CITY OF RICHMOND

REPORT TO COMMITTEE

TO:	Public Works and Transportation Committee	**DATE:**	June 13, 2001
FROM:	Paul H. Lee, P.Eng., Manager, Engineering Planning	**FILE:**	0157-20-GVWD1
RE:	**Greater Vancouver Water District – Proposal to Advance the Timing of the Capilano Water Source Filtration Works**		

STAFF RECOMMENDATION

That the Greater Vancouver Regional District Board be advised that the City of Richmond has no objection to the proposal to advance the timing of filtration of the Capilano water source and supports the inclusion of the public feedback into the final decision.

Paul H. Lee, P.Eng.
Manager, Engineering Planning

Att.1

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CONCURRENCE OF GENERAL MANAGER

442730

STAFF REPORT

ORIGIN

At the June 1, 2001 Greater Vancouver Water District (GVWD) meeting the following Water Committee recommendations were accepted:

That the Board:

1. Approve placing the current Capilano ozonation project on hold and seeking extensions to the validity period of the construction tenders, pending a decision on the timing of filtration of Capilano water;
2. Refer a proposal to advance the timing of filtration of the Capilano water source to member municipalities and a public meeting(s) which would be held as soon as possible to enable a final decision to be made no later than the July Board meeting;
3. Direct staff to pursue the transfer of the provincial grant for the Capilano ozonation project to the filtration project;
4. Direct staff to report back to the Board in July on the results of consultation with the member municipalities and the public, and a revised program and implementation schedule for the Drinking Water Treatment Program.

A copy of the GVWD Commissioner's report to the Water Committee is attached.

ANALYSIS

The Water Committee's recommendations are the direct result of a joint meeting held between the Regional Administrators Advisory Committee (RAAC), the Regional Engineers Advisory Committee (REAC) and the Regional Medical Health Officers (RMHO) pertaining to the impacts of the new amendments to the Safe Drinking Water Regulations.

The major impact of the new regulations is in the area of turbidity. The previous Drinking Water Guidelines permitted a maximum of 5 NTU's whereas the proposed new regulations contain a standard for turbidity of 1 NTU. In order for the GVWD to achieve this standard consistently in the Capilano and Seymour watersheds, it will be necessary to filter the water. Presently, the GVWD's Drinking Water Treatment Program has scheduled the Seymour filtration plant to be completed by late 2005 (Phase 1) and the Capilano filtration plant to be completed in 2020 (Phase 2), preceded by ozone primary disinfection and corrosion control by 2003 (Phase 1).

While the GVWD sources are acceptable up to 5 NTU (confirmed by Health Canada), it is felt by the GVWD and the MHO's that public concern, especially in the wake of the Walkerton and North Battleford contamination incidents, may force a more conservative approach. Thus requiring the advancement of the filtration program on the Capilano watershed. Health Canada have indicated to the MHO's and the GVWD that for turbidity levels in excess of 1 NTU, the MHO's will be granted the discretion to decide if further action (i.e. system improvements, etc) will be required. This will place the onus and potential liability exposure on the MHO's which may not be well received and may ultimately result in the order to construct the filtration plant.

The acceleration of the filtration of the Capilano source is not cost effective if the previous standard of 5 NTU can be upheld in which case, ozonation will suffice and filtration will not be cost effective until sometime well after 2010 as long as the standards remain the same.

However, the new regulations stipulate a maximum of 1 NTU and with the uncertainty of the MHO's position, accelerating the filtration schedule does become more cost effective.

It is anticipated that advancing the filtration at the Capilano water source will result in an increase of approximately $25 per residential user over and above the rate increases currently scheduled for 2006.

The GVRD is proceeding with public meetings scheduled on June 13,14, and 28 to obtain public input on this issue. Staff will attend the June 13, 2001 Public Meeting in Burnaby and provide Committee with any feedback.

FINANCIAL IMPACT

None at this time.

CONCLUSION

Recent amendments to the Safe Drinking Water Regulations with respect to maximum turbidity levels have caused the GVWD and the regional MHO's to re-evaluate the GVWD's Drinking Water Treatment Program with respect to accelerating the construction of the filtration plant on the Capilano source. Although the new amendments do permit the 1 NTU maximum to be exceeded at the MHO's discretion, it is uncertain as to how the MHO's will exercise this discretion given the potential liability involved. Furthermore, in light of the ever increasing public concern and awareness with drinking water quality, regulations will only become more stringent and public demands for compliance will become absolute.

Paul H. Lee, P.Eng.
Manager, Engineering Planning

PHL:phl

Greater Vancouver Water District

ESTABLISHED 1924

Committee Meeting Date: May 18, 2001

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TO: Water Committee

FROM: Johnny Carline, Commissioner

DATE: May 9, 2001

SUBJECT: **Phasing of Filtration of Capilano Source – Drinking Water Treatment Program**

Recommendation:

That the Board:

a) Approve placing the current Capilano ozonation project on hold and seeking extensions to the validity period of the construction tenders;
b) Refer a proposal to advance the timing of filtration of the Capilano water source to member municipalities and a public meeting(s) which would be held as soon as possible to enable a final decision to be made no later than the July Board meeting;
c) Direct staff to pursue the transfer of the provincial grant for the Capilano ozonation project to the filtration project;
d) Direct staff to report back to the Board in July on the results of consultation with the member municipalities and the public, and a revised program and implementation schedule for the Drinking Water Treatment Program.

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1. PURPOSE

To pursue an opportunity to reconsider the phasing of filtration of the Capilano water source in the Drinking Water Treatment Program.

2. CONTEXT

The District provides its members with water of a consistently high quality from its surface water sources in the mountain watersheds. There have never been any waterborne disease outbreaks associated with this water supply. For many years, the basic measures for continuing to ensure safe water have been the maintenance of a closed watershed policy (source water protection), water disinfection with chlorine and a rigorous program of water quality monitoring and control. The GVRD and member municipalities became aware of some issues with water quality in the mid 1980s and a number of years of study identified the following four main issues:

- the potential risks of waterborne disease causing organisms, notably *Giardia* and *Cryptosporidium*,
- turbidity,
- corrosive water,
- distribution system bacterial regrowth.

In 1994, after a lengthy process of research and consultation, the Board approved a three-phased Drinking Water Treatment Program (DWTP) to provide water that meets the Canadian Drinking Water Quality Guidelines.

In 1999, the completion of the Westerly Transfer provided the District with significantly increased flexibility in the operation of the water system. This allows the District to take any one source off-line in the winter low water demand period in order to respond to a water quality issue such as a turbidity event in that source.

The Drinking Water Treatment Program responds to the following risk factors:

- *Giardia:* carried by wild animals in the watershed. To date, levels in the water have been relatively low. Waterborne disease outbreaks have occurred in other water systems in BC and the Pacific Northwest.
- *Cryptosporidium:* also carried by wild animals in the watershed. Outbreaks have occurred in other systems but always in association with contamination by domestic animals or human sewage. Consultant studies suggest this to be a lower risk in GVWD watersheds.
- *Turbidity:* cloudiness in the water from fine dirt that can interfere with the disinfection process.
- *Corrosive water:* a product of the softness of GVWD water, this causes blue-green staining of plumbing fixtures, premature failing of copper plumbing and higher copper levels in treated sewage discharges and biosolids;
- *Bacterial regrowth:* occurs in late summer in some parts of the GVWD and municipal water distribution systems because of the loss of chlorine residuals required to control bacteria.

The current Drinking Water Treatment Program provides treatment by rechlorination, ozonation, and corrosion control and Seymour filtration in Phase 1, followed by the later staged development of other filtration facilities, to the point that filtered water would ultimately be available from two of the three sources. The current Program involves the following projects scheduled as shown:

Phase 1:

- Ozone primary disinfection and corrosion control for the Coquitlam (completed in 2000) and Capilano (planned construction in 2001 with completion in 2003) sources.
- Interim corrosion control for Seymour source (completed 1999).
- Secondary disinfection through rechlorination stations (8 stations completed in 1998 and 1999).
- Seymour filtration plant (planned completion in late 2005).

It should be noted that in this plan the ozonation facilities have been designed to inactivate *Giardia*. They would have to be significantly expanded to provide for levels of ozonation that would be effective against *Cryptosporidium*. In any event, ozonation is not effective in dealing with turbidity. Only filtration is effective in dealing with all three problems: *Giardia*, *Cryptosporidium* and turbidity.

Phase 2:

- Capilano filtration plant (planned completion in 2020). Ozonation and corrosion control at Capilano would be decommissioned, and the pump station would be upgraded to deliver water via a tunnel to an expanded Seymour filtration plant. Treated water would return via another tunnel to the Capilano site utilizing piping and a balancing tank constructed in Phase 1.

Phase 3:

- Possible Coquitlam filtration plant depending on future standards (proposed completion in 2025).

This strategy is cost-effective if it is assumed that the Canadian Drinking Water Quality Guidelines as they are currently interpreted, allowing up to 5 NTU turbidity in GVWD water, are the driving force behind the timing of the facility upgrades. In the last year, however, there has been evidence that science, regulations and public opinion may increase the pressure for an earlier move to filtration of at least the Capilano source. Some of these developments are:

- The publication of a Health Canada study in late 2000 that found a statistical connection between turbidity in Greater Vancouver's water and the incidence of gastro-intestinal disease in the population between 1992 and 1998 prior to a number of water treatment improvements being completed; while the interpretation of this study is open to question, it reinforces the informed common sense view in the medical health and water research community that by interfering in the disinfection process, turbidity increases the risk of illness from waterborne organisms;
- The failure of water treatment facilities in Walkerton, Ontario, that left seven people dead and thousands ill, and a cryptosporidiosis outbreak currently under way in North Battleford, Saskatchewan. While these, and earlier tragic incidents such as that in Milwaukee, arose from circumstances quite different than those which apply in Vancouver, they have raised the bar in terms of the level of reassurance sought by the public that their water is safe; and
- The enactment by the Province of the Drinking Water Protection Act and amendments to the Safe Drinking Water Regulations under the Health Act, which is the subject of a separate report to the Water Committee. In particular, these amended regulations contain a standard for turbidity of 1 NTU. For turbidity levels above 1 NTU, consistently attainable in GVWD water only through filtration, the Medical Health Officers have the discretion to decide if further action (i.e. system improvements) is required. This places a great deal of responsibility on the shoulders of the Medical Health Officers and while, to date, they have supported the current plan, public concern might force a more conservative response requiring filtration in the future.

These developments have put the spotlight on the reliability of municipal water systems and have led to calls for higher standards and a more assertive role for the federal and provincial governments.

The award of the $37 million construction contract for the Capilano ozonation facility is imminent; the bidders are bound to the provisions of their bids until mid-June. The Province has approved a grant of $18 million towards the total capital cost of $78 million. In the light of the above factors, it would be prudent to review the options before committing to this expenditure.

3. ALTERNATIVES

1. Continue with the Current Plan (estimated capital cost of $78 million for Capilano ozonation by 2003 and $265 million for future Capilano filtration).

   In this alternative, the District would proceed with the development of Capilano ozonation and corrosion control as an interim measure pending full development of the combined filtration facility at Seymour (currently planned for 2020) to serve the two sources.

   The advantages of this alternative are:

   - It is the most cost-effective IF it is assumed that the District will not be compelled to build the filtration plant for Capilano, either to meet the turbidity standards in the new regulations or in other regulations or respond to public opinion before 2011;
   - It is consistent with the District's financial strategy of deferring capital expenditure wherever possible to provide fiscal capacity for other priorities, such as transportation, and avoid, to the extent possible, 'overlapping' capital project borrowing programs;
   - It provides the earliest possible upgrade to Capilano ozonation and corrosion control to respond to corrosive water and the risk of *Giardia*; and
   - The project's design and the community impacts of construction have been addressed and it can be implemented relatively easily.

   The disadvantages of this alternative are:

   - It is not cost-effective, if the factors outlined in this report will require an accelerated schedule for full filtration;
   - The ozonation treatment process does not filter out organics which combine with distribution system chlorine to produce by-products that are of some concern;
   - Ozonation treatment, as presently designed, does not fully address the small risk of *Cryptosporidium*;
   - The ozonation plant is located at one of the region's beauty spots and the local community have strongly opposed what they refer to as an 'industrial building' in this area; and
   - The ozonation plant will be abandoned once the filtration plant for Capilano is completed and while a good portion of the overall project (i.e. pumping station, some pipelines and the balancing tank) will continue to be used, there may still be a public impression of wasted assets.

2. Go Directly to Filtration of Capilano in conjunction with Filtration of Seymour (estimated capital cost of $280 million).

   In this alternative the Capilano ozonation project would be abandoned and the full Phase 2 filtration facility would be built at Seymour, along with the connecting twin tunnels to Capilano, pump station and related works, or some other combination of facilities, to provide filtration of both sources.

   The advantages of this alternative are:

   - It would be more cost-effective if an accelerated schedule for filtration materializes;
   - It responds proactively to the full set of water contamination risks as quickly as possible, demonstrating the District's complete commitment to the highest possible water quality;
   - It completes the major capital works required for water treatment at Capilano and Seymour in the current decade rather than extending them closer to 2020 when the upgrading of the Iona Wastewater Treatment Plant to secondary treatment is expected to be required;
   - It is expected to eliminate the need for expenditure of funds for a dedicated water supply intake to the Capilano Salmon Hatchery;
   - It confines the disruption of the Lower Seymour Conservation Reserve by treatment plant construction to one period rather than two; and
   - It reduces the aesthetic and community impact of water treatment works at Capilano.

   The disadvantages of this alternative are:

   - It would delay implementation of improvements to the treatment of the Capilano source by approximately three years;
   - Although no more costly in the long run, it would lead to a more rapid increase in the water rate in the short term. This would be approximately 5 cents higher than the planned 26 cents per cubic metre expected by 2006;
   - It would be a big project with impacts that can be expected from a project of this scale;
   - Some of the investment made in the design and materials procurement for the ozonation plant will now be of no value leading to possible criticism of waste; and
   - The District might be criticized for responding immediately to the recent provincial water treatment standards rather than pressing for further consultation.

This report was discussed with the region's Medical Health Officers, Municipal Administrators and Municipal Engineers and the report was amended to reflect their input. The Medical Health Officers expressed their support for the proposal to advance the filtration of the Capilano source. The municipal staff will provide their further input through the municipal consultation process.

4. CONCLUSION

The decision on a course of action in respect to these alternatives involves weighing a number of intangible and unpredictable factors. It might reasonably be questioned as to whether accelerating improvements to water quality is the best use of public money relative to, say,

investments to improve air quality, which appears to be a more immediate threat to human health. However, while it would seem desirable to have some objective rational calculus to determine such priorities, in reality public opinion should and will have a significant influence on such considerations. On some issues, where public sensitivities are particularly acute, the goal of public assurance may be as important a factor as objective risk management. Water quality appears to be just such an issue.

It appears that Canada is experiencing a defining moment in respect to drinking water and that public concern with this issue will push the District, both directly and through senior government action, towards earlier implementation of treatment that responds to all known risks.

The decision of the Board to provide an opportunity for a public meeting on the proposed private design-build-operate format for the Seymour filtration facility offers an opportunity to arrange a parallel meeting to obtain feedback on the alternatives presented in this report before a final decision is made. Whether more extensive consultation will be required can be assessed after this first round of feedback is obtained.

The continued increase in public concern, reflecting incidents elsewhere, and similar evolution of senior government regulations on water quality points to the need to reconsider the District's strategy for implementation of the Drinking Water Treatment Program. It now appears that an early implementation of filtration for the Capilano source along with filtration of the Seymour source may well be the most cost effective long term strategy and one which places the District in harmony with the views of the medical health and broader general community.