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# 2009 Annual Bacteriological Summary of Greater Victoria's Drinking Water

*(Executive Summary and Selected Charts only)*

Maria Roxborough  
Laboratory Manager  
Water Quality Division

Joe Pennimpede  
Senior Water Sampling Technician  
Water Quality Division

and

Stewart Irwin  
Senior Manager  
Water Quality Division

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ENVIRONMENTAL SUSTAINABILITY  
**CAPITAL REGIONAL DISTRICT**  
479 Island Highway  
Victoria, BC

## *Executive Summary*

The 2009 Annual Bacteriological Summary of Greater Victoria's Drinking Water is the second report in the Water Quality Division's 2009 annual report series. It extends the bacteriological information given in the 2009 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 municipal Water Suppliers 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/waterquality/annualreports.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 in 2009 continued to be very good and easily met the Provincial and Federal limits for safe, potable drinking water.
2. **Sample Collection.** In 2009, the Water Quality Division collected and analyzed 4,268 bacteriological samples from 150 sampling locations in the Greater Victoria Drinking Water System. This included samples collected from the raw source (untreated water), first customer, transmission mains, distribution system reservoirs and distribution systems. A similar number of bacteriological samples were collected in 2004 through 2008.
3. **Source Water.** In 2009, the level of total coliform bacteria in the raw (untreated source) water entering the Japan Gulch Treatment Plant from Sooke Reservoir was moderately high during the spring and summer (**Figure 2**). Nevertheless, as in previous years, the quality of the raw water entering the plant easily met the USEPA Surface Water Treatment Rule fecal coliform limit of no more than 10% of the samples having 20 colony forming units per 100 mL and therefore continued to qualify to remain an unfiltered surface water supply under this portion of their regulations (**inset in Figure 2B**).
4. **First Customer.** In 2009, there were four occurrences of total coliform bacteria at the first customer sampling location below the Japan Gulch Treatment Plant (**Figure 4**). The annual total coliform positive sample rate of 1.6% was comparable to the last several years (**Figure 4A**). No *E. coli* bacteria were found in any of the samples collected at this sampling location. This latter observation indicates that no fecal-associated contamination was present in the water entering the distribution system and provides greater assurance of the bacterial safety of Greater Victoria's drinking water.
5. **Transmission Mains.** Only three samples collected from the transmission mains feeding the municipalities contained total coliforms. This result was similar to previous years and indicates that very few total coliform bacteria were being delivered to the municipal distribution systems (**Figure 5A**).
6. **Balancing Reservoirs.** Samples collected from the balancing reservoirs located within the various municipal distribution systems showed that the bacteriological levels in some of these reservoirs continued to be problematic (**Figure 6**). This was primarily due to the bacteriological regrowth associated with poor water circulation through the reservoirs and the resulting low chlorine residuals (**Figure 6A**). One of the balancing reservoirs (Walfred Reservoir) had an annual percentage positive that exceeded the 10% total coliform limit (**Figure 6A**). (**Note:** This limit is only one of the indicator limits used and did not compromise the safety of the drinking water.) However, when the balancing reservoirs are considered as a group, the total coliform Guideline level of 10% positive samples was not exceeded in any month of 2009 (**Figure 6**). Broadly, the number of total coliform occurrences in the balancing reservoirs was similar to 2000 through 2004, 2007 and 2008.

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 2009 (**Figure 7**), similar to 2007 and 2008. The total coliform positive rate of 0.7% was slightly lower than that of 2005 and 2006 and the same as that in 2007 with a trend of declining total coliform positive samples over time in the Greater Victoria Distribution System (**Figure 7A**).
  
8. **Individual Municipal Distribution Systems.** In 2009, only one of the municipal distribution systems (Sidney) exceeded the monthly total coliform limit of 10%. While this limit was exceeded, it did not compromise the safety of the drinking water as the resample was negative. In general, the bacteriological water quality of all the municipal distribution systems has improved over time (since 1992). This includes
  - Central Saanich (**Figure 8**)
  - North Saanich (**Figure 9**)
  - Oak Bay (**Figure 10**)
  - Saanich (**Figure 11**)
  - Sidney (**Figure 12**)
  - Victoria/Esquimalt (**Figure 13**)
  - Juan de Fuca Distribution System (**Figure 14**).
  
9. **Chlorine Residual.** The median annual chlorine residual at the first customer sampling location below the Japan Gulch Treatment Plant was 1.21 mg/L (similar to 2004 to 2008). Overall, within the distribution system, the median annual chlorine residual was 0.64 mg/L and very similar to the levels observed since 2004. Within the municipal distribution systems, the median annual chlorine residual varied from a low of 0.39 mg/L for North Saanich to a high of 0.75 for Saanich.
  
10. **Water Temperature.** At the Japan Gulch Treatment Plant, the coldest daily water temperature recorded was 2.8°C in January while the warmest was 19.4°C in August 2009. Similarly, the water at the first customer location was cooler than in past years. The Guideline limit of 15°C was exceeded from July 15th to October 2, 2009 which was better than in previous years. Compared to other Canadian cities, the summer temperature of the drinking water in Greater Victoria is quite warm. The lower water temperature in 2005 through 2009 was primarily due to the raising of the water level in Sooke Reservoir.

## RECOMMENDATIONS

1. **Improve Distribution Reservoir Circulation.** It is recommended that the program of improving the circulation of the water in the distribution reservoirs be continued and include those reservoirs that exceeded the total coliform limits in 2009.















