



REPORT | ADMINISTRATIVE REPORT TO COUNCIL

PRESENTED: March 20, 2018

REPORT: 18-027

FROM: Infrastructure Services

FILE: 220

SUBJECT: A BYLAW FOR THE PROHIBITION OF ONCE-THROUGH COOLING DEVICES WITHIN THE RESORT MUNICIPALITY OF WHISTLER

COMMENT/RECOMMENDATION FROM THE CHIEF ADMINISTRATIVE OFFICER

That the recommendation of the General Manager of Infrastructure Services be endorsed.

RECOMMENDATION

That Council permit staff to engage community stakeholders and proceed with the development of a bylaw prohibiting the use and installation of once-through cooling devices within the Resort Municipality of Whistler.

REFERENCES

Appendix "A" – Capital Regional District, once-through cooling FAQ and Data

February 5, 2013 Comprehensive Water Conservation and Supply Plan Administrative Report to Council (not attached)

October 6, 2015 Comprehensive Water Conservation and Supply Plan Update Administrative Report to Council (not attached)

PURPOSE OF REPORT

The purpose of this Report is to describe the reasons for prohibiting the use of potable drinking water used in certain types of cooling, refrigeration, and ice-making equipment within the Resort Municipality of Whistler.

DISCUSSION

In March 2004, the municipality completed a Long-Term Water Supply Plan. This study presented a comprehensive approach for ensuring that the municipal water utility continued to deliver high-quality domestic water and fire protection into the future. Major elements of the study included water conservation, water metering, water quality improvements, groundwater development and water distribution/storage improvements.

The Water Supply Plan was updated in 2012, and in February 2013 an initial comparison of potential water conservation and supply projects was made, evaluating each project on a cost per unit of water basis. The projects were prioritized on a least cost basis – whether it was for new supply or for conservation. In 2015, the Water Conservation and Supply Plan project comparisons were updated with new information, and the Once-Through Cooling (OTC) Water Use Bylaw remained the highest ranked project (lowest cost for the highest potential benefit).

While an initial bylaw for this purpose was drafted in 2009, this administrative report recommends advancing the creation of a bylaw that will phase out the use of OTC equipment in Whistler.

A prohibition of OTC equipment will align the Resort Municipality of Whistler with other jurisdictions including the City of Vancouver, City of Abbotsford, and the Capital Regional District.

OTC equipment refers to cooling equipment (generally, ice-making machines as well as air conditioning and refrigeration equipment) which rely upon the temperature of the municipal water supply for cooling purposes. The water passes through the subject piece of equipment and is simply discarded down the sanitary sewer system. Basically, it is cooling equipment that uses cold potable drinking water to simply cool the refrigeration condenser coils and then immediately discharge the water directly into the wastewater drain.

The amount of potable water that this equipment employs for this purpose can be significant. For example, a well-maintained typical small-medium OTC unit (1 ton, 12,000 BTU/hour, roughly 1 hp), uses approximately 6L water/minute. These units typically run about 12 hours per day and are adequate to cool a suite up to 550 square feet. This consumption rate can potentially add up to approximately 1,600 cubic meters per year per unit (enough to fill half an Olympic-sized swimming pool)¹.

This type of equipment uses the most water during the warmest periods of the year and contributes to the peak-flow amounts. Most of this type of equipment is located in the Whistler Village areas where our water system has the largest challenges with meeting peak flow demands.

Use of this equipment leads to an increase in demand for potable water in conjunction with a similar increase in the volume having to be treated at the Wastewater Treatment Plant.

In order to prevent the continued installation of OTC equipment, this bylaw is necessary to ensure that these types of coolers, air conditioners and icemakers will be effectively phased-out and replaced with alternative systems such as recirculating or air cooled equipment.

The financial benefits of this initiative are threefold;

1. This will lead to a reduction in operational costs associated with the provision of potable water within the municipality.
2. This will also lead to the reduction of operational costs associated with the treatment of wastewater.
3. Finally, this will lead to savings in capital costs by deferring infrastructure upgrades required to meet peak demands associated with both water supply and treatment.

The incremental gains and reduction in peak flows achieved over time through this bylaw should lead to savings in both operational and capital costs associated with our distribution and treatment of potable water.

This bylaw proposes the following:

- a) To prohibit the new installation of OTC equipment that is connected to the municipal water distribution system.

To prohibit the (re)installation of OTC equipment connected to the municipal water distribution system.

¹ Capital Regional District—*Once Through Cooling Frequently Asked Questions* - as reported in the Water Conservation Business Fact Sheets on their website, https://www.crd.bc.ca/docs/default-source/water-conservation-pdf/2017-otc-faq-v2.pdf?sfvrsn=f43e33ca_2

- b) To grandfather existing OTC equipment. The RMOW is currently investigating the best strategy for a complete phase out of existing OTC equipment. Based on stakeholder feedback, this may involve timelines predicated on a date, lifespan of the equipment, predetermined repair threshold, or a combination there of.

WHISTLER 2020 ANALYSIS

W2020 Strategy	TOWARD Descriptions of success that resolution moves us toward	Comments
Built Environment	Building design, construction and operation is characterized by efficiency, durability and flexibility for changing and long-term uses.	This bylaw will move Whistler buildings toward more efficient use of our freshwater resources.
Energy	Energy is generated, distributed, and used efficiently, through market transformation, design, and appropriate end uses.	This bylaw is structured to improve efficiencies within the system, and to ensure the end uses are appropriate to the potable water resource itself.
Water	Water supply is distributed reliably, equitably and affordably – and is managed proactively within the context of effective and efficient emergency preparedness.	The total volume of water used in once-through cooling equipment can be substantial. This volume creates pressures on the remainder of the system which can be proactively reduced through the introduction of this bylaw.
Water	All potable water is used sparingly and only used to meet appropriate needs.	Once-through cooling equipment is unnecessarily consumptive of potable water resources.

W2020 Strategy	AWAY FROM Descriptions of success that resolution moves away from	Mitigation Strategies and Comments
Economic	The Whistler economy provides opportunities for achieving competitive return on invested capital.	To ensure that the bylaw did not move away from this DOS, this bylaw proposes to regulate the installation of this equipment only after the useful life of existing equipment is realized (i.e. through the plumbing permit process associated with any future (re)installations).

OTHER POLICY CONSIDERATIONS

The Whistler 2020 Water Strategy envisions a future where, “all potable water is used sparingly and only used to meet appropriate needs” and, “residents and visitors are educated about, and encouraged to protect and conserve natural water resources”. The continued wasteful use of fresh water resources is at odds with these policy considerations, and therefore it is the opinion of staff that this bylaw will provide a meaningful step towards our description of success for managing our fresh water resources.

BUDGET CONSIDERATIONS

RMOW staff are currently conducting an internal audit to ascertain which if any municipal facilities currently use OTC equipment.

Minor expenses for this initiative are anticipated such as stakeholder engagement and public outreach activities.

Impacts on businesses currently using this equipment will be mitigated by grandfathering existing OTC equipment thereby deferring replacement costs until current equipment reaches the end of its useful life or the potential period established within the bylaw.

COMMUNITY ENGAGEMENT AND CONSULTATION

Beginning in spring of 2018, the consultation process will focus on targeted communications with stakeholders affected by this regulation. A public engagement letter will be sent out to stakeholders explaining the upcoming changes in regards to OTC equipment and outlining the date for a formal meeting to discuss proposed regulations. Stakeholders' concerns will be reviewed by staff and if necessary, modifications to improve outcomes and unanticipated hardships will be addressed where consistent with RMOW objectives and public interest.

As the bylaw will only impact building operators at the time of infrastructure replacement, there will be time for building management and owners to be made aware of the changes to the regulations.

SUMMARY

Community outreach and bylaw development will be designed to phase out OTC equipment in our community. The equipment targeted in this initiative can use a significant volume of municipal potable water for cooling benefits and then discard the water to waste without any further benefit.

It is recommended that council permit staff to engage community stakeholders and proceed with the development of a bylaw prohibiting the use and installation of once-through cooling (OTC) devices within the Resort Municipality of Whistler.

Respectfully submitted,

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for
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GENERAL MANAGER OF INFRASTRUCTURE SERVICES

Once through Cooling

Frequently Asked Questions



Capital Regional District | 2017



At a Glance

The Water Conservation Bylaw (Bylaw 4099) now includes the Once-through-Cooling (OTC) Ban:

- effective January 1st, 2019
- includes commercial and industrial air conditioners, refrigerators, coolers and ice machines

1. What is Once-through-Cooling (OTC) Equipment?

Once-through cooling (OTC) technology (also known as single-pass cooling systems) are systems that use clean potable water from a municipal source for the purpose of removing heat before discharging the water directly to the sewer. Typical examples of OTC equipment may include:

- Refrigeration compressor units for walk-in coolers and freezers
- Ice-making machines
- Server room cooling systems
- Air conditioners
- Heat pumps
- X-ray machines
- Wok stoves
- Hydraulic equipment
- Degreasers
- Welding Equipment
- Other industrial or laboratory type equipment

2. What kinds of businesses use OTC equipment?

OTC equipment can be found in a wide variety of businesses. Typically, it is found in:

- Restaurants and bars
- Food wholesale/retail/processing facilities
- Universities, colleges, and schools
- Hotels and motels
- Office buildings
- Medical facilities
- Laboratories
- Industrial facilities
- Other industrial, commercial, or institutional facilities.

3. I've heard that the CRD has banned OTC equipment – how does this affect me?

In May of 2016, CRD Water Conservation Bylaw (Bylaw 4099) was amended, prohibiting the use of water in "Once through Cooling Equipment;" this will be in effect January 1st, 2019. This means that any person in the Capital Regional District, who is on municipal water and is using OTC equipment must discontinue the use of this equipment on or before this date. In most cases, this will mean de-commissioning the use of the OTC equipment and upgrading to an air-cooled unit or retrofitting the OTC unit to a re-circulating system.

4. I'm in the refrigeration industry. Can I continue to sell or distribute OTC equipment?

The bylaw prohibits the use of water in OTC equipment. Selling or distributing this equipment puts your customers at risk of violating these regulations and subsequent enforcement action by the CRD.

5. What does it cost to replace OTC equipment with air-cooled equipment?

The actual cost to replace OTC equipment in a restaurant or food service facility can vary widely depending on numbers, sizes and types of OTC systems currently operating, and conditions that may prevent or complicate direct replacement with equivalent air-cooled systems. For example, remote air-cooled condensers (outdoor) are more expensive than those located inside the building; similarly, heat loading affects costs (walk-in coolers are less expensive to cool than walk-in freezers); also, the complexity of the system affects cost (chilled-loop systems are considerably more expensive than straight air-cooled condensers).

A simple replacement, **where no additional engineering work is required**, of an OTC unit in a restaurant with an equivalent air-cooled unit (located inside the building) can cost between \$3,000 and \$5,000 dollars. The total expected annual savings of water costs is \$5,000 for a typical 1 ton (12,000 BTU/hr) unit.

6. How much water does an OTC unit use and how much is that in water utility costs?

A typical small-medium OTC unit (1 ton, 12,000 BTU/hour, roughly 1 hp), with no maintenance issues uses approximately 6L/minute for an average of \$5,000/year. These would typically run about 12 hours a day, which adds up to approximately 1,600 cubic meters per year per unit (enough to fill half an Olympic-sized swimming pool). By switching to an air-cooled unit, a facility can save about \$3.14 per cubic meter (CRD water rate + CRD sewer rate) of water saved for a total annual savings of \$5,000.

7. We've got so much water, why do we need to save it?

While the reservoir may fill up quickly during rainy periods, drinking-water usage doubles in the summer, primarily due to more intensive irrigation demands with lawn and garden watering. Population growth and increasing per-capita water consumption will eventually require expansion of our water supply system. Costly expansion can only be deferred through ongoing water conservation.

8. What is your plan for phasing out OTC equipment by 2019?

Over the next two years, CRD staff will work with the refrigeration and air conditioning industry to discuss the ban, address concerns, and strategize ways of supporting affected industries, such as the hotel, food services, and office sectors. CRD Staff will work directly with businesses transitioning from OTC equipment to air-cooled or re-circulating equipment to

provide them with informational resources and water use estimates. It is important to note that the CRD offered rebate incentives from 2007 to 2014. During this time, the CRD issued businesses over \$260,000 in rebates to change out over 200 units to air-cooled units.

9. Does the OTC Ban include other types of once-through-water commercial equipment, such as such as non-re-circulating dental vacuum systems?

While operation of dental vacuum systems can waste a lot of water, the ban in the water conservation bylaw refers to once-through-**cooling** equipment only. The CRD business water conservation program is currently evaluating ways to inform commercial operations of alternative options for re-circulating systems and best practices for increasing operating efficiencies.

10. I heard there was a rebate for replacing this equipment. Is this rebate still available?

The CRD is no longer offering rebates for replacement of OTC equipment. The CRD offered rebate incentives from 2007 to 2014, issuing businesses over \$260,000 in rebates to change out over 200 units to air-cooled units.

11. Why now? What authority and decision is driving this ban?

This ban is just one component of a 2016 amendment to the CRD Water Conservation Bylaw. The ban is designed to eliminate the use of OTC equipment in the region, following seven years of rebate incentives. The use of OTC equipment is, in many cases considered an antiquated and wasteful practice, and a final phasing out of OTC equipment use is projected to save significant water. This translates to increased longevity of our water supply. The ban was signed off by the CRD Board and is aligned with other Canadian cities, such as Waterloo, Abbotsford, Mission, Edmonton, Calgary, and Guelph; and major jurisdictions in the US including Los Angeles, Miami, New York, and Boston. The City of Vancouver has also proposed a ban on the use of OTC equipment with is targeted to be in effect in 2019.

12. What are the fines associated with non-compliance to the ban?

Fine amounts are dependent on whether there is a stage water restriction in effect. *Schedule 26 To Bylaw No. 1857* has assigned fines ranging from \$250 for OTC equipment use to \$500 for OTC equipment use during Stage 3. Fines can be applied daily.

13. How long do I have to replace my unit?

All units must be replaced or retrofitted with a re-circulating system before January 1st, 2019.

14. What do I do with my OTC equipment once it is decommissioned?

De-commissioned OTC equipment may be disposed of at scrap metal recycling facilities within the region. In many cases, the service providers doing the replacing or retrofitting will take care of this, as they are obligated by code to provide decommissioning services when installing a new unit.

All refrigeration units are required to be decommissioned by law, *Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* (CEPA 1999), before being sent to a scrap metal recycling yard (metal recycling depots will take them once decommissioned). Professionally decommissioned units will be tagged and have paperwork as proof of decommissioning. This will need to accompany the unit when dropping off. Most

scrap metal recycling yards can also provide this service for a fee. As of February 2017, the following depots accept OTC units:

- **Ellice (Bay Street Industrial area)**

If the refrigerant is removed by a professional, and there is a tag on the unit / paperwork to verify, then the drop off cost is \$15 (steel charge – no quantity/size limit). A fee of \$15 is charged when the refrigerant has been removed by a professional and verified with a tag on the unit and associated paperwork. Units dropped off with the refrigerant not removed or without a verification tag and associated paperwork will be charged \$32.

- **Schnitzer (Bay Street Industrial area)**

A fee of \$20 per unit is applied to remove refrigerant. If the refrigerant has been removed professionally (with accompanying paperwork), then they will pay for the metal.

- **Hartland (Central Saanich area)**

\$26 gate fee plus \$20 per unit for refrigerant removal (even if it has already been professionally removed).

- **A&P Disposal (Sooke)**

No charge for refrigerant removal.

15. How many OTC units are there in Victoria?

It is estimated that there are still over 200 OTC units in operation, however this number is based on industry consultation done in 2007 and has not been verified. CRD staff are frequently discovering new OTC units in operation through Cross Connection and Source Control inspections.

16. My OTC unit is in a small space with limited ventilation. How will other technologies address space restrictions?

An air-cooled unit requires ample cool air in order to operate effectively. Small, confined spaces particularly close to hot kitchens can cause excessive strain on an air-cooled system. If your existing OTC unit is in a confined space, potential solutions include:

- Improved ventilation to enable direct replacement with air-cooled equipment
- Relocating the heat pump to a suitable location with adequate ventilation within the building
- Installing a closed-loop cooling system (where municipal water is used multiple times (i.e. re-circulated) before being discharged)
- Installing a chilled-water system where a chiller is installed on a rooftop or other exterior location. This is the most costly solution, typically applied when there are several OTC units located in a common area.

17. What about OTC units that re-circulate water?

OTC units that have been retro-fitted to re-circulate water are allowable under the bylaw. Facilities may be inspected for verification of the system.

OTC Replacement in Restaurants

The term Once-through cooling (OTC) refers to cooling equipment that transfers waste heat to water, which passes only once through the equipment before being discharged to a drain. The process requires a substantial volume of water, and is considered by today's standards to be expensive, wasteful and inefficient. Among the most common uses of OTC are restaurant refrigeration systems, including condensing units for walk-in coolers and freezers and other refrigerated cases, ice makers and soft-serve ice cream machines. As part of their commitment to reducing water consumption, the Capital Regional District and the City of Vancouver are both preparing to prohibit the use of OTC effective January 1, 2019 in the CRD, and January 1, 2020 in the City of Vancouver.

Most restaurants do not have any OTC systems, and those that do often only have one OTC appliance that will cost a few thousand dollars to replace with an air cooled system. The water and sewer cost savings usually pay for the full cost of eliminating OTC within a few years, and these cost savings continue afterward. In cases where a facility has multiple OTC systems, or a system requires an engineered solution where ventilation is inadequate for direct replacement with air cooled systems, the initial investment may be substantial, but often includes opportunities to recover energy from the waste heat. In these cases, the payback is typically short and reliable, and the ongoing savings can significantly improve the business's profitability.

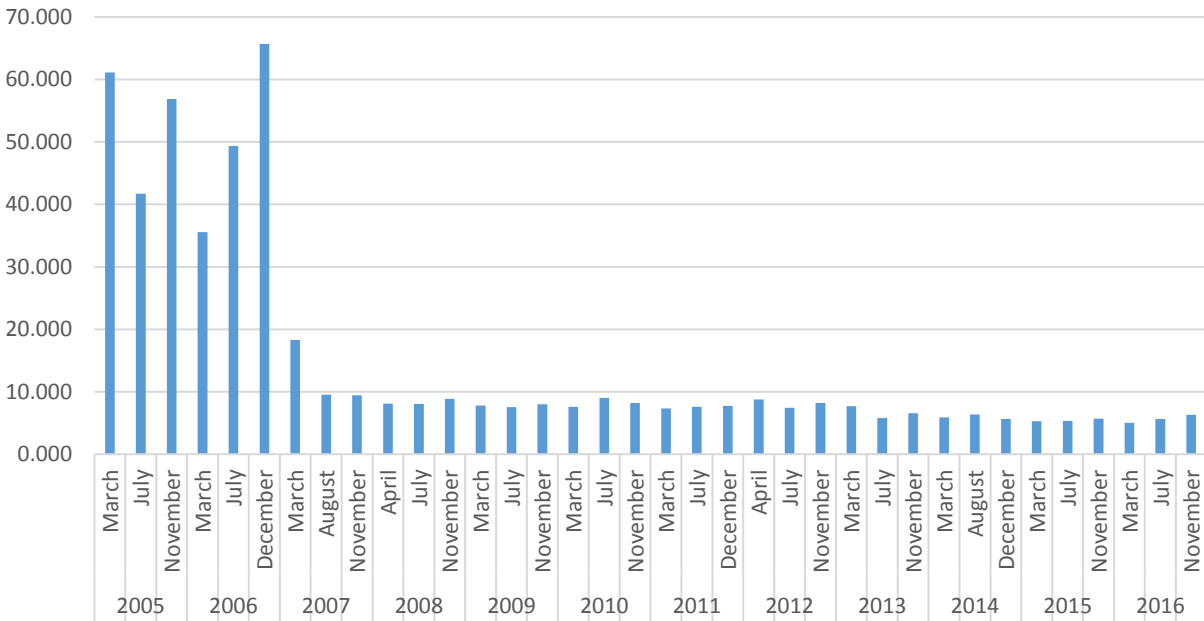
The actual cost to eliminate OTC in a facility can vary widely depending on numbers, sizes and types of OTC systems currently operating, and conditions that may prevent or complicate direct replacement with equivalent air-cooled systems. Based on many retrofits that have been completed in recent years in Greater Vancouver and Greater Victoria, retrofit costs and utility cost savings are typically in the ranges shown in the table below.

Retrofit Scenario	Typical Retrofit Cost	Typical Annual Cost Savings	Typical Simple Payback Period
Replace a OTC condensing unit with an air-cooled equivalent for a walk-in cooler (3/4 to 1 hp)	\$2,500 to \$4,000	\$1,000 to \$3,000	1 to 3 years
Replace a OTC condensing unit with an air-cooled equivalent for a walk-in freezer (1 to 2 hp)	\$3,000 to \$5,000	\$1,500 to \$4,000	1 to 3 years
Replace a OTC condensing unit with an air-cooled outdoor equivalent for a walk-in cooler or freezer (3/4 to 2 hp)	\$5,000 to \$7,000	\$1,000 to \$3,000	2 to 5 years
Replace a OTC condensing unit with an air-cooled equivalent for a refrigerated case (1/3 hp)	\$1,500 to \$2,500	\$300 to \$1,000	3 to 7 years
Replace a OTC ice maker with an air-cooled equivalent	\$3,500 to \$12,000	\$1,000 to \$4,000	3 to 7 years
Replace a OTC ice maker with an air-cooled equivalent with a remote refrigeration condenser	\$5,000 to \$15,000	\$1,000 to \$4,000	5 to 10 years
Install a closed-loop chilled water system with an outdoor chiller to serve existing water-cooled equipment	\$20,000 to more than \$100,000	Varies depending on scope of retrofit	

Refrigeration experts understand that the operating conditions for restaurant refrigeration systems can be very demanding, including hot ambient air, and oily particles in the air that can clog heat exchangers. Without regular maintenance, these conditions can cause premature failure of air cooled systems. However, properly installed, adequately ventilated and regularly serviced equipment will provide several years of reliable service in most restaurant environments.

The information provided in this info sheet is intended to assist the owners of restaurants and food service facilities with planning for replacement or retrofitting of existing OTC systems to comply with regulations that will come into effect January 1, 2019 in the CRD. The CRD will not be liable for the accuracy of the information presented in this document.

**Actual water billing from local restaurant that switched out
OTC in 2007 - Average Water Consumption Per Day (m³)
(Arranged by Billing Period)**



**Actual water billing from local restaurant that switched out
OTC in 2007 - Total Water Consumption (m³) Per Billing Period**

