

Water matters

A newsletter from
the Black Mountain
Irrigation District

Issue Number 8
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BMID invites input on proposed treatment system

Black Mountain Irrigation District trustees will soon decide whether or not to approve the \$2-million gravity-fed treatment system recommended by Reid Crowther & Partners Ltd. for construction on Mission Creek upstream of Stevens Reservoir. To ensure their decision reflects the wants and needs of BMID's residential customers, trustees encourage your questions and comments about the proposed project. You're invited to contact staff or attend an open house Tuesday, December 8th from 8 AM to 8 PM at BMID's office, 285 Gray Road.

Understanding the Proposed System

Responding to poor water quality caused by 1997's excessive spring run-off, BMID embarked on a six-week pilot project in April to test the effectiveness and cost-efficiency of a treatment system recommended by engineers from Reid Crowther. The proposed treatment system involves 'coagulation/flocculation/sedimentation', during which a chemical — in this case alum — is added at the

front end of the collection process. The chemical binds with suspended particles (coagulation), which then form clusters (flocculation), and settle out (sedimentation). Results of the pilot study show that this process will effectively reduce turbidity, particle count (size and number of particles in the water), colour, and total organic carbon (TOC) levels.

Turbidity

Turbidity (cloudiness) is caused by suspended particles of clay, silt, organic and inorganic matter, plankton, and other microscopic organisms that water picks up as it travels through watercourses. Turbidity levels often spike, sometimes dramatically, during freshet (spring run-off) or after heavy rains. As outlined in the *Canadian Drinking Water*

Quality Guidelines, turbidity is a health consideration because bacteria, viruses, parasites, and heavy metals can attach themselves to the suspended particles, which then interfere with disinfection by shielding contaminants from the disinfectant (generally chlorine).

BMID's treatment goal for turbidity corresponds with federal and provincial objectives of 1 NTU for health and 5 NTU for aesthetics. (An NTU is an optical measurement of water's ability to scatter and absorb light rather than transmit it in straight lines.) Because pilot tests showed that treated water was dramatically less turbid — particularly during peak run-off — Reid Crowther concludes the proposed treatment system will help BMID meet its quality objectives.

Particle Counts

Particle counting is an increasingly-used indicator of water quality. Typically, particle counters determine the number of particles in a given size range in a specified volume of water. (Waterborne pathogens such as *Cryptosporidium* and *Giardia*, for example, measure between three and five microns and seven and twelve microns respectively.) Particle counting enables a system operator to learn what processes result in the best reduction of particles in these critical size ranges.

Particle counts were conducted on raw and treated water samples during the pilot study. Overall, analyses showed a 50 to 90 percent drop in the numbers of particles in treated water. Of the five

You're Invited!

Black Mountain Irrigation wants to know what you think about its proposed treatment project to improve drinking water quality, particularly during spring run-off. Project details will be presented during an open house Tuesday, December 8th from 8 AM to 8 PM at BMID's office (285 Gray Road). BMID staff and technical consultants will be available to answer your questions about the treatment process and project costs.

See 'Treatment System' page 2

The proposed treatment system

continued from page 1

coagulants tested, alum provided a higher reduction of particles in the measured sizes.

Colour

Described as human perception of visible light, colour is measured in true colour units (TCUs). While turbidity reduction is the primary goal of the proposed treatment system, colour removal is another welcome outcome. As pilot tests indicate, coagulation with alum effectively removes colour from Mission Creek water. TCUs were reduced from 35 to 5; BMID's objective being 15.

Total Organic Compounds

Total organic carbons (TOCs) are the plant and animal materials found in raw water. By settling out most TOCs through coagulation/flocculation/sedimentation, BMID can reduce the amount of chlorine it injects before distribution. This, in turn, reduces the levels of disinfection byproducts such as trihalomethanes (THMs) produced when TOCs mix with chlorine.

The reduction of carcinogenic THMs is a primary objective of the proposed project. THM levels observed during the pilot study (which was conducted during spring run-off) were found to be higher than federal and provincial objectives. In keeping with BMID's treatment goals, settling reduced THMs to well below recommended levels.

The Recommended Coagulant

Of the five coagulants tested, alum (aluminum sulfate) proved the most effective and cost-efficient. Raw water levels of dissolved aluminum (that which can be absorbed) averaged 0.1 milligrams per

litre, compared to 0.105 milligrams per litre in water treated with alum. Most of the added aluminum settled out as 'floc' or was present as total aluminum, which is not bioavailable (easily absorbed).

For several years, the Federal-Provincial Subcommittee on Drinking Water has worked to establish a guideline for aluminum in drinking water. Based on its research, the subcommittee has determined the public health benefits of using aluminum-based coagulants to remove harmful micro-organisms and organic matter (thus reducing chlorine demand and THM production) exceed the slight risk associated with residual aluminum.

BMID's test levels of residual aluminum averaged 0.105 milligrams per litre, well within the subcommittee's preliminary guidelines of 0.1 to 0.2.

Sludge Disposal

Assuming a 90-day freshet, the annual sludge volume from a full-scale operation would be about 200 cubic metres, when dried. Disposal options — which will be explored with the public and various regulatory bodies — must be cost effective and flexible enough to handle volume variations throughout the year. Sanitary landfills are the most common receiver of 'dewatered' water-treatment-plant sludge in B.C. In BMID's case, the Glenmore Landfill is the most probable site.

Estimated Costs

The capital cost estimate in 1998 dollars — including the pilot study, facility design, engineering, and construction — is about \$2 million. Yearly operating costs — including chemicals, operator salary and

Aluminum and Human Health

Aluminum is the third most abundant element in the earth's crust, and is present in soil, air, and water. Humans are constantly exposed to aluminum in food, drugs (e.g. antacids), cosmetics, (e.g. deodorant), consumer products (e.g. cooking utensils), the air we breathe (e.g. dry soil, smoke, and sprays), and water (e.g. coagulants used in treatment). Most adults ingest between 9 and 14 milligrams of aluminum daily from all sources; about 90 percent coming from their diets. In general, exposure to aluminum from drinking water is very low (below three percent) compared with that from foods and drugs.

Canadian Drinking Water Quality Guidelines are being revised to include a guideline for aluminum in drinking water. BMID levels of residual aluminum following treatment with alum averaged 0.105 milligrams per litre, well within preliminary guidelines of 0.1 to 0.2.

benefits, and sludge disposal — is estimated at \$148,000 for use during the three months of freshet, and \$283,000 if used year-round.

The additional cost per connection to operate this process for three months a year (during freshet), based on 6,000 connections, is estimated at \$2.05 per month per single-family residential unit.

Peak Consumption!

The summer of '98 stands out as a record-breaking year for water consumption. BMID's residential and agricultural customers used nearly one billion gallons in July, and 954 million gallons in August. The peak-use day was July 26th, during which almost 43 million U.S. gallons were consumed. That's a per-minute flow of 36,000 gallons!

To help you put this peak consumption in perspective — one billion gallons of water would cover 3,000 acres to a depth of one foot, or one acre to a depth of 3000 feet!

Kids!

Share your thoughts about water and you could WIN a PIZZA PARTY for ten!



Black Mountain Irrigation District wants to know how you feel about our most precious natural resource. If you're between 8 and 13 years old, write us a letter explaining why water is important to you. All letters will be separated into two age categories — 8 to 10 and 11 to 13.

A winner in each age group will be selected December 11th. Each winner will treat nine of his or her friends to a pizza party at the Rutland Pizza Hut. Winning letters will also be featured in the next issue of *WaterMatters*.

So write on! Deliver or mail your letter to the BMID office (285 Gray Road, Kelowna, B.C. V1X 1W8) on or before December 11th and you could win a Christmas party to remember!

To get your creative juices flowing, we've included a letter written by 10-year-old Ashley Mariel Goughlin from Pawtucket, Rhode Island.

A Day Without Water

One morning, I woke up and there was no water. Men were working on the pipes outside. There was a leak, so they shut off our water. Luckily it was Saturday.

Breakfast wasn't really good. My parents couldn't make coffee. They knew they would have headaches later in the day. I couldn't brush my teeth. I had to rub them with a face cloth and take a breath mint.

Saturday is cleaning day, so we started our routine. We stripped our beds and picked up our clothes. But we couldn't wash the clothes. At lunchtime, I couldn't have my favourite lunch, hotdogs. We didn't have water to boil them.

We cleaned the house the best we could. But we couldn't wash the floor. The breakfast, lunch, and supper dishes piled up in the sink. We couldn't flush the toilet after we went to the bathroom. At bedtime, we couldn't take a bath before putting on pajamas, and I couldn't get a drink before I went to bed.

By the time we woke up, we had water. I drank a big glassful and thought, I thank God we have water! Remember, don't waste water. It's a beautiful and useful gift.

Meet the Staff

Phil Ruskowsky — who's been with BMID for 24 years, the last 13 as administrator — has overseen many changes at the district. Being BMID's chief financial and policy officer, Phil's major responsibilities are to oversee fiscal management and system improvements for the district's expanding customer base. "My biggest challenge is to meet the increasing demands of politicians and the public."

But despite the many challenges, Phil enjoys his work — especially communicating with staff, the public,



growers, developers, and various levels of government.

He sees a bright future for the district because, "We've been proactive, and we will continue to operate that way."

now you know!

- Raindrops are not tear-shaped. Scientists using high-speed cameras have discovered they are shaped like small hamburger buns!

- More than half the world's animal and plant species live in water.

- Water accounts for about 70% of the human body. It gives our bodies shape, regulates body temperature, dilutes salts, aids digestion, lubricates organs and joints, carries oxygen to body parts, cleanses blood in the kidneys, and removes waste products.

Preventing Cross Connections

Although your drinking water is treated and tested by BMID, contaminants can enter the water supply within your home through a 'cross connection.' Under certain conditions, the flow in household water lines can reverse and siphon contaminants into the water supply. The 'backflow' caused by this 'cross connection' can prove fatal if the contaminants involved are lethal.

A residential cross connection can best be described as a connection between your drinking water supply and a container that holds a mixture of water and an additive (e.g. a laundry tub full of water and bleach), or a container holding a chemical compound (e.g. an insect-control sprayer attached to a garden hose). If the water supply is reduced (due to a fire in the neighbourhood) or stopped (due to a watermain break), the back-siphonage or back-pressure draws

water backward through the system.

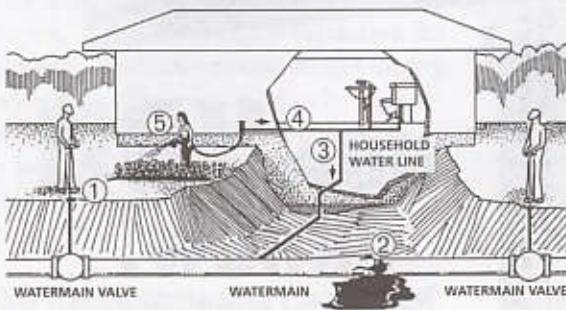
To prevent backflow, it's important to identify all possible cross connections in your home. Because most residential cross connections are created by hoses, it's wise to install vacuum breakers between all threaded taps and hoses. These allow water to flow out but not back in.



Potential cross connections in floor drains, water softeners, tubs, or sinks can be prevented by installing air-gap fittings available at your local plumbing store.

Agricultural irrigation systems with potential cross-connections must have approved backflow preventors installed that must be tested annually. ■

BACKFLOW FROM A CROSS CONNECTION



- ① The watermain is shut off and depressurized for a repair.
- ② Water flows out a break or a crack in the watermain and into the soil.
- ③ The water in the household lines drains into the watermain which is at a lower elevation.
- ④ A siphon is created by the water draining out of the household lines.
- ⑤ Contaminants are siphoned through a cross connection and into the household water lines and the watermain.

BYLAW BULLETIN!

- BMID trustees have approved a \$1.50 per acre increase in irrigation water rates for 1998, and a \$1 per month increase in residential rates effective January 1st, 1999. Comparable increases for commercial and industrial properties will also apply. The rate increases will enable the district to proceed with water system improvements to further enhance water quality. Even with the increases, BMID water rates are among the lowest in the area.

- A revised Capital Expenditures Charge Bylaw has been approved by the Ministry of Municipal Affairs. The new charge rates more accurately reflect the costs to developers for capital works required to service new development in the district.

A schedule outlining the district's different rate structures is available at the office.

Back Copies Available

This is our eighth issue of *Water Matters*. If you're interested, we have additional copies of all back issues. Just call the office at 765-5169.



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