Legionella Regulations in South Australia

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Government of South Australia
SA Health

Health Protection Programs

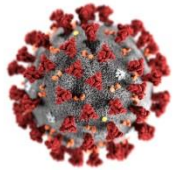
Part of Health Protection branch with Health Protection Operations and Wastewater

- Team has 5 staff members

What do we do?

- Responsible for all environmental health portfolios excluding food and wastewater…
- This includes:
  - Mosquito surveillance and control
  - Clandestine drug laboratories
  - Public swimming pools and spa pools
  - Exhumation of human remains
  - Skin penetration, tattooing, and personal appearance
  - Severe domestic squalor
  - Animal contact, and public health pests
  - Management of public health and safety at events
  - Sanitation and personal hygiene facilities
  - And finally… *Legionella*!
- Create/review policy/regulations for all the above portfolios
- Provide education/training for Environmental Health Officers (EHOs)

Health Protection Programs



- Investigate outbreaks of environmentally mediated diseases

Legionellosis

COVID-19

Murray Valley Encephalitis virus

Q fever

HIV/Hepatitis C

Pseudomonas aeruginosa

Ross River virus

Mycobacterium avium intracellulare complex (MAC)

Cryptosporidiosis

Salmonella

Barmah Forest virus

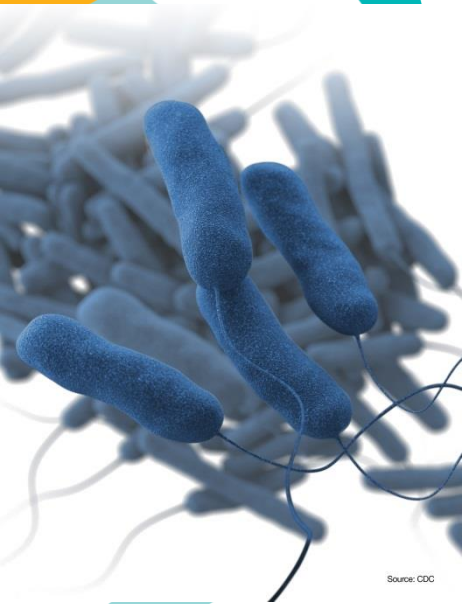
STEC

Norovirus

- *Legionella* ecology
- Legionellosis clinical features
- Detections, notifications, and case investigations
- *Legionella* testing
- *Legionella* related risks
- Regulatory framework in South Australia
- Annual inspections – Findings from HPO
- *Legionella* Regulations Review

Legionella ecology

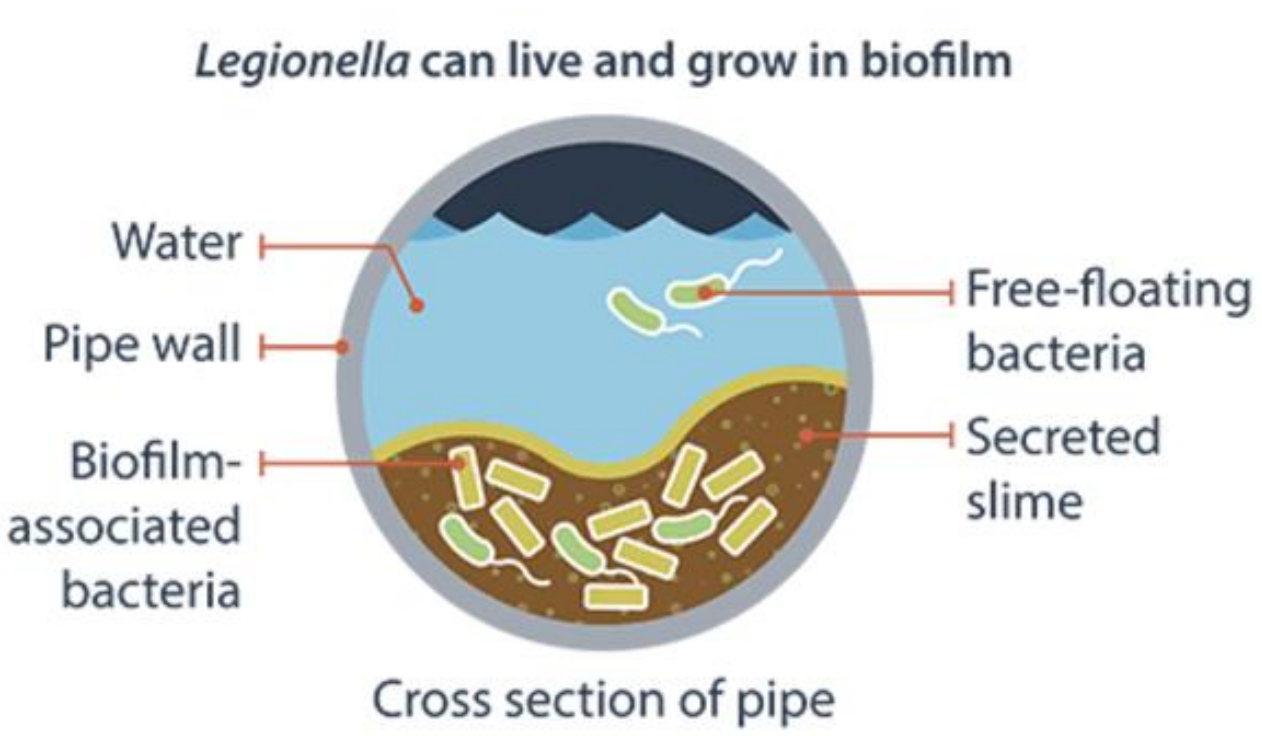
- First identified in 1977 following an outbreak of fatal pneumonia at an American Legion conference in 1976 (34 deaths, 220 illnesses)
- Initially some skepticism. The US National Enquirer referred to it as a hoax.
- Over 70 species of which less than 20 cause disease
- The most significant species is *Legionella pneumophila* although *L.longbeachae* an issue in Sth Aust
- There 16 serogroups of *L.pneumophila*. Serogroup 1 causes over 90 % of waterborne cases of LD



Legionella ecology

- *Legionella* is a slime bacterium that grows best in the presence of dirt, slimes, sludges and deposits. Multiplies within amoebae
- Grows in warm water (20-45^{O}C). Generally needs to be released in aerosols to cause infection.
(> 50^{O}C dies slowly; >60^{O}C dies quickly)
- Killed easily by chlorine and other disinfectants when **suspended in water**
- The organism is extremely common in water environments but infections are uncommon

Legionella & biofilm



Water temperature and *Legionella* proliferation

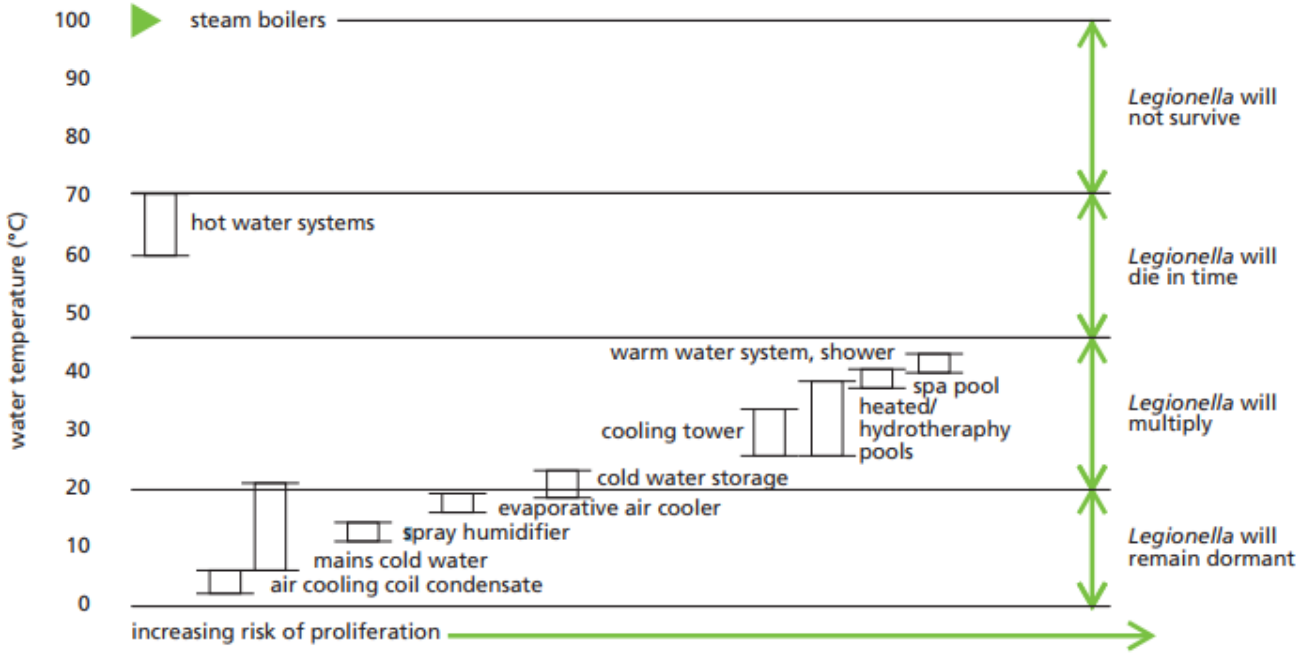


Figure 1

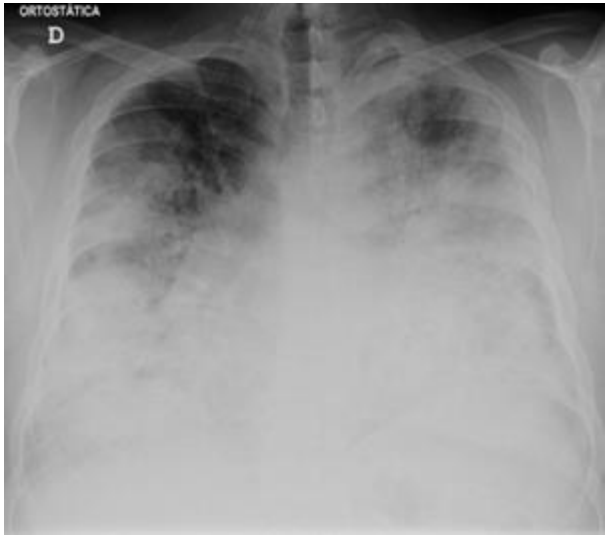
Water temperature & increasing risk of *Legionella* proliferation

(Modified from: New South Wales Health Department, Code of Practice for the Control of Legionnaires' disease.*)*

Legionnaires' disease

- Legionnaires' disease is a severe pneumonia with a mortality rate of 10-20 %. Incubation period 2-10 days (usually 5-6 days). Symptoms can include headache, fever, sore muscles, non-productive cough

- Pontiac Fever has flu-like non-pneumonic symptoms. Incubation period 5-65 hours. Self limited.

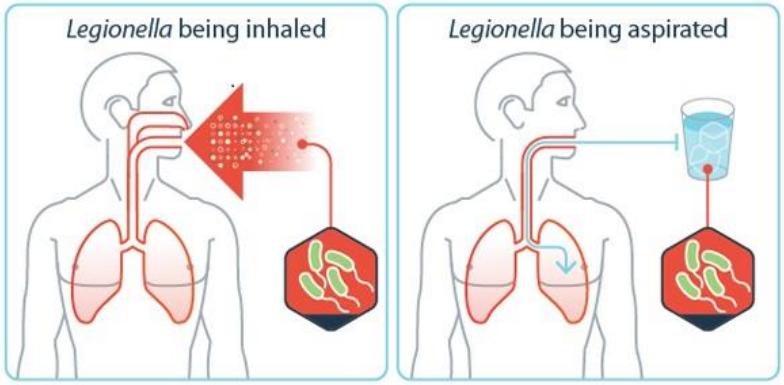


Legionnaires' disease

- Originates from water bodies that are colonised with *Legionella (*spa pools, cooling towers, nebulisers, CPAP machines, medical devices)

- Risk of illness increased:
  - immunocompromised
  - over 45 and a male
  - a smoker
  - a heavy drinker
  - underlying respiratory illness

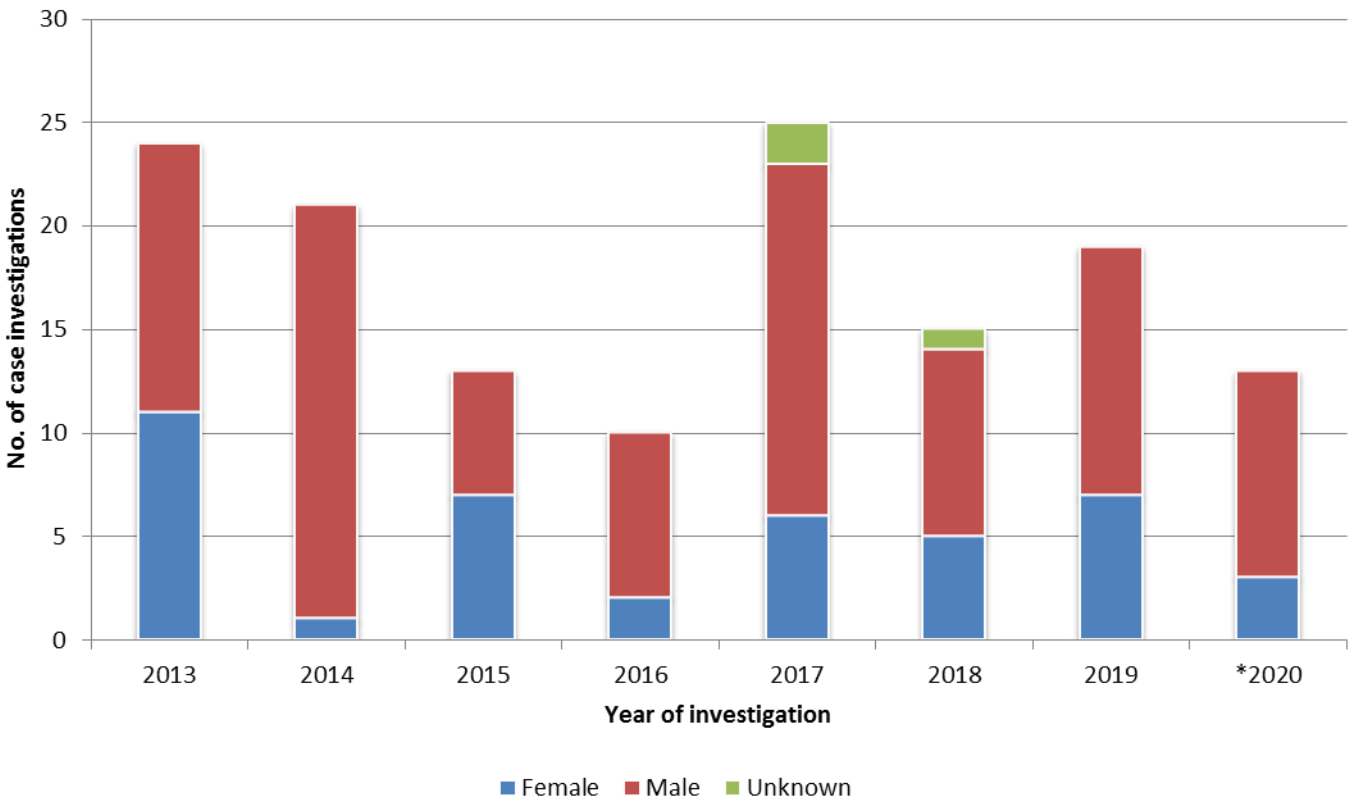
- Transmission through inhalation of aerosols OR aspiration



Investigation Protocol - SA

- All Legionellosis infections reportable to SA Health
- Each case is investigated as though it is a sentinel in an outbreak
- Case/case representative interviewed to track movements in 10 days prior to onset
- Referral to local councils
- Desktop investigations and sampling as appropriate
- Home water system tested
- Focus on precautionary action

LP1 Investigations in SA



SA Health

Legionnaires' disease outbreak Adelaide 2017

Legionnaires' disease cases reported in Adelaide

Posted 12 May 2017, 4:49pm

Three Legionnaires' disease cases in Adelaide have prompted health authorities to urge businesses to decontaminate air-conditioning and industrial cooling towers.

RELATED STORY: Two more cases of legionnaires' disease reported in SA

SA Health's director of health protection, Chris Lease, said three cases of the disease had been reported recently in two males and one female.

He said all three people, aged 58 to 77, had been hospitalised.

"While there is no source identified for the recent cases which may or may not be related, the investigation into the cases is continuing and precautionary work to address the identified areas of risk is already underway," Dr Lease said.

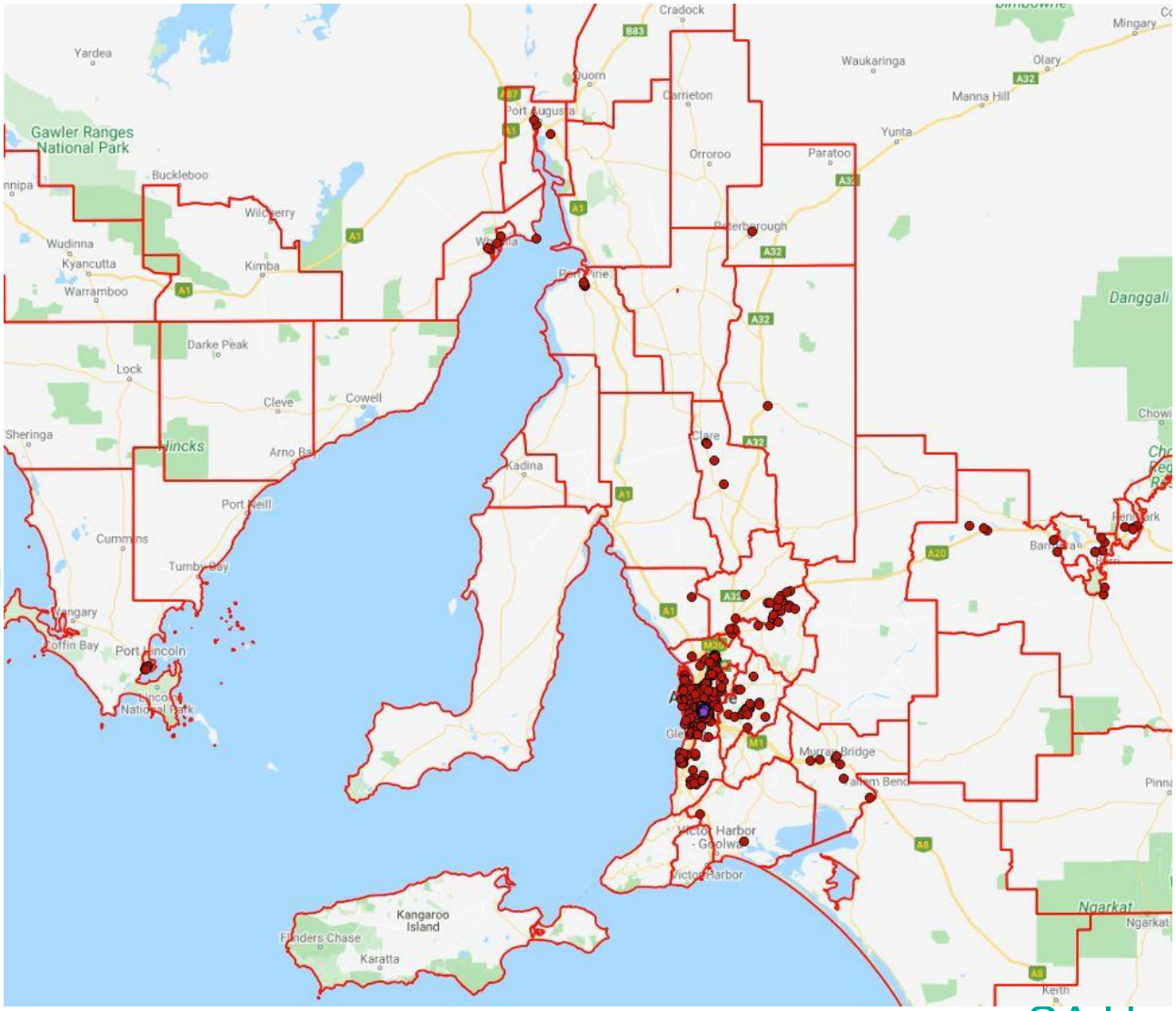
He said when a cluster of cases with locations in common were found the health authority would work with local councils to identify areas of risk.

Dr Lease said the cases were an important reminder to all cooling tower operators to maintain their systems.

SA Health has called on cooling towers operators in the southern metropolitan area to decontaminate systems.

The new cases follow a cluster of nine cases in January, which were suspected to have been contracted within the Adelaide CBD, although the source was not identified.

CWS register for South Australia



*As at 2017

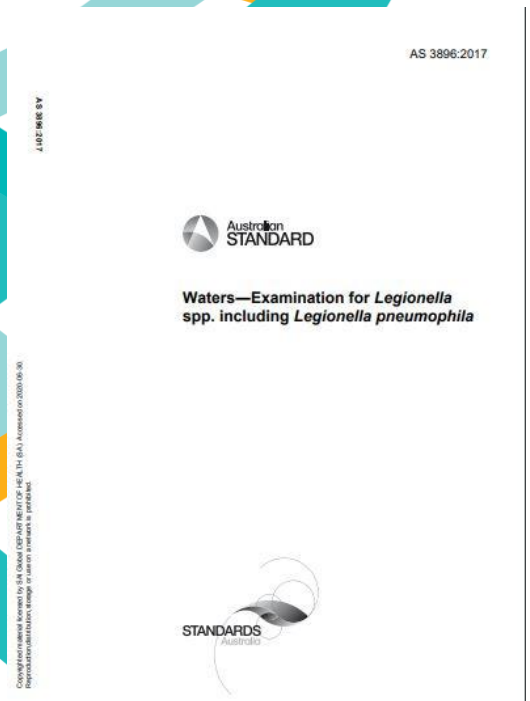
SA Health

Legionella detections in cooling water systems

Year	Notifications	Range (cfu/mL)
2013	10	1000 - 19,200
2014	22	200 - 45,000
2015	11	10 - 8,200
2016	13	100 - 37,000
2017	17	22 - 14,000
2018	13	400 - 8,700
2019	9	1200 - 120,000
*2020	4	1000 - 43,000

*2020: Year to date

Legionella testing



- Culture is the gold standard (as per AS 3896-2017)
- 7-10 days to get a result
- Legionella exists in viable but non-culturable forms
- Legionella lives in biofilms – absence of evidence is not evidence of absence
- Important in case investigations
- Detections are evidence you have a problem – take action, investigate, review

Probability and severity

- Risk = Exposure (to hazard) x Probability x Severity

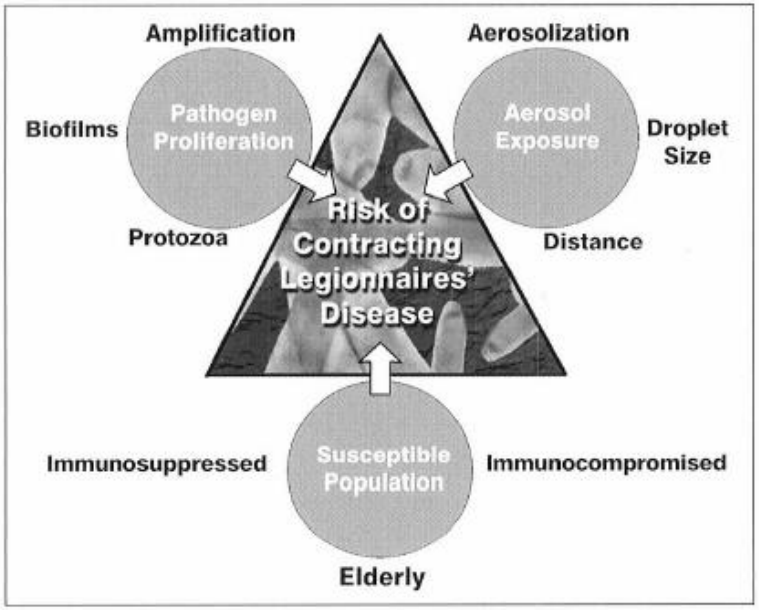
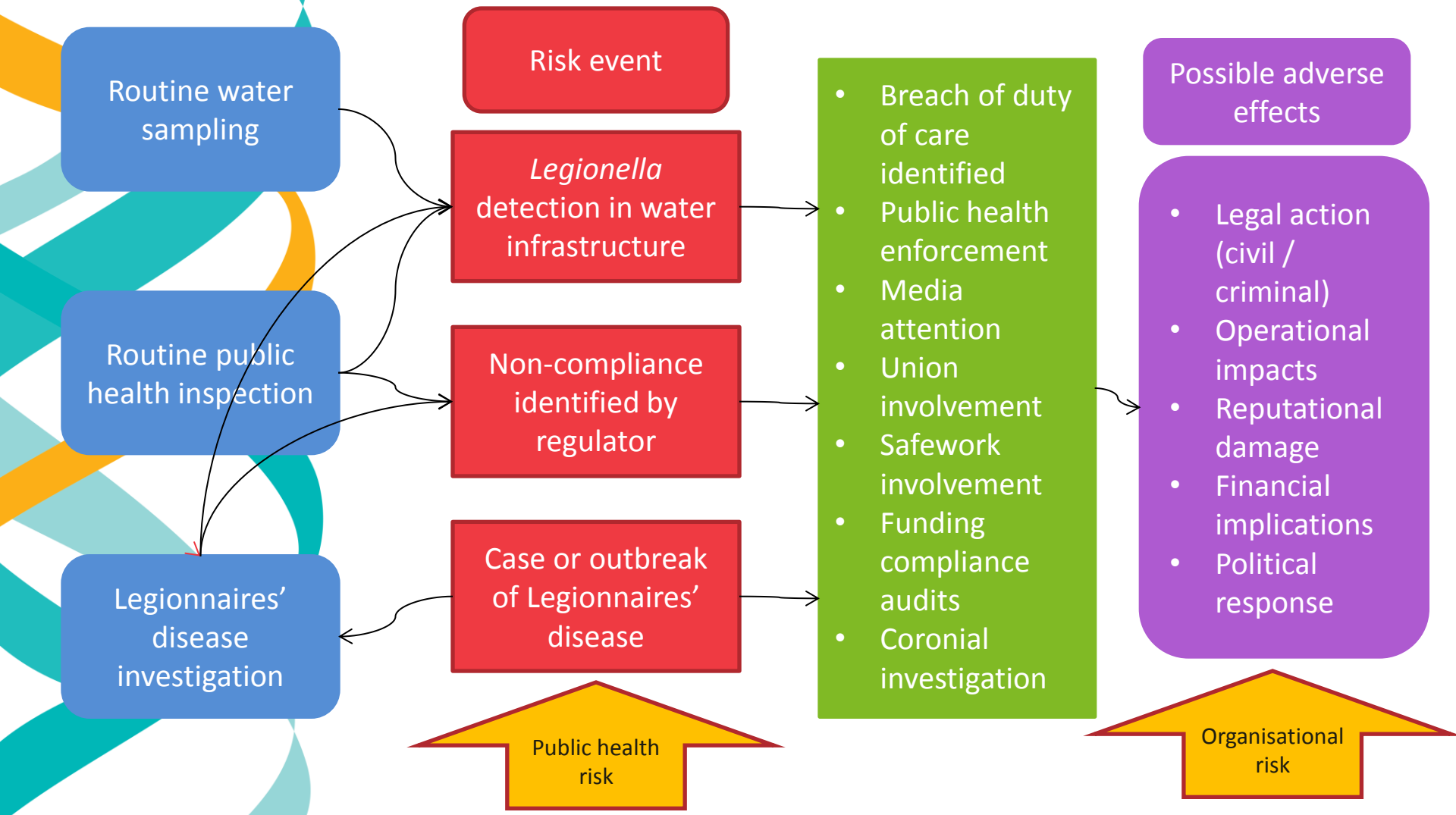


Figure 1: Factors that affect legionellosis risk.

Source: Assessing Risk of Legionella
by Andrew J Cooper; Howard R Barnes;
Eric R Myers 2004

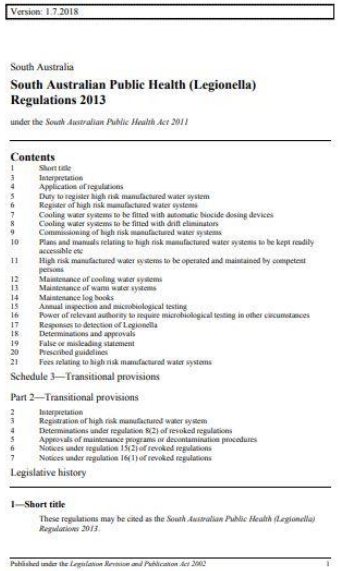
Legionella related risks



South Australian Public Health (Legionella) Regulations 2013

SA Health

South Australian Public Health (Legionella) Regulations 2013



Version: 1.7.2018

South Australia

South Australian Public Health (Legionella) Regulations 2013

under the *South Australian Public Health Act 2011*

Contents

1—Short title

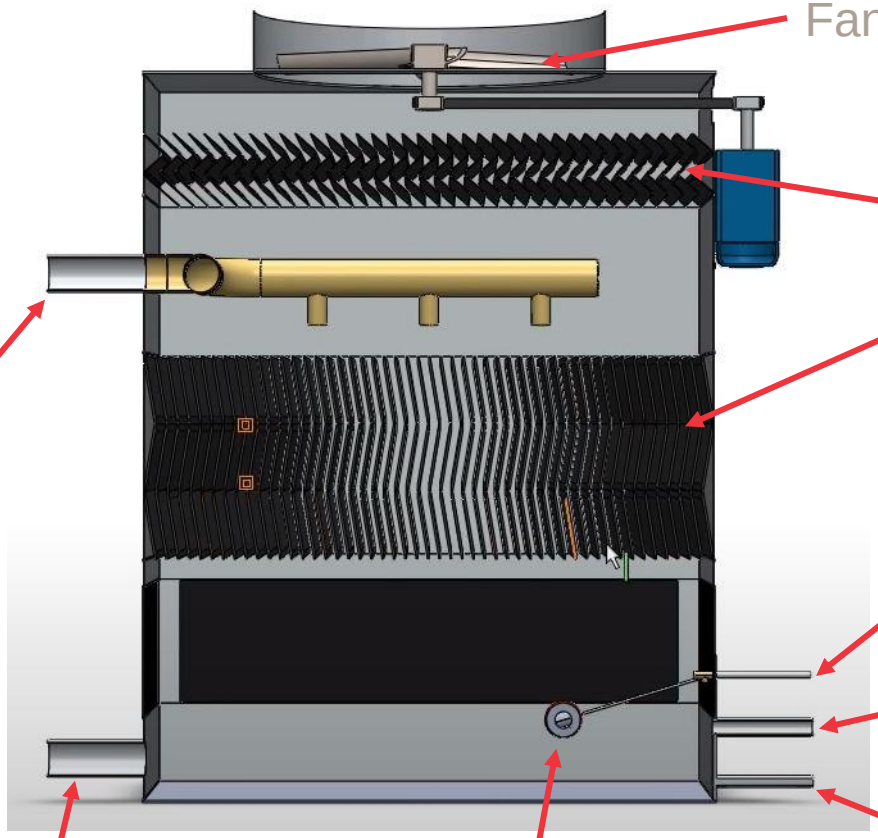
These regulations may be cited as the *South Australian Public Health (Legionella) Regulations 2013*.

- Revoked the *Public and Environmental Health (Legionella) Regulations 2008*
- High risk manufactured water systems
  - Cooling water systems
  - Warm water systems
- Administered by SA Health and local councils (as relevant public health authorities for their areas)

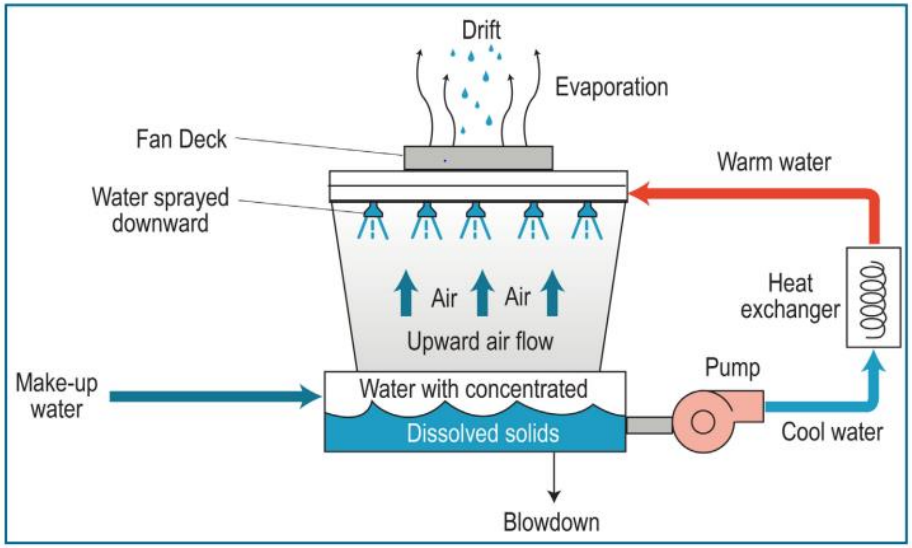
South Australian Public Health (Legionella) Regulations 2013

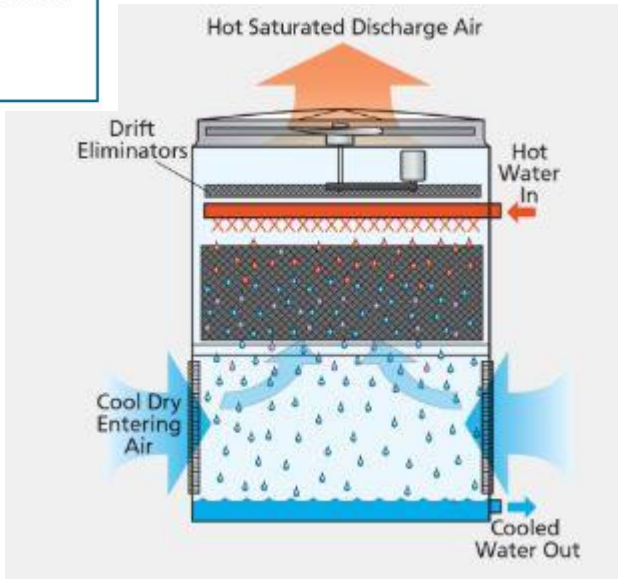
- Prescribed guidelines:
  - *Guidelines for the Control of Legionella in Manufactured Water Systems in South Australia*
  - *AS/NZS 3666.1: Design, installation and commissioning*
  - *AS/NZS 3666.2: Operation and maintenance*
  - *AS/NZS 3666.3: Performance-based maintenance of cooling water systems*
  - *SAA/SNZ HB32: Control of microbial growth in air-handling and water systems in buildings*

Cooling water systems



Cooling water systems





SA Health

General regulatory requirements

- Registration with local council
- Systems to be managed by competent person
- Plans and manuals to be maintained
- Maintenance programs
  - ASNZS 3666.2, or
  - ASNZA 3666.3, or
  - Alternate program (as approved by Minister)
- Annual inspection and microbiological sampling

** Access to systems is essential in ensuring and demonstrating compliance

Regulation 7 - Automatic biocide dosing devices

- Mandatory on all systems (no exemptions)
- Must operate at all times while the system is in operation
- Dual biocide (incorporating a halogen based disinfectant) best practice
- Require active monitoring during periods of hot weather / high evaporation where make up water is being added (dilution) OR where total dissolved solids are high and blow down rates are up (disinfectant loss)

Regulation 8 - Drift eliminators

- **Drift eliminators** (mandatory unless otherwise approved by the Minister)
  - Must cover full exhaust air stream to prevent air by-pass
  - Performance criteria as per Clause 4.4 of 3666.1
  - Must be able to be cleaned *in situ* or removable without damage

Regulation 9 - Commissioning

- Essential prior to bringing a system into service
- As per Clause 4.7 3666.1
- Disinfection/cleaning and pre-inspection vital
- SA Repat Hospital 1986 – new towers that were poorly commissioned and disinfected likely source of outbreak

Regulation 11 - Competent persons

- All HRMWS to be operated and maintained by a competent person as defined in regulation 15(3)
- Competent to ensure compliance with the Regulations
- Clarity on roles / responsibilities and clear communication pathways essential to ensure compliance (e.g. notification of *Legionella* detections in systems)

Regulation 14 – Maintenance log books

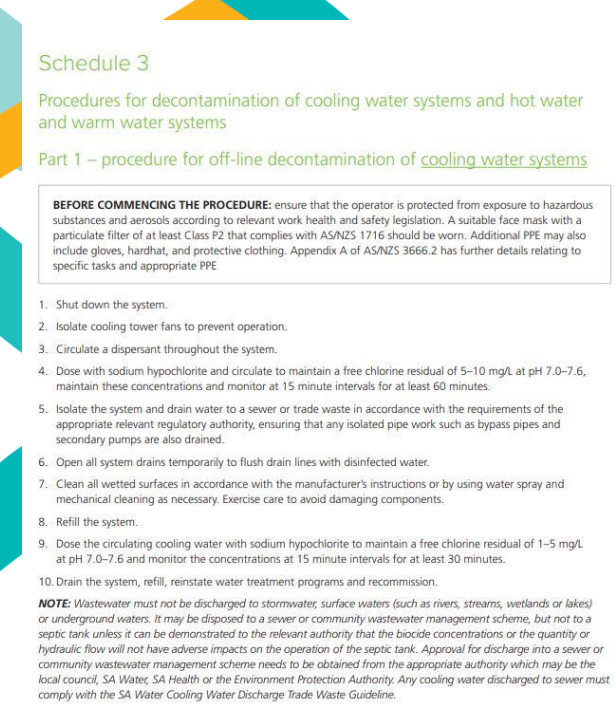
- Must be kept up to date
- As per Clause 2.6.2 3666.2
- Must contain ALL micro results
- Details of disinfection protocols (type/quantity and frequency)
- Must be readily accessible
- Must be available for inspection
- Maintain for 5 yrs after date of last entry

Regulation 15 & 16 - Legionella testing

- Can be required where the relevant authority is investigating a case/outbreak
- Authority (council) can collect samples or require collection of samples
- Samples must be tested in accordance with AS/NZS 3896
- Any sampling that identifies 1000 or more cfu/mL must be reported to authority
- Systems must be shut down and decontaminated in accordance with prescribed (or otherwise approved) method

Legionella detections in CWS

- Legionella detected >1000cfu/mL must be immediately reported within 24 hours
- The CWS must be **immediately**:
  - Shutdown OR
  - Decontaminated



Schedule 3

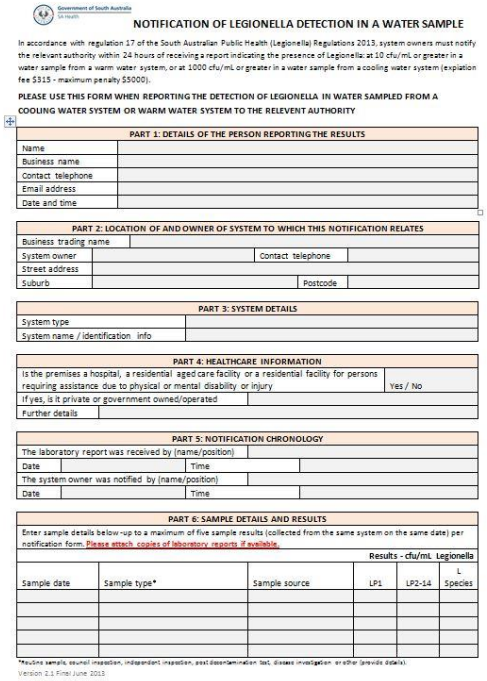
Procedures for decontamination of cooling water systems and hot water and warm water systems

Part 1 – procedure for off-line decontamination of cooling water systems

BEFORE COMMENCING THE PROCEDURE: ensure that the operator is protected from exposure to hazardous substances and aerosols according to relevant work health and safety legislation. A suitable face mask with a particulate filter of at least Class P2 that complies with AS/NZS 1716 should be worn. Additional PPE may also include gloves, hardhat, and protective clothing. Appendix A of AS/NZS 3666.2 has further details relating to specific tasks and appropriate PPE

1. Shut down the system.
2. Isolate cooling tower fans to prevent operation.
3. Circulate a dispersant throughout the system.
4. Dose with sodium hypochlorite and circulate to maintain a free chlorine residual of 5–10 mg/L at pH 7.0–7.6, maintain these concentrations and monitor at 15 minute intervals for at least 60 minutes.
5. Isolate the system and drain water to a sewer or trade waste in accordance with the requirements of the appropriate relevant regulatory authority, ensuring that any isolated pipe work such as bypass pipes and secondary pumps are also drained.
6. Open all system drains temporarily to flush drain lines with disinfected water.
7. Clean all wetted surfaces in accordance with the manufacturer's instructions or by using water spray and mechanical cleaning as necessary. Exercise care to avoid damaging components.
8. Refill the system.
9. Dose the circulating cooling water with sodium hypochlorite to maintain a free chlorine residual of 1–5 mg/L at pH 7.0–7.6 and monitor the concentrations at 15 minute intervals for at least 30 minutes.
10. Drain the system, refill, reinstate water treatment programs and recommission.

NOTE: *Wastewater must not be discharged to stormwater, surface waters (such as rivers, streams, wetlands or lakes) or underground waters. It may be disposed to a sewer or community wastewater management scheme, but not to a septic tank unless it can be demonstrated to the relevant authority that the biocide concentrations or the quantity or hydraulic flow will not have adverse impacts on the operation of the septic tank. Approval for discharge into a sewer or community wastewater management scheme needs to be obtained from the appropriate authority which may be the local council, SA Water, SA Health or the Environment Protection Authority. Any cooling water discharged to sewer must comply with the SA Water Cooling Water Discharge Trade Waste Guideline.*



Government of South Australia SA Health

NOTIFICATION OF LEGIONELLA DETECTION IN A WATER SAMPLE

In accordance with regulation 17 of the South Australian Public Health (Legionella) Regulations 2013, system owners must notify the relevant authority within 24 hours of receiving a report indicating the presence of Legionella: at 10 cfu/mL or greater in a water sample from a warm water system, or at 1000 cfu/mL or greater in a water sample from a cooling water system (expiation fee $315 - maximum penalty $5000).

PLEASE USE THIS FORM WHEN REPORTING THE DETECTION OF LEGIONELLA IN WATER SAMPLED FROM A COOLING WATER SYSTEM OR WARM WATER SYSTEM TO THE RELEVENT AUTHORITY

PART 1: DETAILS OF THE PERSON REPORTING THE RESULTS	
Name	
Business name	
Contact telephone	
Email address	
Date and time	

PART 2: LOCATION OF AND OWNER OF SYSTEM TO WHICH THIS NOTIFICATION RELATES			
Business trading name			
System owner		Contact telephone	
Street address			
Suburb		Postcode	

PART 3: SYSTEM DETAILS	
System type	
System name / identification info	

PART 4: HEALTHCARE INFORMATION	
Is the premises a hospital, a residential aged care facility or a residential facility for persons requiring assistance due to physical or mental disability or injury	Yes / No
If yes, is it private or government owned/operated	
Further details	

PART 5: NOTIFICATION CHRONOLOGY			
The laboratory report was received by (name/position)			
Date		Time	
The system owner was notified by (name/position)			
Date		Time	

PART 6: SAMPLE DETAILS AND RESULTS

Enter sample details below -up to a maximum of five sample results (collected from the same system on the same date) per notification form. Please attach copies of laboratory reports if available.

			Results - cfu/mL Legionella		
Sample date	Sample type*	Sample source	LP1	LP2-14	L Species

*Routine sample, council inspection, independent inspection, post decontamination test, disease investigation or other (provide details).

Version 2.1 Final June 2013

False or misleading statements / hindering an officer

- Both offences under Regulations or *South Australian Public Health Act 2011*

Annual inspection

- Conducted by:
  - Local council EHO
  - In unincorporated areas by state authorised EHO (SA Health)
  - Independent inspector – Regulation 15(2)
- NOT an audit
- Minimum of once per year BUT could be more frequent
- Micro testing a feature of the annual inspection

Annual inspections – findings from Health Protection Operations

SA Health

Health Protection operations

- 7 Staff
- 85% of South Australian land mass
- Food inspections/ Audits/ Wastewater systems/ house builds/ Environmental complaints/ Indigenous environmental training/ Tobacco control/ Drinking water systems and finally… cooling towers.

- **We are required to**
- Inspect towers at least annually
- Take a water sample annually
- May undertake Random inspections (very Rare)
- Maintain a register of cooling/warm water systems.

Notification of major changes

- Historically has been an issue but improved
- Generally failure to notify of shutdown (Reg 6.5)/ restarting (Reg 5.2)
- Often no evidence provided of commissioning processes in maintenance manuals
- No evidence of commissioning events in log books.
- Hence we are not aware of what towers are operating and how they have been commissioned.
- Improved in recent years.

Operating and maintenance manuals

- The go to document to identify how the tower is to be maintained and operated both physically and chemically. Including attached chemical systems.
- Often out of date (not updated to reflect system modifications)
- Often not relevant or overly onerous
- Often lack chemical parameters. Ie the TDS/pH/ Corrosion rates that are intended to be kept.

Maintenance log books

- Remember we can only assess what is recorded and presented
- Very clear list provided in part 5 of the inspection report form.
- Chemical parameters are often undertaken by maintenance persons but not recorded or presented – Amend templates
- Communication between physical maintenance teams results in omissions from maintenance logs/ reduced faith in the maintenance system.
- Remember your maintenance manual should guide your maintenance log.

Biocide Dosing

- Generally done well and presented on system diagram
- Include volumes used/ necessary water parameters for effective control – please ensure these are consistent with tower maintenance manual requirements.

Drift Eliminators

- Often large towers with high rates of blowdown anyway
- Very ad-hoc
- Qualified expert can advise on suitable timeframe for checks. We will assess against this if included in the maintenance log books.

Physical Parameters

- Generally self explanatory. (see inspection sheet part 9)
- We will generally assess records to show this has been occurring
- Many issues will also be picked up by general maintenance or WHS procedures.
- Please include in maintenance log books/ inspection and response.

Key takeaways

- Cooling water systems amplify *Legionella*
- Proactive monitoring to ensure compliance and effective risk management is essential
- Be clear about roles and responsibilities
- Document as much as possible (including communication pathways)
- Safe and sufficient access is essential in facilitating and demonstrating compliance
- Refer SA Health / SafeWork SA factsheet
- You are the expert on your tower

Legionella Regulations Review

- Three phases of consultation
  - Working group to explore the options
  - Targeted consultation to inform drafting instructions for new regulations
  - Formal consultation on draft regulations

- What are the options?
  - We have some ideas BUT
  - We won't know until consultation has commenced.
  - It's up to you!

Legionella Regulations Review

- Some ideas…
  - Changes to independent inspection regime
    - Consideration of mandatory training/testing of independent inspectors OR EHOs only
  - Risk based inspection frequencies
  - Legionella risk management plans
  - Specific requirements for systems with ongoing/repeated detections
  - Source water – cooling towers
  - Prescribed guidelines for investigation of Legionnaires' Disease
  - Inclusion of other possible sources:
    - Spas
    - Carwashes
    - Misters (including supermarket misters)
    - Ice machines
    - Chilled water dispensers
    - Dental chairs
    - Nebulisers & humidifiers
    - And others…

Questions?

- Email legionella@sa.gov.au
- Call Health Protection Programs on 8226 7100
- Visit SA Health's Legionella regulations and guidelines webpage

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