

A Legionella Investigation

Are Solar Preheat Hot Water Systems a Public Health Concern?

Legionella Seminar For Environmental Health Officers

16th – 17th August 2023

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Legionella Notification received from SA Health – April 2023

Desktop Investigation:

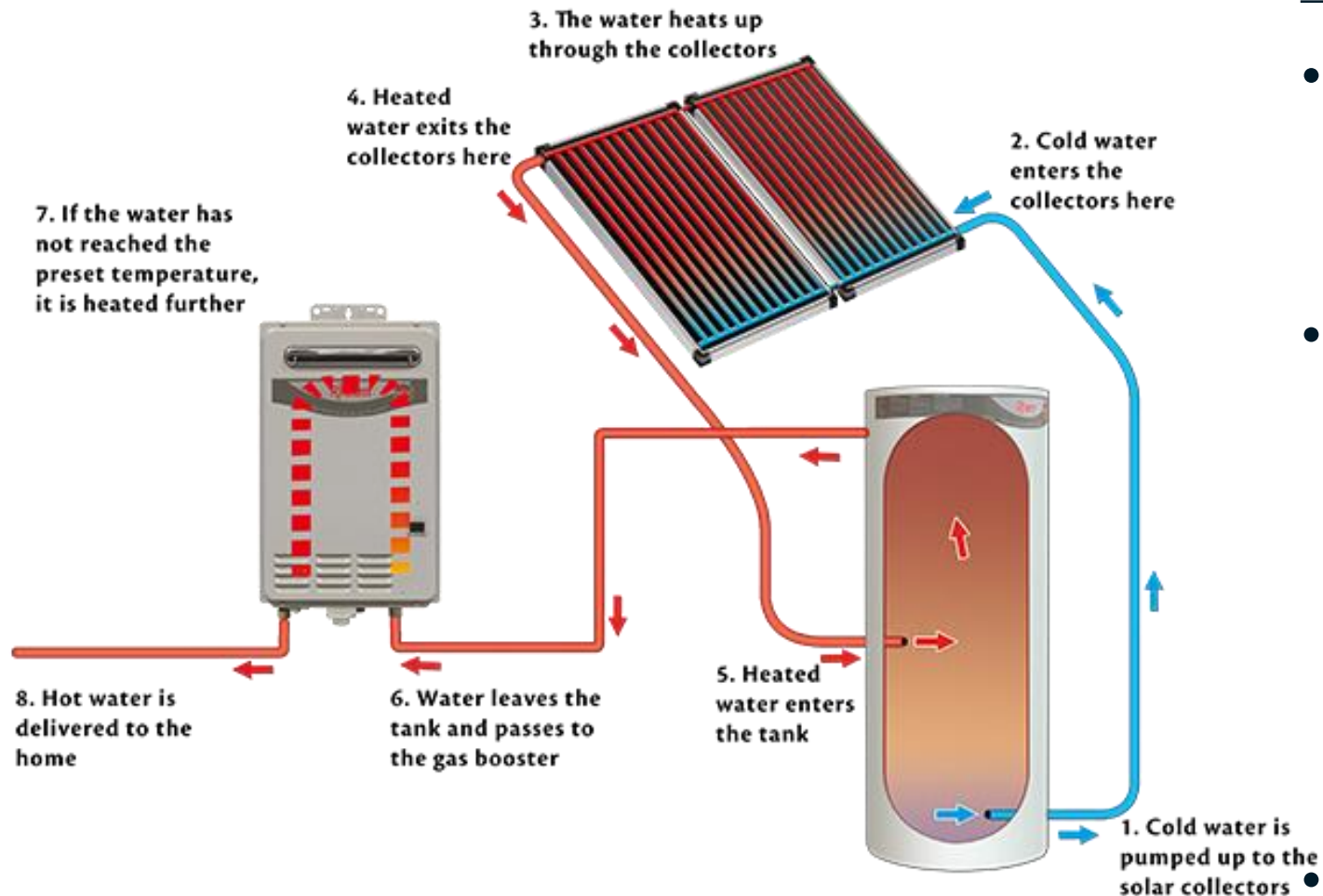
- No registered HRMWS's in areas visited by the case within incubation period.
- Stayed at a caravan park and used the communal shower facilities.
- Caravan park provides both permanent and short-term accommodation.
- There had been no complaint history associated with this premises.
- Site visit warranted to investigate heated water system.



Caravan Park Communal Heated Water System

- Bathing facilities serviced by two Gas Boosted Solar Preheat Systems. The 3rd serviced the laundry.
- Park management had minimal knowledge of the system.
- The system did not appear to be well maintained.
- The circulation pumps to the evacuated tubes were not in operation.
- Evacuation tubes on the roof were not tilted to maximise solar efficiency.

How does a solar boosted hot water system work?



- Water is pumped from the base of the storage tank to the solar collectors.
- Water is heated via the heat exchange in the solar collectors and sent back to the storage tank. This occurs when the water temperature in the collectors is higher than the tank.

The water temperature is 'boosted' by a gas or electric hot water service before entering the building.



Storage tank temperatures:

- Tank 1: 22.6^{°C}
- Tank 2: 31.4^{°C}
- Tank: 32.2^{°C}

Outlet temperatures:

- Hand wash basins: 38^{°C}
- Shower heads: 42.8^{°C}
(peaked @ 53^{°C})



Evacuated solar tubes

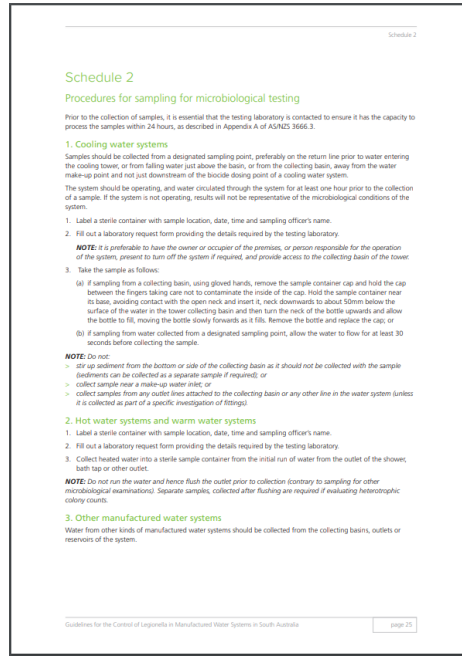


Response to findings:

- 10 water samples were collected from the storage tanks, showerheads and handwash basins.
- Park Management directed to disconnect the solar preheat system; and
- Undertake a 'precautionary' system decontamination (pending results).

Sample Results

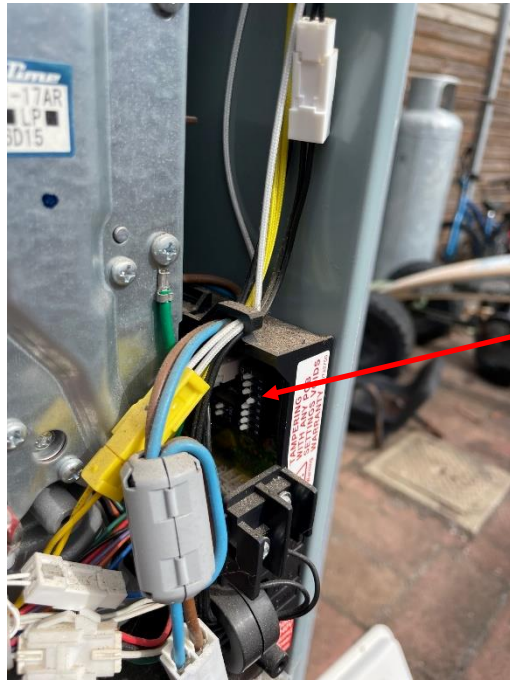
Sample location	LP 1	Leg. Species	LP 2-14
Solar Tank 1 (20 ^o)	-	-	10cfu/ml
Solar Tank 2 (31.4 ^o)	710cfu/ml	400cfu/ml	-
Solar Tank 3 (32.2 ^o)	700cfu/ml	600cfu/ml	-
Shower 3 (Men's)	70cfu/ml	100cfu/ml	-
Shower 4 (men's)	200cfu/ml	100cfu/ml	-
Shower 5 (Men's)	130cfu/ml	200cfu/ml	-
Handbasin 3 (Men's)	60cfu/ml	20cfu/ml	-
Shower 1 (women's)	400cfu/ml	110cfu/ml	-
Shower 2 (women's)	200cfu/ml	70cfu/ml	-
Handbasin 2 (women's)	80cfu/ml	20cfu/ml	-



Follow up Action:

- ‘Precautionary’ decontamination now mandatory.
- Returned to site to validate the decontamination process.
- Temperatures at outlets ranged from 55^C – 59^C. Process deemed invalid.
- Park Management directed to prevent access showers and hot water taps until decontamination process repeated.





Follow up action:

- Plumber overrode the boosting capacity of the hot water system.
- 66^c at the taps. 61-63^c at the showerheads. All outlets and were flushed for min. 10min.
- 2 lots of follow up samples collected approx. 5 days apart. All samples <10cfu/ml





Follow up action:

- Park Management opted to decommission the solar preheat rather than repair and retain it.
- No enforcement action was required as Park Management cooperated with all directions they were given.
- Solar Preheat systems are not referenced in the Legionella Guidelines.



Safety and public health requirements
for plumbing products — Water heaters
and hot-water storage tanks



Part 7.2 (f) - *Where the water heater is a solar storage water heater with an instantaneous inline booster, the booster must heat the water to a min. 70°C before passing through the booster's heated water outlet, if the water from the solar water heater is less than 55°C.*

Public Health Concerns:

- Solar preheat system boosted by domestic continuous flow hot water systems. Regulated to 50C. How is this compliant with *AS3498-20020– Safety and public health requirements for plumbing products - Water heaters and hot-water storage tanks*?
- No routine monitoring of stored water temperatures.
- No awareness of the risks by the operator.

Advice for EHO's:

- Conduct a risk assessment. Is a susceptible population group potentially exposed?
- Assess the boost mechanism of the solar preheated water.
- Gas Boosted – Does the system have the capacity to pasteurise the preheated water?
- Electric boosted – peak flow capacity v retention time.
- Is the system fitted with a TMV? Is the system now a WWS?
- Use your general duty powers under the *South Australian Public Health Act* should a risk to public health risk be identified.

Thank you