



2004 Annual Bacteriological Summary of Greater Victoria's Drinking Water

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Executive Summary

The 2004 Annual Bacteriological Summary of Greater Victoria's Drinking Water is the second report in the Water Quality Division's 2004 annual report series. It extends the bacteriological information given in the 2004 Annual Overview of Greater Victoria's Drinking Water Quality and details the bacteriological results for the source water, first customer, transmission system, distribution system reservoirs and the distribution systems of individual water purveyors who are part of the Greater Victoria Drinking Water System. When completed, these annual reports are posted on the CRD website at http://www.crd.bc.ca/water/water_quality/water_quality_reports.htm.

The primary observations and conclusions contained in this report are listed below:

1. **Overall Summary.** In general, the overall bacteriological quality of the drinking water in Greater Victoria continues to be very good and meets the requirements of the Provincial and Federal limits.
2. **Sample Collection.** In 2004, the Water Quality Division collected and analysed 4,306 bacteriological samples from 150 sampling locations in the Greater Victoria Drinking Water System. This includes samples collected from the raw source (untreated water), first customer, transmission mains, distribution system reservoirs and distribution systems. A similar number of samples were collected in 2003 and 2002.
3. **Source Water.** In 2004, as in the past few years, the level of total coliform bacteria in the raw source water entering the treatment plants continued to be elevated during the summer (**Figure 1**). A bacterial spike was observed in late July, 2004 closely following the transplant of several thousand fish from Deception Creek and Deception Reservoir into Sooke Reservoir (**Figure 1C**) under the direction of Fisheries officials. Nevertheless, as in previous years, the quality of the raw water entering the plant easily met the fecal coliform limit of 20 colony forming units per 100 mL in the USEPA Surface Water Treatment Rule and therefore continued to qualify to remain an unfiltered surface water supply under this portion of their regulations (**Figure 1B**). The level of 20 per 100 mL was only exceeded once the entire year. Both the median value of 0 per 100 mL and the maximum value of 21 per 100 mL indicate a good quality source that is not subject to contamination.
4. **First Customer.** Total coliform bacteria were observed at the first customer sampling location below the Japan Gulch Treatment Plant during July but did not exceed the Canadian Guideline limit of 10% monthly percentage total coliform positive samples (**Figure 3**). The annual total coliform positive sample rate of 0.4% was similar to 2003 and one of the lowest ever observed (**Figure 4a**) and was primarily due to the use of the combination of ultraviolet light and free chlorine as primary disinfectants. No fecal coliform (*E. coli*) bacteria were found in any of the samples collected at this point. This provides further assurance of the bacterial safety of Greater Victoria's drinking water.
5. **Transmission Mains.** None of the samples collected from the transmission mains feeding the municipalities contained total coliforms (**Figure 5**). This result is the best observed in the past decade (**Figure 5a**) and shows that no total coliform bacteria are being delivered to the municipal distribution systems.
6. **Distribution System Reservoirs.** Samples collected from the distribution system reservoirs showed some bacteriological regrowth associated with the low chlorine residuals as a result of the poor water circulation through the reservoirs (**Figure 6A**). When the distribution system reservoirs are considered as a group, the total coliform Guideline level of 10% positive samples

was never exceeded in 2004. Similarly, on an individual basis, none of the distribution system reservoirs had an annual percentage positive that exceeded the 10% limit with the exception of Kirby Road Reservoir in Sooke. Over the past decade, there has been a general improvement in the bacteriological quality of the water in the distribution system reservoirs (**Figure 6D**).

7. **Greater Victoria Distribution System.** When the results of all the individual distribution systems are considered as a whole, the Greater Victoria Distribution System complied with both the Provincial Regulation and the Federal Guidelines for bacteriological water quality during all months of the year. Total coliforms were found during six months in 2004 (**Figure 7**). The total coliform positive rate of 0.6% was virtually identical to 2003 and one of the lowest ever observed in the past decade and continued the trend of declining total coliform positive samples in the Greater Victoria Distribution System and hence, improved bacteriological water quality (**Figure 7a**).
8. **Individual Municipal Distribution Systems.** In 2004, none of the municipal distribution systems exceeded the monthly total coliform limit of 10% and, in general, the bacteriological water quality of all of the municipal distribution systems has improved over time (since 1992). This includes
 - Central Saanich (**Figure 8** and **Figure 8a**)
 - North Saanich (**Figure 9** and **Figure 9a**)
 - Oak Bay (**Figure 10** and **Figure 10a**)
 - Saanich (**Figure 11** and **Figure 11a**)
 - Sidney (**Figure 12** and **Figure 12a**)
 - Victoria/Esquimalt (**Figure 13** and **Figure 13a**)
 - Juan de Fuca Distribution System (**Figure 14** and **Figure 14a**).
9. **Chlorine Residual.** The median annual chlorine residual at the first customer sampling location below the Japan Gulch Plant was 1.25 mg/L (similar to 2003). Overall, within the distribution system, the median annual chlorine residual was 0.68 mg/L, higher than that found in 2003 (0.58 mg/L) and similar to that found in 2002 and 2001 (0.67 and 0.64 mg/L, respectively). Within the municipal distribution systems, the median annual chlorine residual varied from a low of 0.40 mg/L for Sidney to a high of 0.80 mg/L for Oak Bay.
10. **Water Temperature.** At the Japan Gulch Plant, the coldest daily water temperature recorded was 3.0°C in January while the warmest was 20.9°C in August 2004. The Guideline limit of 15°C was exceeded from July 9, 2004 to October 18, 2004 which was similar to previous years. Compared to other Canadian cities, the summer temperature of the drinking water in Greater Victoria is extremely warm. However, the Water Services Department cannot control the temperature of the water.























