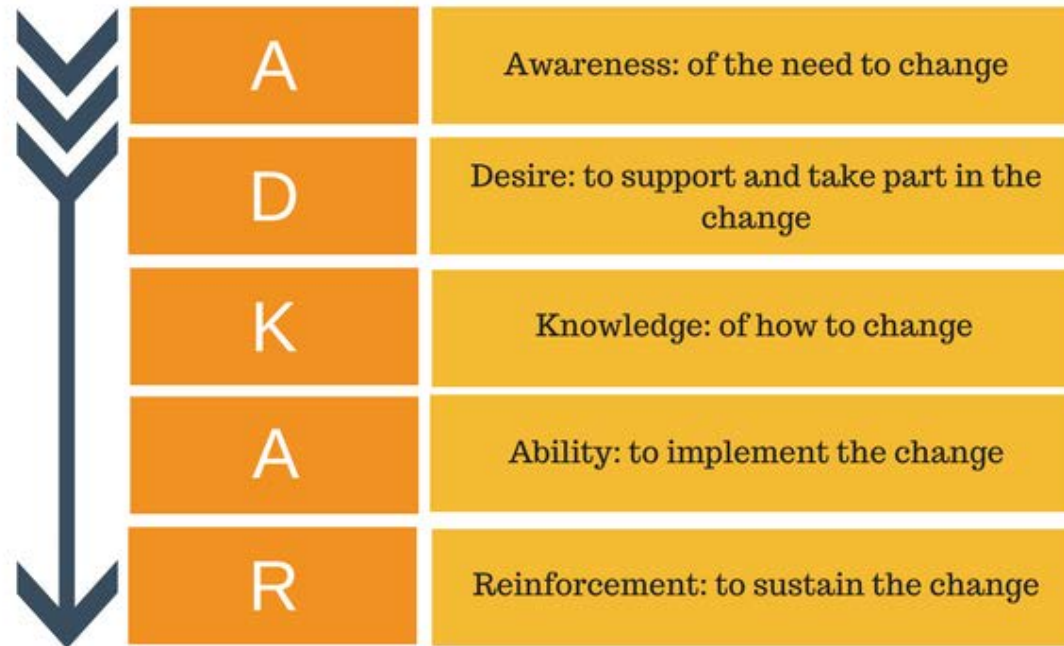
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# Role of Training in Unlocking The Water Quality Risk Management Journey

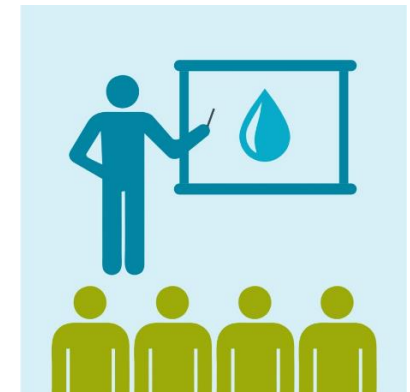
## ADKAR Model of Change



# Role of Training in Unlocking The Water Risk Management Journey

The key objectives of the water quality awareness training are to:

1. Empower Licensed Plumbers to perform their duties in relation to water quality **with more confidence and competence**
2. **Improve public health outcomes** by focussing on key water quality risks
3. Contribute towards a plumbers **Continuous Professional Development**
4. Inform plumbers of the **latest guidelines and standards**



# What Does Good Look Like – Awareness & Training

Adequate awareness, training and the provision of relevant information is recognised as essential '**duty of care**'. Using a risk-based approach water hygiene awareness training is central for all plumbers with special consideration given to:

- Health Care facilities
- Aged Care facilities
- Remote locations
- Self-managed water systems (plumbers operating water treatment equipment)
- All other systems.



Elderly



# What Does Good Look Like – Awareness & Training

Role	Recommended Minimum Qualification Requirements
Key Personnel <sup>3</sup> Involved in the Operation, Management and Maintenance of Drinking Water Systems	Drinking Water Quality Awareness Training <sup>1</sup>
Drinking Water Quality Samplers	Appropriate water sampling and monitoring <sup>1</sup>
Drinking Water Treatment Plant Operator	Certificate III in Water Operations <sup>4</sup>
Drinking Water Treatment Plant Supervisors	Relevant Industry Experience <sup>2</sup> Drinking Water Quality Event Response Training

•<sup>1</sup>For personnel that do not have a Certificate III in Water Operations

•<sup>2</sup>Once appointed supervisors will be required to obtain their Certificate III in Water Operations

•<sup>3</sup>Key personnel includes supervisors, superintendents and management level personnel whose accountabilities include operation, maintenance and / or management of a component of the drinking water system

•<sup>4</sup>Existing operators will be provided with a reasonable time and assistance to complete their Certificate III in Water Operations



# What Does Good Look Like – Effective Record Keeping & Working Smarter

- Starts with awareness of key data .  
Records such as operational data (such as flushing records, free residual chlorine, temperature – efficacy of barriers and effectiveness of remedials)
- Use of software such as Compliance Tool
- Drives the implementation of the plan and associated program / protocols
- Provides central repository for all water quality related records
- Provides foundation for sound risk based decision making (all the pieces of the puzzle)
- Drives accountability / full transparency (proof of presence, task completion and performance)

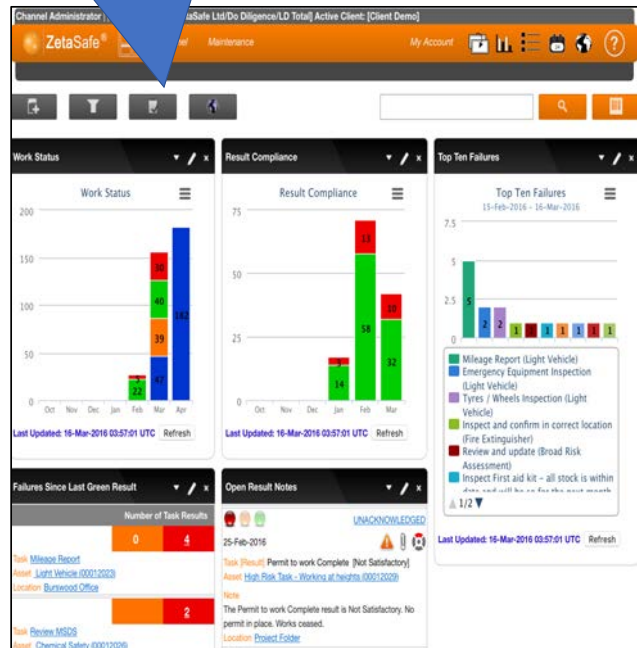


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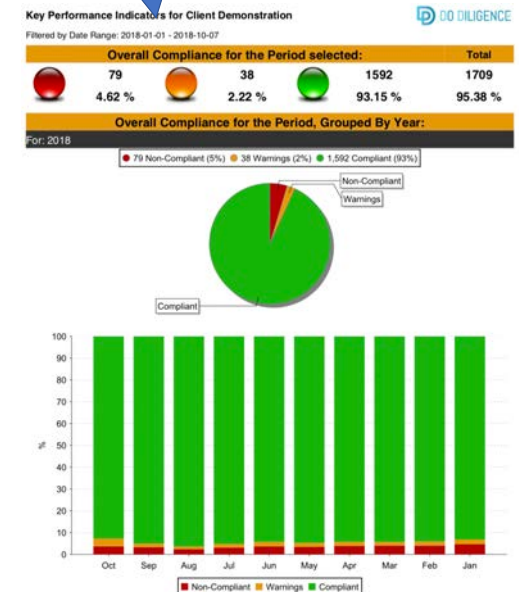
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# What Does Good Look Like – Effective Record Keeping & Working Smarter

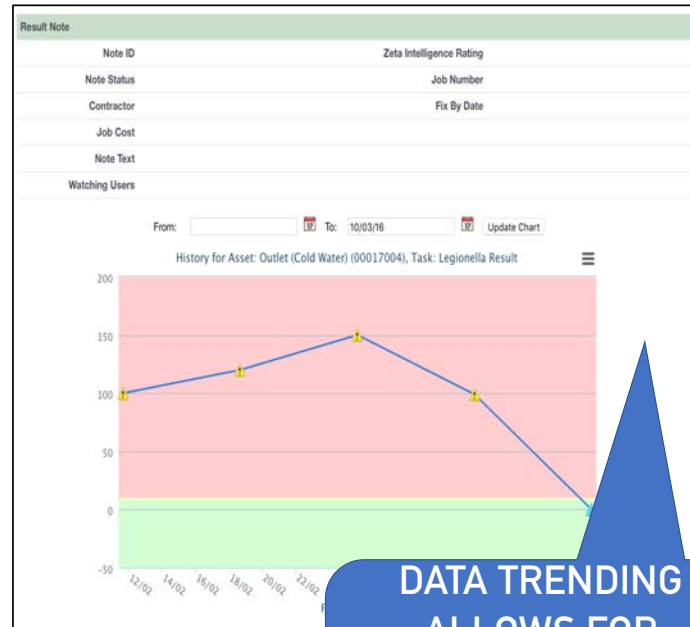
LIVE DASHBOARD AVAILABLE  
24/7 – Performance per  
Hydraulic Zone



Automated Reporting



DATA TRENDING  
ALLOWS FOR  
ANALYSIS AND  
INFORMED DECISION  
MAKING

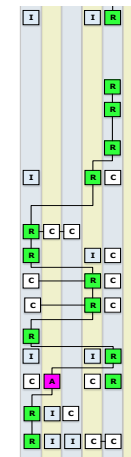
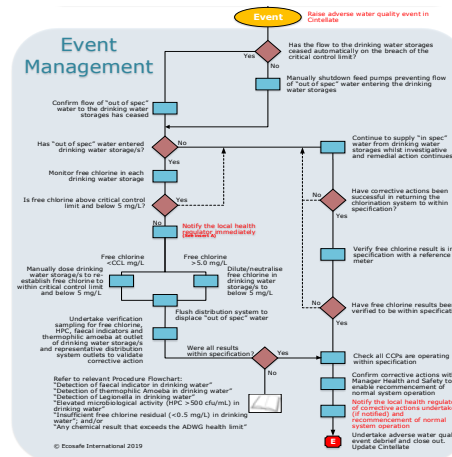
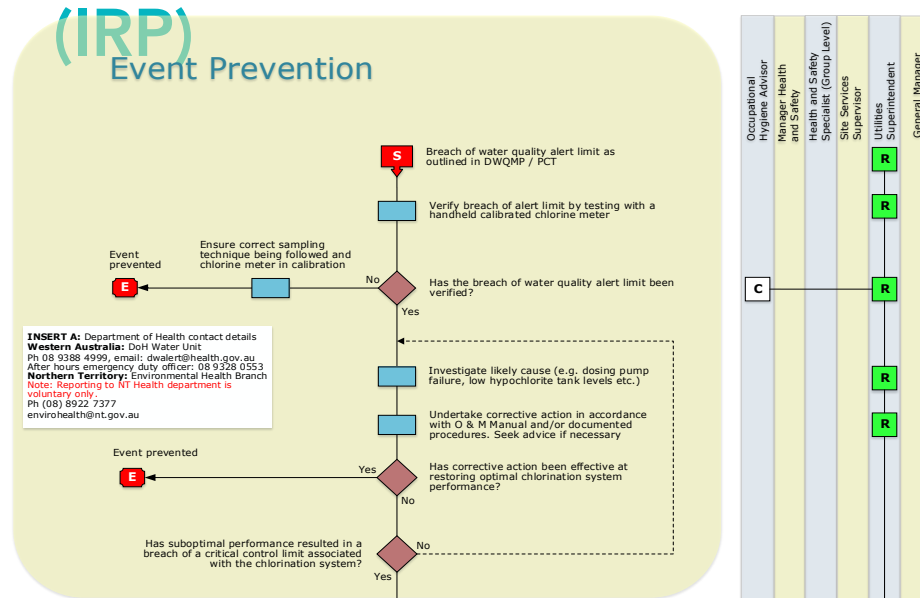


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# What Does Good Look Like - Incident Response Protocols

- The IRP should be pre-determined and cover all possible scenarios.
- Personnel to be aware of IRP's.
- Should be as prescriptive as possible.
- Should include an outline of all nominated roles and responsibilities.
- Should include details surrounding the need for internal / external reporting.
- Should include timeframes / actions for closing out the incident.



# Looking Forward - Key Considerations



The Landscape continues to Change in Water Quality Risk Management. The following merits further consideration:

- Plumbers have the **potential to directly impact public health** and hence need to be **better informed** so that aware of this potential to impact public health
- Use a risk based approach to **close the water hygiene awareness / training gap** endemic within plumbers (start with high risk facilities) both at plumber training and operational level
- **Consideration of 'minimum water hygiene awareness' training requirements** for high risk facilities
- How plumbing community intend to practically respond to the need for increased accountability?







Thank You for Your Time

ANY QUESTIONS?

