

Exemption Decision Paper

Exemption Number	EXE-00001010
Exemption Type	Residual Disinfection Exemption
Supply Name	Christchurch
Supply ID	CHR009
Date	02 November 2023 / te 2 o Whiringa-ā-rangi 2023
Submitted by	Christchurch City Council
Exemption Team	Jim Graham, Principal Advisor, Drinking Water India Eiloart, Senior Technical Advisor
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Exemption	Christchurch City, C.t and continuous monitoring

Recommendation

For reasons set out in this paper, the Exemption Team considers that the application for exemption from the concentration/time (C.t) and continuous monitoring requirements of the Drinking Water Quality Assurance Rules (DWQAR) cannot be granted in relation to the Christchurch drinking water supply, because:

- It cannot be demonstrated that, if the exemption was granted, the drinking water supplied by the supplier will comply with ‘all other legislative requirements’ on an ongoing basis, and
- an exemption cannot be granted under section 58 of the Water Services Act 2021 (WSA) for the chlorine C.t and continuous monitoring requirements of the DWQAR because they are part of primary disinfection.

Executive summary

1. On 1 November 2022, Christchurch City Council (CCC) applied for a residual disinfection exemption in relation to Rules T3.2 and T3.4 relating to C.t and Rules T3.3, T3.5, T3.6 and Table 19 relating to Continuous Monitoring, for the Christchurch drinking water supply (supply ID CHR009). The application was made under section 58 of the WSA.
2. The exemption application indicated that approximately 70% of the Christchurch supply had residual disinfection. However, subsequent to the application being lodged, and in response to a draft decision regarding a residual disinfection exemption application for CCC’s Brooklands/Kainga supply, CCC has chlorinated all of the Christchurch supply.

3. The distribution system is likely to meet the D3 'distribution system' rules for chlorine in the DWQAR. However, the application seeks an exemption under section 58(1)(b) of the WSA in relation to the inability of the Christchurch supply's treatment systems to:
 - provide sufficient C.t to water that is chlorinated, and
 - adequately monitor the supply with continuous monitoring equipment as part of the primary treatment process.
4. A residual disinfection exemption can only be granted if the decision-maker is satisfied that:
 - the exemption is consistent with the main purpose of the WSA, and
 - drinking water supplied by the supplier will comply with 'all other legislative requirements and the drinking water safety plan (DWSP) on an ongoing basis.
5. Key issues relevant to the Christchurch drinking water supply are:
 - Multiple treatment plants across the supply with DWQAR Class 2 sources lack both protozoal and bacterial barriers, contrary to the legislative requirement for a multi-barrier approach to drinking water safety required under section 31 of the WSA. With regard to this, the supply does not meet 'all other legislative requirements' particularly the DWQAR requirement to provide a compliant primary bacterial barrier.
 - Positive *E. coli* and total coliform results have been identified at some treatment plants in the supply, without corrective actions completed.
6. In addition, a residual disinfection exemption cannot be granted for C.t value or continuous monitoring requirements of the DWQAR, as these relate to the primary disinfection process of water treatment. This is the case even though C.t requirements can sometimes be satisfied while treated drinking water is resident in a distribution network, before it reaches the first point of supply to a consumer.

Supply information

7. The Christchurch water supply serves a registered population of 389,290 consumers across the city and surrounding suburbs. The main characteristics of the supply are briefly described below.
8. The source water is understood to be a system of five aquifers accessed across the city at 142 bores, ranging in screen depth between 28m and 232m.
9. Bores feed abstracted groundwater to 50 primary pump stations across the network, before it is delivered to the distribution network.
10. Raw water is dosed with chlorine gas at a selection of primary pump stations. For convenience, these pump stations are referred to as 'treatment plants' in this paper.
11. One site with shallow bores, 'Main Pumps' treatment plant, has ultra-violet (UV) disinfection installed due to the identified risk of contamination at the bores.

12. The UV disinfection at Main Pumps is set at a level consistent with the inactivation of both bacteria and protozoa.
13. Some parts of the supply do not have satisfactory protozoa barriers and the mixing of water in the distribution system means it is not possible to determine which areas receive water that is compliant with the DWQAR protozoa rules and which don't.
14. There is no dedicated water storage at many sites between the treatment plant and the distribution network that can be used to provide the chlorine contact time, or C.t, required by the DWQAR.
15. The distribution system is complex, with the bores and treatment plants feeding directly into a network across 11 registered zones, consisting of 1,648 km of water mains and 1,600 km of sub-mains.
16. CCC network control processes mean that water meters and backflow prevention devices are now installed on each new connection, and most high and medium risk connections have testable backflow preventers.
17. Temporary chlorination is listed in the DWSP (Vol B) as a barrier to contamination at bore heads that are yet to meet sanitary bore head requirements, as well as being a barrier to backflow contamination in the network until backflow prevention devices are installed, although this information has been superseded as all of the supply is currently chlorinated.
18. There are six treatment plants supplied by Class 2 bores without a protozoal barrier: Averill, Kerrs, Montreal, Tanner, Burwood, and Mairehau.
19. Taumata Arowai has received 33 notifications of non-compliance or potentially unsafe drinking water in relation to the supply since it became the regulator in mid-November 2021. Of these, 11 notifications relate to three contamination events:
 - Riccarton Zone Total Coliforms, 23 August 2022.
 - Sockburn Pump Station *E. coli* and Total Coliforms, 20 November 2022.
 - Estuary Pump Station *E. coli* and Total Coliforms, 25 November 2022.
20. The Exemption Team reviewed the Annual Reports on Drinking-water Quality published by the Ministry of Health in order to examine the compliance history of the Christchurch supply. Reports dating back to the 2016/17 year were considered. Compliance was not achieved in 2020/2021 due to *E. coli* detections in the network. Protozoal requirements were not met due to insufficient barriers from 2017/2018 up to 2020/2021.

Information provided by the applicant

21. CCC's exemption application was accompanied by a covering letter.

22. The Exemption Team referred to the submitted DWSP (Volumes A, B and C, submitted 17 November 2022) where applicable.
23. Additional supporting information was also provided, including: Weekly Monitoring Report 29112022, Chlorination – Full Daily Monitoring Report 30112022, Weekly Extremity Report 29112922, Compliance Details for Christchurch CHR009, and 21 438550 Drinking Water Sampling Schedule – 1st January 2023 to 31st December 2023.
24. All information provided has been considered by the Exemptions Team.

Practical considerations

25. CCC's application and additional supporting information states that the reasons for seeking a residual disinfection exemption for T3 Rules relating to C.t and continuous monitoring for the Christchurch supply are:
 - the Christchurch supply does not have water storage facilities at treatment sites to provide suitable C.t, and
 - the Christchurch supply does not have continuous monitoring infrastructure in place to meet the T3 rules.
26. The time and cost associated with the design, installation, and commissioning of these aspects of residual disinfection systems can be relevant practical considerations for residual disinfection exemption applications.

Assessment process

27. Before CCC's application was submitted, Taumata Arowai staff discussed CCC's network issues with CCC staff and indicated that CCC could apply for a residual disinfection exemption for C.t and continuous monitoring.
28. Upon receiving CCC's application, an initial review of the covering letter was conducted, and additional information was requested from CCC.
29. Further queries and requests for clarification were subsequently raised with CCC staff and responses received.
30. The application was assessed by a Taumata Arowai staff member and then reviewed internally.
31. The exemption application report has been reviewed by an international expert in drinking water systems.

32. An initial draft exemption decision was prepared and provided to CCC on 9 May 2023. The initial draft decision indicated that continuous monitoring was part of primary disinfection and hence could not be the subject of a residual disinfection exemption. The initial draft decision also indicated that a C.t exemption could not be granted as the supply would not comply with ‘all other legislative requirements’ on an ongoing basis as required under section 58(3)(b) of the WSA.
33. CCC provided feedback on the initial draft decision on 30 June 2023.
34. After further consideration of the exemption and consideration of another application for a residual disinfection exemption for C.t made by another water supplier, the Exemption Team considers that a residual disinfection exemption for continuous monitoring and/or C.t requirements of the DWQAR cannot be granted under section 58 of the WSA because both are part of primary disinfection.

Assessment factors

35. CCC’s exemption application was initially assessed against the relevant factors arising under the WSA, Taumata Arowai policy and guidance material in relation to exemption applications, and other considerations relevant to decision-making by Taumata Arowai and its staff.
36. As part of that, the Exemptions Team considered the Taumata Arowai Compliance, Monitoring and Enforcement Strategy 2022-2025 (CME Strategy). This is a matter that the Taumata Arowai Chief Executive, and any delegate of the Chief Executive, must have regard to when determining exemption applications.¹

Drinking Water Safety Plan

37. The DWSP, particularly sections referenced within CCC’s residual disinfection application, has been reviewed.
38. There are various inconsistencies and discrepancies between some parts of the DWSP. The DWSP appears to be out of date, referring to the revoked DWSNZ and may not be fully implemented within the context of the Christchurch City supply.

The Treaty of Waitangi / te Tiriti o Waitangi and its principles

39. Taumata Arowai and its staff are required to uphold the Treaty of Waitangi (te Tiriti o Waitangi) and its principles when carrying out their functions.²
40. What this means in practice varies from situation to situation, depending on the relevance of Treaty/te Tiriti provisions and associated principles, including: partnership, self-determination, mutual benefit, honour, active protection, options, right of development, informed decisions,

¹ WSA, section 136(7); TAWSRA, section 11(2)(b).

² TAWSRA, s 19(1)(b)(i).

equity and equal treatment, and other principles that may be developed or identified as relevant from time to time. There is also some overlap between these principles and aspects of Te Mana o te Wai, which is discussed in the next section of this paper.

41. CCC's application does not include a great deal of information about the interests of mana whenua or other Māori (including consumers who are Māori) in relation to the Christchurch supply or indicate that any engagement with Māori has occurred in relation to the exemption application. This has a bearing on the Treaty/te Tiriti principle of informed decisions.³ The absence of specific information means that consistency with this principle has not been able to be considered in anything other than a generalised way. This overlaps with the consideration of Te Mana o te Wai as discussed below.

Te Mana o te Wai

42. For the purposes of the WSA, Te Mana o te Wai is defined in the National Policy Statement for Freshwater Management 2020 and applies to water as it is defined in the Resource Management Act 1991. Everyone exercising or performing a function, power, or duty under the WSA must give effect to Te Mana o te Wai when doing so, to the extent it applies to the function, power, or duty.
43. In this instance and as noted above, CCC has not provided any information or commentary on the implications of its proposal to operate the Christchurch supply without required C.t and continuous monitoring from the perspective of Te Mana o te Wai. There is similarly no information about how the proposal relates to or reflects the roles of tangata whenua in the management of freshwater.

Compliance, Monitoring and Enforcement Strategy

44. The CME Strategy outlines the approach Taumata Arowai will take to exemption applications. It provides part of the setting for the more detailed provisions in other Taumata Arowai policy and guidance material.
45. Amongst other things, the CME Strategy provides that Taumata Arowai will be guided by the following principles when determining exemption applications:
 - consumption of safe drinking water by consumers is paramount; and
 - the scale, complexity and degree of risk associated with a drinking water supply will affect the assessment of whether an exemption would be consistent with the main

³ That is, the onus to make a decision that is sufficiently informed as to the relevant facts and law so as to have regard to the impact (if any) on Treaty/te Tiriti principles. As a local authority, CCC is also subject to principles and requirements that relate to the Treaty of Waitangi and the involvement of Māori in its decision-making processes (as set out, for example, in section 4 of the Local Government Act 2002). However, CCC's approach to those principles and requirements is not relevant to the assessment of its exemption application or a matter for the decision-maker to enquire into, to the extent these fall outside the scope of the concept of Te Mana o te Wai.

purpose of the WSA, to ensure that drinking water suppliers provide safe drinking water to consumers.

46. The Exemption Team has had regard to the relevant parts of the CME Strategy when conducting its assessment and preparing this paper.

Consistency with the main purpose of the Water Services Act 2021

47. On the whole, the Exemption Team considers that the drinking water supply at Christchurch is well set up and operated considering the complexity of a large supply. It draws from source water that is of good quality and supply components include some effective barriers to bacteria and protozoa. There is an extensive water quality monitoring programme in place across the supply.

Application of section 58 of the Water Services Act 2021

48. Section 58 (1) of the WSA states (emphasis added):

The chief executive may exempt a drinking water supplier or class of drinking water supplier from the requirement to use residual disinfection in—

- (a) a supply that includes reticulation; or*
- (b) any part of a supply that includes reticulation.*

49. The exemption application indicates that the supply currently provides for residual disinfection for approximately 70% of the network, although subsequent to the application being lodged all of the Christchurch supply has been chlorinated and the water in the distribution system is likely to meet the D3 chlorine rules in the DWQAR.
50. The application nevertheless seeks an exemption under section 58(1)(b) in relation to the inability of the CCC treatment plants (pumping stations) to provide sufficient C.t and to continuously monitor water that is chlorinated as part of the primary treatment process and delivered to the distribution network.
51. A 'part of a supply' could be a particular physical part of a supply – e.g. a certain geographic area or distribution zone – or particular supply infrastructure. Alternatively, it could also arguably be a process applied as part of a supply's operations and treatment processes.
52. C.t and continuous monitoring could each be characterised as a process that is part of a drinking water supply that includes reticulation. However, for an exemption to be granted under section 58(1)(b) it must also be a process associated with *residual disinfection* – that is what an exemption under section 58 necessarily applies to.
53. The Exemption Team does not consider that C.t or continuous monitoring are things that are necessary and material for effective residual disinfection. Rather, they are required as aspects of primary disinfection. While C.t compliance can in some cases be achieved while treated water is in a distribution system, that does not mean that it is a function of residual disinfection. It just

means – where the necessary C.t time is achieved – that primary treatment is completed within the distribution system.

54. Rule T3.2 in the DWQAR requires that treated water must achieve a chlorine C.t value of at least 15 min.mg/L for at least 95 % of each day. Table 19 in the DWQAR requires that chlorine must be continuously monitored at a water treatment plant. The location of these rules in the treatment section of the DWQAR reflects the position that C.t and continuous monitoring requirements are part of a primary treatment process rather than part of a distribution system function. In contrast, the distribution system requirements in the ‘D’ rules of the DWQAR require a minimum free available chlorine level, but do not impose any C.t requirement and make continuous monitoring an alternative option to collecting grab samples.
55. Section 58 cannot be used to seek an exemption to a process that is a function of primary disinfection. For this reason, it is not possible to grant an exemption from C.t or continuous monitoring requirements in Rules T3.2 to 3.6 and Table 19 of the DWQAR under section 58 of the WSA.

Compliance with other legislative requirements under the Water Services Act 2021

56. A residual disinfection exemption cannot be granted unless the decision-maker is satisfied that the drinking water supplied will comply with all other legislative requirements (i.e. other than the usual requirement to provide for residual disinfection) on an ongoing basis.
57. ‘Legislative requirements’ has a particular meaning⁴ that covers requirements imposed by the WSA, most secondary legislation made under the WSA (such as drinking water standards and the DWQAR), and some enforcement instruments (directions or compliance orders issued under the WSA).
58. The supply’s previous compliance history is noted under the ‘Supply information’ heading above.
59. The DWSP identifies rule modules in the DWQAR where determinand monitoring is required, but all other compliance references are to the DWSNZ. The DWSP does not fully take account of the requirements of the DWQAR.
60. Having regard to the supply’s previous compliance history, monitoring results, the DWSP and the lack of a primary protozoal bacterial treatment barriers that complies with the DWQAR, in all parts of the supply, the Exemption Team considers that not all other legislative requirements are currently being met.

⁴ WSA, s5.

Future works or compliance

61. In its feedback on the draft of this decision paper, CCC expressed the view that the words ‘will comply’ in s 58(3)(b) allow the decision-maker to consider a future state of affairs when assessing an application for a residual disinfection exemption. CCC suggested:
- ... we consider the requirement in s 58(3)(b) is broader than what CCC is currently doing. The use of “will” versus “is” clearly connotes that it is future looking.*
- Contrasted with s 58(3)(a) that the [decision-maker] must not grant the exemption unless satisfied that the exemption is consistent with the main purpose of [the WSA].*
- Given the effect of s 58(3)(b) Taumata Arowai can consider its future compliance, with the Regulations and DWQAR ... that have since come into effect after CCC applied. Based on the broad wording and future intent of s 58(3)(b), we also consider the [decision-maker] can be satisfied this limb is met even if the supplier was not yet fully compliant with all other legislative requirements i.e., by providing evidence that it is in progress.*
62. CCC referred to various statements of purpose in the WSA in support of the points above. It also suggested that the statutory power to impose conditions on a residual disinfection exemption would have no utility if full compliance with legislative requirements was required from the outset.
63. However, an exemption of this nature would be conditional upon the proposed works being carried out, or compliance otherwise being achieved, before it could be relied on. This is a necessary consequence of the requirement for ‘ongoing’ compliance, which by necessary implication means ‘ongoing’ from the point when the exemption is relied on.
64. In order to assess whether a residual disinfection exemption can be granted on this basis, the decision-maker requires detailed information about the nature of any proposed future works or compliance solutions so this can be robustly assessed against the statutory tests in s 58(3) of the WSA. A general indication that compliance will be achieved in the future in unspecified ways is inadequate – even if supported by evidence of planning or progress in some selected areas – as it does not provide the decision-maker with the information necessary to be suitably satisfied in relation to the s 58(3) matters.
65. As indicated above, exemption conditions remain relevant even where future works or compliance are considered. This recognises that an exemption is a departure from normal legislative requirements that may result in new or amplified risks in some areas, notwithstanding that the overall purpose of the WSA is still achieved. That may conceptually require things to be done that are over and above ordinary requirements to address the risks arising, which can be supported through appropriate conditions.

Decision

The Exemption Team recommends that you:

- (a) **note** the Exemptions Team's views that, having regard to the scale, complexity and risk profile of the Christchurch City drinking water supply:
- that an exemption cannot be granted because the drinking water supplied by the supply will not comply with all other legislative requirements on an ongoing basis and;
 - that an exemption cannot be granted under section 58 of the WSA for the concentration/time (C.t) and/or continuous monitoring requirements of the DWQAR
- (b) **agree** to decline the residual disinfection exemption applications for continuous monitoring and chlorine C.t for the Christchurch City drinking water supply.

Yes / ~~No~~



Date: 7/11/2023

Steve Taylor
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