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A newsletter from the
Black Mountain Irrigation District
No. 39

VALLEY WATER NEWS

Okanagan Basin Water Board

The OBWB has a \$3.7M budget for 2011. The budget is to cover continued work on the Water Milfoil Control program, grants for sewage facilities, grants for water management programs, and funding for the new Water Resources Chair at UBCO.

OBWB hosted a "Rain to Resource" workshop on October 28-29, 2010 in Kelowna. The workshop highlighted the benefits of reuse and recycling of rainwater runoff, use of gray-water and management and safety in the use of these resources.

Kelowna is located in a semi-arid climate, and as a result, will continue to use a higher volume of water outdoors than the average Canadian. If we want a "green" community, this is inevitable but we can be wise in how we use the resource.

Rainfall in the valley floor is in the range of 300mm per year while the net moisture deficit (depth of water to have sufficient water to grow crops) is in the range of 750mm. As a result, supplemental water is required by means of storage, conveyance and distribution to supply our customers. Fortunately there is an annual rainfall depth in the upper reaches of Mission Creek in the range of 5x that which falls on the valley floor.

Kelowna Joint Water Committee

It has been a productive year for the KJWC with progress being made on a number of issues.

Groundwater Protection: Increased tools for groundwater protection are being considered within the City's Official Community Plan. There are 29 groundwater wells that supply drinking water in Kelowna. Rutland Waterworks owns the majority of them. BMID owns three of them. Groundwater Protection Zones are now identified for each well so that proposed surface land use activity and/or subsurface works, such as geothermal installations, can be reviewed prior to the activity being approved.

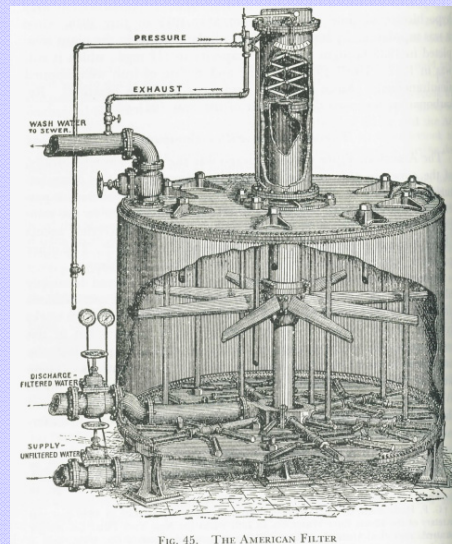
Kelowna Integrated Water Supply Plan

In September, 2010, the four City Improvement Districts: BMID; GEID; SEKID and RWD; and the City of Kelowna signed a Memorandum of Understanding for the development of a (continued on next pg.)

A BRIEF HISTORY OF DRINKING WATER DISINFECTION

Man has known of the requirements to treat drinking water for thousands of years although in earlier times, there was less scientific explanation of why processes worked, just that the water was aesthetically better and resulted in less sickness. Early treatment methods include processes involving heat (boiling), filtering with charcoal or through the ground, copper, silver, and eventually in the 1900's, disinfection with chlorine, ozone and ultra-violet light.

Although the application of chlorination for purifying water was recognized as early as 1835 in Philadelphia by Dr. Robley Dunglison, it took decades to apply it to public water supply. Society in the 1800's recognized the need to treat water from the local rivers and filtration was a major part of that effort. Removal of the particulate matter in the water was partially successful, but did not eliminate the outbreaks. Many different types of filtration were developed.



Widespread epidemics typically result in focused funding by society to develop solutions. A recent example of this would be the 1992 *Cryptosporidium* outbreak in Milwaukee where 400,000 persons became ill.

In 1854 in London, there was a severe cholera outbreak where 616 persons died and the mortality rate in the outbreak area was almost 13%. At the time, there were many theories on what was causing the outbreaks, but it was known that the source was the Broad Street Well. At that time, sewers dumped out into the River Thames and negatively affected some of the area wells.

Germ theory was being developed by Louis Pasteur in the 1850s, but Pasteur's theories did not gain general acceptance until 30 years later. In 1884, German scientist Robert Koch identified the causal agent of cholera and proved that filtration was successful in reducing illness in drinking water supplies. Filtration was used extensively through the 19th century, and although it removed most of the impurities, it was found to be insufficient to fully protect the public against diseases.

Across the Atlantic in the United States, a survey of 47 US cities from 1880-89 showed that the average mortality rate for typhoid was 58 deaths per 100,000 persons. The problem was known, but a cost-effective solution was not. Coliforms science was already being used to determine safety of water in the late 1890s, but it was primarily used to test the effectiveness of filtration systems. Its application to disinfection was not yet utilized.

Heat (boiling of water) was considered at a city-wide level. It was found to be effective but cost prohibitive as the energy required to boil the water was significant. It was quickly discounted as a viable option. (For more, see next page).

"At the end of the second century, the Water Supply for the City of Rome provided 130,000,000 US gallons per day" - George Symons—AWWA Journal, October, 2006 (Note: This is about 5 x what BMID provides in mid-summer)

BMID WATER NEWS

KJWC (continued from front page)

Kelowna Integrated Water Supply Plan. The plan is to provide the best technical and lowest cost solutions for upgrading drinking water systems in the Kelowna region. A water quality assessment of the 29 groundwater wells, 4 lake intakes and 4 large creek sources has been completed. The separation of irrigation and domestic supplies will form a part of the solutions in the rural areas with high coloured creek water. It was determined that where UV disinfection is not viable, that it will be cost effective to separate the domestic and irrigation water systems for areas where the lot sizes are >1.0 acre.

System redundancy, interconnection, and risk management are important components of the project. Regardless of the long term form of governance for water delivery for the City, the findings of this integrated strategy should benefit all water utilities and customers within Kelowna.

BMID District Projects

Highway 33 Widening: The Provincial contract for the four-laning of Highway 33 from Muir to Gallagher's Road will be completed in the spring of 2011. BMID has two 42 inch diameter pipe crossings completed and we have renewed the mains and services along this corridor.

Houghton Road Corridor H & M Excavating completed the roads and surface works in October. BMID was fortunate to be able to renew all water services within this corridor early in the project.

Black Mountain Reservoir Project Preparation: Designs are being completed for significant portions of the 42" main with construction planned for the early spring of 2010. The pipeline from Highway 33 north to the Reservoir Ultra-violet disinfection site north of Joe Rich Road is scheduled for 2011. BMID is working with the City of Kelowna Parks Department and the Development Services staff to meet their requirements.

BMID Operations: The BMID works staff have been busy in the fall of 2010. Irrigation was shut off in mid-October. Hydrant maintenance is competed for the year. Each hydrant is checked and maintained twice per year. Crews are now on valve exercising and on service shut-off exercising. This is to ensure that all line valves and property services function properly in the event of an emergency.

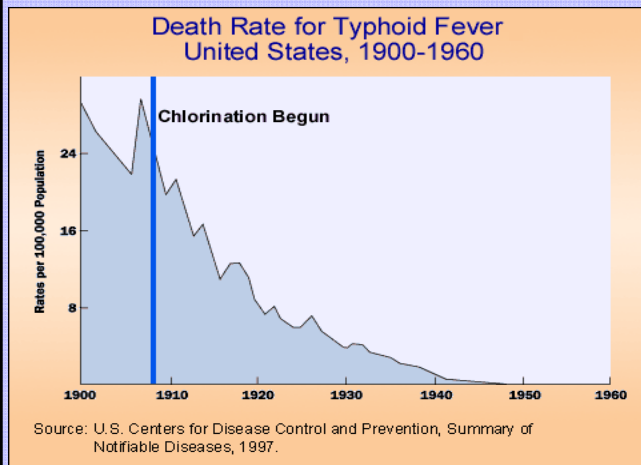
OBSERVE, RECORD & REPORT
questionable watershed activities to
BMID at 765-5169

DISINFECTION - (CONTINUED)

Europe was slightly ahead of North America in recognizing chlorination as a successful means of controlling germs and bacteria in water supplies. The first City to implement full-scale water disinfection was Middelkerke in Belgium in 1902. The London Metropolitan Water Board followed shortly thereafter in 1905.

In North America, chlorination was first implemented in Jersey City in 1908. A lawsuit was filed by the City fathers of New Jersey who stated that the water company violated their contract to provide water that was "pure and wholesome and free from pollution deleterious for drinking and domestic purposes". The scientific data and ruling by the court was in favour of the use of chlorination for Jersey City. The decision opened the door for wide-scale acceptance and implementation in North America for one of the most important health measures ever implemented.

Typhoid, cholera and tuberculosis are all very uncommon illnesses in today's society due to the unheralded use of chlorination. Filtration combined with chlorination for drinking water is considered to be one of the greatest health advances in the last 1000 years.



QUESTION - WHAT IF THE CHLORINE TASTE IS TOO STRONG FROM YOUR TAP?

If the chlorine taste in your drinking water from your tap is too strong, pour fresh tap water in a uncovered jug/container and leave it in your fridge overnight. The chlorine within the water will dissipate into the air and should be significantly reduced. Do not leave the water uncovered for more than a day or two. Alternately, if you have a higher than normal sensitivity to chlorine, consider the use of a carbon filter to adsorb the chlorine. Change the filter regularly as per the filter suppliers recommendations. BMID's service areas with the highest chlorine residual levels are those closest to the Mission Creek source in the Highway 33 corridor near Gallagher's Road with chlorine residual levels in the range of 1.0 mg/L (1.0 part per million). The maximum allowed dosage within the industry guidelines is 4.0 mg/L.

Chloramine is another disinfection method which is chlorine with the addition of ammonia. It is a less powerful oxidant than chlorine alone, and provides for improved taste and more stable residual levels in the distribution system.

Ozone, which is a powerful disinfectant, is commonly used in Europe. but is used much less frequently in North America. It is more effective on hard-to-kill protozoa, but is strong enough to break down organic matter which could cause re-growth in the distribution system. Ozone decays very quickly.

Ultra-Violet (UV) light disinfection operates in a different way than the chemical disinfectants. When bacteria, viruses, and protozoa are exposed to UV light of a particular wavelength (254 nanometers), their reproductive capability is destroyed and they no longer pose a threat to human health. UV light is cost effective, leaves no known byproducts or adverse effects, and is an excellent primary disinfectant. UV disinfection is being designed for BMID's Mission Creek source.

"In 1900, there were 36 deaths per 100,000 person from cholera. Due to chlorination of water supplies, by 1950 this number had dropped to 0.1 deaths per 100,000 persons" - AWWA Journal - March 2006 -

