

Attachment 1

Cooling Tower System

Risk Management Plan Template

Components and Format of a risk management plan

Generally a risk management plan should have a number of basic components that would include:

- Site and contact details
- Assessment of each of the critical risks
- Summary of the overall risk classification
- Details of the system collected during the risk assessment process
- Attachments or reference to other documents such as operational plans, shut-down procedures and so on.

Whilst there is no prescribed format for a risk management plan this template is provided as a guide. Other formats may, of course, be used.

About the Template

The template is designed to be completed:

- By cooling tower system operators or land owners who have cooling tower systems on their land.
- After first reading the preceding Guide.
- After completing a thorough risk assessment as outlined in the Guide.

This process will meet the requirements of the *Public Health and Wellbeing Act 2008* in terms of the development of a risk management plan.

A risk management plan must be developed for every cooling tower system on the site. The Plan once developed must be made available to an authorised officer of the Department of Health on request.

Implementation of an Operational Program outlined in the risk management plan would also meet the requirements of the *Public Health and Wellbeing Regulations 2009*.

The template is also available in Word format at www.health.vic.gov.au/environment/legionella and can be modified to use in the development of your plan.

Disclaimer

This document is intended only as a general guide to the development of Risk Management Plans for Cooling Tower Systems. No warranty as to the completeness of the information is given. The Department of Health and its employees disclaim all liability and responsibility for any direct or indirect loss or damage which may be suffered through reliance on any information contained in or omitted from this document, and no person should act solely on the basis of the information contained in the document without taking appropriate professional advice about obligations in specific circumstances.

Site and Key Contact Details

Record	Your details
Site location <i>(property address)</i>	
Number of cooling towers in system	
Cooling Tower System Number¹	
Tower location reference <i>(If one exists)</i>	
Site owner's name/contact details <i>(Include company name, contact person's business and after hours telephone numbers)</i>	
Cooling tower system owner's name/contact details <i>(Include company name, contact person's business and after hours telephone numbers)</i>	
Who is responsible for day-to-day operation of the cooling tower system? <i>(Include company name, contact person's business and after hours telephone numbers)²</i>	
Water treatment provider name/contact details <i>(Include company name, contact person's business and after hours telephone numbers)</i>	
Water sampling/laboratory contractor/contact details <i>(Include company name, contact person's business and after hours telephone numbers)</i>	
Department of Health Legionella Team	1800 248 898

¹ This is marked on the Certificate of Registration supplied by the Department of Health.

² This person has the authority to approve the disinfection of the system on request of the Department of Health. It is not the water treatment service provider.

1 Critical Risks

1.1 Stagnant Water

Stagnant Water Risk Control Strategy	Assessment of the cooling tower system (Tick box)	Operational or Tower System Improvement Response ³
Installation of a timer connected to a recirculating pump set to operate at least once a day to circulate the water	Is the system (or part of the system) idle for more than a month? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Where the system (or part of the system) is idle for more than a month, is a recirculating pump with a timer fitted to automatically circulate the water at regular intervals, to prevent it becoming stagnant? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁴	
Removal or activation of any 'dead legs'	Are there 'dead legs' in the system? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Other ⁵		

Risk Classification for Stagnant Water Risk⁶

- A
- B
- C
- D

³ Indicate the operational program or improvements you will put in place as a result of this assessment.

⁴ If you do not have a recirculating pump and timer installed you can address the risk by installing such a pump. You should state the date that the pump will be installed. If you do not propose to install such a pump, then you should describe how you will address the risk in the response column.

⁵ Use this row to describe other risks and response strategies that relate to this risk.

⁶ Refer to Figure 12 in Section 6.2.2 of the guide and find the scenario that matches your system to evaluate the risk associated with stagnant water and your system.

1.2 Nutrient Growth

Nutrient Growth Risk Control Strategy	Assessment of the Cooling Tower System	Operational or Tower system Improvement Response ⁱ
Identify sources of, and where possible, reduce the amount of environmental contamination	Are there factors in and around the site that may lead to environmental contamination and an increase in the level of nutrients in the cooling tower system? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If Yes, can you reduce the levels of contamination? <input type="checkbox"/> Yes ⁷ <input type="checkbox"/> No ⁸	
Use a comprehensive water treatment program that includes a bio-dispersant ⁹	Do you use a bio-dispersant compatible with the chemicals in use (including chlorine) <input type="checkbox"/> Yes <input type="checkbox"/> No ¹⁰	
Control corrosion	Do you have a corrosion control program? <input type="checkbox"/> Yes <input type="checkbox"/> No ¹¹	
Increase the frequency of cleaning	How frequently is the tower cleaned? ¹²	
Protect the basin and 'top deck' of the tower from sunlight	Are any of the wetted surfaces exposed to sunlight? <input type="checkbox"/> Yes ¹³ <input type="checkbox"/> No	
Reduce the water temperature where possible	Can the water temperature of the tower be reduced? <input type="checkbox"/> Yes ¹⁴ <input type="checkbox"/> No ¹⁵	
Other ¹⁶		

Risk Classification for Nutrient Growth Risk¹⁷

- A
- B
- C

⁷ Describe the strategies in the response column.

⁸ Describe how you will address the risk in the response column.

⁹ The Public Health and Wellbeing Regulations 2009 requires that the system is continuously treated with a bio-dispersant.

¹⁰ The Public Health and Wellbeing Regulations 2009 require the use of a chlorine compatible bio-dispersant as part of the disinfection, cleaning and re-disinfection process, (as a minimum) prior to initial start up or any shut down period of greater than one month and at intervals not exceeding six months.

¹¹ The Public Health and Wellbeing Regulations 2009 require the treatment of the cooling tower system water with chemicals or other agents to minimise corrosion.

¹² The Public Health and Wellbeing Regulations 2009 require the disinfection, cleaning and re-disinfection process to be performed prior to initial start up or any shut down period of greater than one month and at intervals not exceeding six months.

¹³ Describe how you will address the risk in the response column.

¹⁴ You should describe how and when you will reduce the temperature in the response column.

¹⁵ Describe how you will address the risk in the response column.

¹⁶ Use this row to describe other risks and response strategies that relate to this risk.

¹⁷ Refer to Table in Section 6.2 of the Guide and find the scenario that matches your system to evaluate the risk associated with Nutrient Growth and your system.

1.3 Poor Water Quality

Poor Water Quality Risk Control Strategy	Assessment of the Cooling Tower System	Operational or Tower System Improvement Response ¹⁸
Comprehensive water treatment program	Do you use two or more biocides in some form of rotation? <input type="checkbox"/> Yes <input type="checkbox"/> No ¹⁹	
	Do you use a bio-dispersant compatible with the chemicals in use (including chlorine)? <input type="checkbox"/> Yes <input type="checkbox"/> No ^{20,21}	
	Do you treat the water with anti-corrosive chemicals? <input type="checkbox"/> Yes <input type="checkbox"/> No ²²	
	Have you developed control measures that are frequently measured to confirm that the water chemistry is under control? <input type="checkbox"/> Yes ²³ <input type="checkbox"/> No ²⁴	
Testing for HCC	How frequently do you test for HCC?	
Testing for <i>Legionella</i>	How frequently do you test for <i>Legionella</i> ? ²⁵	
Managing HCC levels	What HCC level do you allow before you take remedial action? <input type="checkbox"/> 200,000 cfu/mL <input type="checkbox"/> A number less than 200,000 cfu/mL ²⁶	
Response to high HCC results	How do you respond to a high HCC test result? <input type="checkbox"/> We follow Attachment A ²⁷ <input type="checkbox"/> We follow Attachment B ²⁸ <input type="checkbox"/> We follow our own response plan ²⁹	
Response to the detection of <i>Legionella</i>	How do you respond to <i>Legionella</i> being detected in a sample? ³⁰ <input type="checkbox"/> We follow Attachment C ³¹ <input type="checkbox"/> We follow an alternative plan which still meets the requirements of the Regulations ³²	

¹⁸ Indicate the operational program you will put in place as a result of this assessment.

¹⁹ The use of two biocides is recommended as a way to minimise the risks of bacteria becoming resistant to the biocide.

²⁰ The Public Health and Wellbeing Regulations 2009 requires that the system is continuously treated with a bio-dispersant.

²¹ The Public Health and Wellbeing Regulations 2009 require the use of a chlorine compatible bio-dispersant as part of the disinfection, cleaning and re-disinfection process, (as a minimum) prior to initial start up or any shut down period of greater than one month and at intervals not exceeding six months.

²² The Public Health and Wellbeing Regulations 2009 require the treatment of the cooling tower system water with chemicals or other agents to minimise corrosion

²³ Describe these in the response column.

²⁴ The monitoring of control measures can increase your confidence that the system is under control and can provide early warning when it is not. Describe how you will address the risk in the response column.

²⁵ The Department recommends every cooling tower system be tested regularly for *Legionella* as per Section 7.4 of the RMP Guide. The Public Health and Wellbeing Regulations 2009 require a minimum of quarterly testing for *Legionella*.

²⁶ If you do use a lower number than 200,000cfu/mL then you must detail the number in the Operational Response column

²⁷ This refers to the 'Attachment A – Standard HCC Sampling and Response' which summarise aspects of the requirements of the *Public Health & Wellbeing Regulations 2009*.

²⁸ This refers to the 'Attachment B – Alternative HCC Sampling and Response' which summarise aspects of the requirements of the *Public Health & Wellbeing Regulations 2009*.

²⁹ Any alternative plan must incorporate the minimum requirements of the *Public Health & Wellbeing Regulations 2009*. The operational response column must describe the plan in detail.

³⁰ The Public Health and Wellbeing Regulations 2009 require that action is taken following the detection of *Legionella*

Labelling of the cooling tower system	Is the cooling tower and cooling tower system labelled with the CTS registration number? <input type="checkbox"/> Yes ³³ <input type="checkbox"/> No ³⁴	
Appropriate bleed-off rates to prevent a build-up of solids	Is an automated bleed-off device installed? ³⁵ <input type="checkbox"/> Yes <input type="checkbox"/> No ³⁶	
Install automated biocide dosing device	Do you have an automated biocide dosing device? <input type="checkbox"/> Yes <input type="checkbox"/> No ³⁷	
Install automated dosing devices for all chemicals or agents	Do you have automated dosing devices for all chemicals/agents? <input type="checkbox"/> Yes <input type="checkbox"/> No ³⁸	
Selection of an appropriate point for chemical dosing	Does the chemical dosing occur well away from where the sampling point for bacterial tests is taken? <input type="checkbox"/> Yes <input type="checkbox"/> No ³⁹	
Provision of a dedicated water sampling point	Are water samples always taken from the same point? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If Yes, is that point clearly labelled with the cooling tower system registration identification number (CTS ID) ⁴⁰ ? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Has a sampling tap been fitted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Install a side stream filter if environment is dirty	Is the environment around the tower dirty? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If yes, do you have a side stream filter? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁴¹	
Other ⁴²		

³⁷ Best practise is the use of electronic programmable automated dosing units. You should describe how you will address the risks of biocide failure in the response column.

³⁶ Describe how you will address the risk of poor water quality in the response column.

³⁵ Best practice is the use of conductivity controlled meters fitted with lock out devices to prevent excessive loss of chemicals during the bleed-off process.

³⁴ The Operational Response must describe how you will deal with the risk that there may be confusion as to which tower or which system is being referred to in service reports or laboratory test results amongst other things

³³ The Operational Response must describe where the label appears on the system. It is recommended that you use a system where a tower is labelled with the CTS ID e.g. '1234' followed by a 'slash' and then a number or other identifying mark to describe the tower e.g. '1234/1' would designate Tower 1 of system 1234

³¹ This refers to the 'Attachment C – Legionella Sampling and Response' which summarise aspects of the requirements of the Public Health & Wellbeing Regulations 2009.

³² The Operational Response must detail the process that you will follow.

³⁸ Best practise is the use of electronic programmable automated dosing units. You should describe how you will address the risks of inadequate chemical dosing in the response column.

³⁹ You should modify your sampling program to ensure you are getting representative results.

⁴⁰ This number is printed on your Certificate of Registration.

⁴¹ Describe how you will address the risk in the response column.

⁴² Use this row to describe other risks and response strategies that relate to this risk.

1.4 Deficiencies in the Cooling Tower System

Deficiencies in the Cooling Tower System Risk Control Strategy	Assessment of the Cooling Tower System	Operational or Tower System Improvement Response ⁴⁴
Review the system design against AS/NZS 3666	Has a review been conducted? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁴⁵	
	Are there any improvements that can be made to the system design to reduce risks? <input type="checkbox"/> Yes ⁴⁶ <input type="checkbox"/> No ⁴⁷	
Review current performance of system	Has a review been conducted? <input type="checkbox"/> Yes ⁴⁸ <input type="checkbox"/> No ⁴⁹	
Develop operating and maintenance manuals	Are operating and maintenance manuals developed? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁵⁰	
Review the useful life of the system and plan to replace it at an appropriate time	When was the tower built?	
	Do you have a program to replace it? <input type="checkbox"/> Yes ⁵¹ <input type="checkbox"/> No ⁵²	
Install a modern high efficiency drift eliminator	Is there a modern high efficiency drift eliminator fitted to every tower in the system? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁵³	
	Are the drift eliminators in good condition? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁵⁴	

⁴³ Refer to Figure 12 in Section 6.2.2 and find the scenario that matches your system to evaluate the risk associated with poor water quality and your system.

⁴⁴ Indicate the operational program you will put in place as a result of this assessment.

⁴⁵ Describe how you will address the risk in the response column.

⁴⁶ Describe the improvements in the response column.

⁴⁷ Describe how you will address the risk in the response column.

⁴⁸ Describe the improvements in the response column.

⁴⁹ Without a review, it is impossible to complete a proper risk assessment. Describe how you will address the risks without the review in the response column.

⁵⁰ Describe how you will address the risks in the response column.

⁵¹ Describe when in the response column.

⁵² Describe how you will address the risks in the response column.

⁵³ Describe how you will address the risks of excessive drift leaving the towers in the response column. for example by installing a drift eliminator that complies with AS/NZS 3666.

⁵⁴ Describe how you will address the risks of excessive drift leaving the towers in the response column, for example by installing a drift eliminator that complies with AS/NZS 3666.

	Have the drift eliminators been certified by the manufacturer as meeting AS/NZS 3666? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁵⁵	
Use suitable materials for external components	Have you reviewed the condition of the tower structure? <input type="checkbox"/> Yes ⁵⁶ <input type="checkbox"/> No ⁵⁷	
Use suitable materials for internal components	Have you reviewed the materials and condition of the internal components of the tower system? <input type="checkbox"/> Yes ⁵⁸ <input type="checkbox"/> No ⁵⁹	
Other ⁶⁰		

Risk Classification for Deficiencies in the Cooling Tower System Risk⁶¹	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
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⁵⁵ Describe how you will address the risks of excessive drift leaving the towers in the response column, for example by installing a drift eliminator that complies with AS/NZS 3666.

⁵⁶ Describe the improvements in the response column.

⁵⁷ Describe how you will address the risk in the response column.

⁵⁸ Describe the improvements in the response column.

⁵⁹ Describe how you will address the risk in the response column.

⁶⁰ Use this row to describe other risks and response strategies that relate to this risk.

⁶¹ Refer to Figure 12 in Section 6.2.2 of the guide and find the scenario that matches your system to evaluate the risk associated with deficiencies in the cooling tower system and your system.

1.5 Location and Access

Location and Access Risk Control Strategy	Assessment of the Cooling Tower System	Operational or Tower System Improvement Response ⁶²
Understand the extent of potential exposure to the cooling tower	Is the cooling tower system located in an acute health or aged residential care facility? <input type="checkbox"/> Yes ⁶³ <input type="checkbox"/> No	
	If No, is the cooling tower system located within 500m of an acute health or aged residential care facility? <input type="checkbox"/> Yes ⁶⁴ <input type="checkbox"/> No	
Minimise access to tower and surrounds	How many people have access to the tower and its surrounds ⁶⁵ ? <input type="checkbox"/> Very high numbers ⁶⁶ <input type="checkbox"/> High numbers ⁶⁷ ... <input type="checkbox"/> Moderate numbers ⁶⁸ <input type="checkbox"/> Low numbers ⁶⁹	
	Are warning signs ⁷⁰ displayed around the tower? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁷¹	
	Is the area around the cooling tower system used as a gathering place for staff and visitors, particularly smokers? <input type="checkbox"/> Yes ⁷² <input type="checkbox"/> No	
	Is access to the tower restricted? <input type="checkbox"/> Yes <input type="checkbox"/> No ⁷³	
Relocation of tower to more remote site or less contaminated environment (where possible)	Have you reviewed whether it is possible to relocate the tower to a safer location? <input type="checkbox"/> Yes ⁷⁴ <input type="checkbox"/> No ⁷⁵	

⁶² Indicate the operational program you will put in place as a result of this assessment.

⁶³ Classify as Risk Category A and respond with highest standards of maintenance and surveillance.

⁶⁴ Classify as a minimum of Risk Category B and respond with high standards of maintenance and surveillance.

⁶⁵ You should consider the surroundings within 500m of the cooling tower

⁶⁶ Refer to Figure 10 of *Guide to Developing Risk Management Plans for Cooling Tower Systems*.

⁶⁷ Refer to Figure 10 of *Guide to Developing Risk Management Plans for Cooling Tower Systems*.

⁶⁸ Refer to Figure 10 of *Guide to Developing Risk Management Plans for Cooling Tower Systems*.

⁶⁹ Refer to Figure 10 of *Guide to Developing Risk Management Plans for Cooling Tower Systems*.

⁷⁰ For example, 'Authorised Persons Only'.

⁷¹ Describe how you will address the risks without such signs.

⁷² Describe how you will address the risks of smokers being in close proximity to the cooling towers.

⁷³ Describe how you will address the risks until access to the tower has been restricted.

Ensure there is a safe and stable area for maintenance workers to access the cooling tower system	Have you reviewed the working environment for maintenance workers? ⁷⁶ <input type="checkbox"/> Yes ⁷⁷ <input type="checkbox"/> No ⁷⁸	
Other ⁷⁹		
Risk Classification for Location and Access Risk⁸⁰		<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D

⁷⁴ Describe outcomes of the review.

⁷⁵ Describe how you will address the risk of location and access without such a review.

⁷⁶ This is a key area in terms of meeting your responsibilities under the Occupational Health and Safety Act.

⁷⁷ Describe the outcomes of the review. For example, any actions to be taken.

⁷⁸ Describe how you will address the risks without such a review.

⁷⁹ Use this row to describe other risks and response strategies that relate to this risk.

⁸⁰ Refer to Figure 12 in Section 6.2.2 of the guide and find the scenario that matches your system to evaluate the risk associated with location and access and your system.

2 Risk Assessment Summary

Critical Risk Classification⁸¹	
Stagnant Water	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Nutrient Growth	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Poor Water Quality	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Deficiencies in the Cooling Tower System	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Location and Access	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Are there any other considerations that may affect the overall risk assessment of the cooling tower system?	
Overall Cooling Tower System Risk Classification Category	<input type="checkbox"/> A
	<input type="checkbox"/> B
	<input type="checkbox"/> C
	<input type="checkbox"/> D

⁸¹ Tick the appropriate box based on your responses to the questions in Figure 12 in Section 6.2.2 of the Guide.
 Risk Management Plan for Cooling Tower System Registration Number (CTS ID) 11

3 Attachments⁸²

⁸² Other information which can be appended to the Risk Management Plan includes site plan, photographs, schematics of water flows, cooling tower makes and models, basic system parameters, for example system volume, system heat rejection capacity and system operating temperature.

4 Operational Program

Recommended Operational Programs based on Risk Classification			
Program A	Program B	Program C	Program D
Weekly inspection	Monthly inspection (two weeks after service)	Monthly inspection (two weeks after service)	Monthly service
Fortnightly service	Monthly service	Monthly service	
HCC and Legionella tested at a minimum of once each month.	HCC and Legionella tested monthly	HCC tested monthly. Legionella tested every two months	HCC tested monthly. Legionella tested every three months
Six monthly cleaning, or more frequently where environmental contamination (for example dust, soil, building works etc) is a problem			

Element	Tick box
Describe your maintenance program?	<input type="checkbox"/> Department of Health Program A
	<input type="checkbox"/> Department of Health Program B
	<input type="checkbox"/> Department of Health Program C
	<input type="checkbox"/> Department of Health Program D
	<input type="checkbox"/> Self-developed
	<input type="checkbox"/> Developed by consultant
If self-developed or developed by consultant, complete remainder of table⁸³	
Service frequency	<input type="checkbox"/> Weekly
	<input type="checkbox"/> Fortnightly
	<input type="checkbox"/> Monthly
HCC testing frequency	<input type="checkbox"/> Monthly
	<input type="checkbox"/> Every week/s
<i>Legionella</i> testing frequency	<input type="checkbox"/> Every three months
	<input type="checkbox"/> Every weeks/months
Tower cleaning frequency (select one and fill in blank if appropriate)	<input type="checkbox"/> Every 6 months
	<input type="checkbox"/> Every months
Inspection frequency	<input type="checkbox"/> Every weeks/month

⁸³ Select one and fill in blank if appropriate

5 Monitoring and Review

Element	Details	
Date RMP due for review		
Name/Title of person responsible for review		
Date RMP reviewed		
Does the RMP require amendment?	<input type="checkbox"/> Yes	
	<input type="checkbox"/> No	
Was the review conducted as a result of a triggering event occurring? ⁸⁴		
If RMP requires amendment, date amendments due and completed?	Due	
	Completed	

6 Communication

Element	Details			
	Category	Name/Title	Telephone	Comment
List parties (names and contact details) who will be informed in the event of a positive <i>Legionella</i> test	Staff			
	Occupational health staff/contractors			
	Unions			
	Building owner			
	Other building occupiers			
	Medical officer			
	Staff counsellors			
	Department of Health, Legionella Team		1800 248 898	
	Media Liaison Officer			
	Company spokesperson			
	Chief Executive			

⁸⁴ Under section 92(2) of the *Public Health and Wellbeing Act 2008*, the owner of the land must also take all reasonable steps to ensure that the risk management plan is reviewed, and if necessary updated, if-

- (a) legionella is detected in the cooling tower system on 2 or more occasions in any period of 12 months; or
- (b) the owner of the land is given written advice by the Secretary that a case of legionnaires' disease is associated with the cooling tower system; or
- (c) the owner of the land receives a report from the Secretary or from any person engaged by the owner of the land or the owner of the cooling tower system that control measures used in respect of the cooling tower system are inadequate or require improvement; or
- (d) there is a significant change in-
 - I. any of the environmental conditions under which the cooling tower system operates; or
 - II. the operation of the cooling tower system; or
- (e) the owner of the land receives an audit certificate that states that the risk management plan does not address the prescribed risks.

7 Endorsement of Risk Management Plan

Name/position of person responsible for Risk Management Plan	
Signature	
Date	

ⁱ Indicate the operational program you will put in place as a result of this assessment