

Bow Island Reservoir and *POLYDEX*[™]

MAJOR IMPROVEMENT IN MUNICIPAL DRINKING WATER QUALITY

The town of Bow Island, located 200 miles southeast of Calgary, Alberta, struggled for years with significant quality issues in its water reservoir until they decided to use *POLYDEX*[™], a mineral-based liquid bacteriostatic algaecide produced by OCION Water Sciences Group. By adding *POLYDEX*[™] directly to the raw water reservoir, the use of coagulants and chlorine was significantly reduced and the use of activated powdered carbon completely eliminated. The overall drinking water quality of Bow Island has significantly improved.

In fall 2010, high organic content in the Bow Island reservoir had created a visible green slime across the surface of the water. The water also had a noticeable and unpleasant taste and odour. The Regional Water Commission attempted to alleviate the problems with aeration and large quantities of powdered activated carbon, coagulants and chlorine; however, the water quality remained inadequate. The following autumn of 2011, The Commission decided to use a pre-treatment of *POLYDEX*[™]. The product was applied to the raw water at the entry point to the reservoir during the autumn season. The operational changes at the reservoir are summarized below:

SUMMARY OF OPERATIONAL CHANGES AT BOW ISLAND RESERVOIR

Properties	Before Polydex Treatment (Fall 2011)	After Polydex Treatment (Spring 2012)
Total Organic Carbon (TOC)	8.3 mg/l	2.6 mg/l
pH	9.4	8.3
True Colour (Units)	16 Units	8 Units
Potassium Permanganate required	0.015 mg/l	0.010 mg/l
Chlorine Residual	Shock required	Residual maintained
Activated Powdered Carbon	600 kg annually	None Required

After the *POLYDEX*[™] application, water quality results were dramatically improved. Ed Campbell, the Senior Utilities Operator for the Regional Commission responsible for the Bow Island Reservoir, highlights his experience with *POLYDEX*[™] in this insightful case study.

CASE STUDY

BOW ISLAND RESERVOIR AND AUTUMN TREATMENT WITH **POLYDEX™**

Bow Island is tucked into the southeastern corner of Alberta, 200 miles southeast of Calgary, and 60 miles north of the US border. It calls itself The Bean Capital of the West. Deep in farm country, the town is surrounded by 110,000 acres of irrigated crops including beans, potatoes, sugar beets, dill and spearmint.

Built in 1982, the Bow Island Reservoir has a clay bottom and holds 682 million litres of waters drawn from the St. Mary's River, which originates in Glacier National Park at Waterton, Alberta. It services the town of Bow Island and neighboring hamlets of Grassy Lake and Burdett with a combined population of about 3000 people. It also provides bulk water to a portion of the St. Mary Irrigation District, which feeds surrounding agricultural lands. Water usage is much higher in the summer time. In 2008, the reservoir was placed under the jurisdiction of the Highway 3 Regional Water Services Commission, as part of an overall provincial restructuring designed to ensure cost effective, consistent compliance across the user base with the more stringent water quality regulations introduced.

By 2010, the Bow Island Reservoir was struggling with year-on-year deterioration of water quality. High organic content had created a visible green slime across the surface of the water. Unpleasant taste and odor were significant issues. Continuous aeration efforts, supported by two 5-horsepower air compressors installed into the header and feeding fine micro bubbles in 10 air diffuser lines, they were unable to maintain sufficient oxygenation in this large body of water. The Commission was also using large quantities of powdered activated carbon, coagulants, and potassium permanganate along with prescribed chlorine in the treatment plant. In 2010, between mid-March and mid-July, approximately 600 kg of activated carbon was applied at a cost exceeding \$5,000. It was expensive, labour intensive work involving continued applications of toxic substances. Nevertheless, water quality issues remained.

Ed Campbell is the Senior Utilities Operator for the Commission and he is responsible for operations at the Bow Island water treatment plant and reservoir. In 2011, a decision was made to test a new approach. A pre-treatment of **POLYDEX™**, OClON Water Sciences' mineral-based liquid bacteriostatic algaecide, was applied to the raw water at the entry point to the reservoir during the fall season. When OClON Water Sciences Group spoke with Campbell about his experiences with **POLYDEX™**, he was extremely positive. "I drink the water every day now. It's clear and without smell or taste."

POLYDEX™ is added directly to the raw water reservoir from 1000 L totes using peristaltic pumps, a very easy application process. The product contains natural mineral ions in their most biologically active state. OClON's proprietary Aqueous Ionic Matrix (AIM) technology ensures that these mineral ions remain in solution providing maximum antimicrobial efficacy. With AIM, **POLYDEX_{MC}** provides long-lasting stability of biologically active copper ions in a wide range of water conditions with only minute quantities of



minerals. When **POLYDEX™**'s ionic minerals are released into the water, the cationic surface-active ions makes a potent biocide that, when used as directed, is entirely safe for consumption by humans and livestock. Moreover, **POLYDEX™** is extremely miscible – it seeks dilution in water thereby avoiding the 'hot spots' common with historic methods of applying copper sulfate for water treatment. Because **POLYDEX™** is self-dispersing, it distributes the active mineral ions uniformly for more complete contact with the micro-organisms that caused so many problems in the reservoir.

According to Campbell, not only is the product "operator friendly", but since switching to **POLYDEX™**, they have experienced a "vast improvement" in the water quality they are delivering to their customers. Campbell reported that since the **POLYDEX™** pre-treatment, the organics are reduced by 70%. Total Organic Carbon (TOC) has gone to 2.6 milligrams per litre (mg/l) from 8.3 and pH levels stand at 8.3 down from 9.4 pH levels in treated water under the old system. True Color was 16 Units compared to the 8 Units now with **POLYDEX™**. In 2010, the potassium permanganate requirement was about 0.015 mg/l and now sits at 0.010 mg/l, an improvement of over 30%. In fact, thermal turnover was not detectable in spring 2012 due to the low levels of suspended solids in the water. Additionally, because of the lower organic content, the chlorine residual requirement is readily maintained, eliminating the need to shock with chlorine to hold levels due to lower turnover in winter. Campbell also noted a very acceptable carryover of copper residual from raw to potable water supplies of approximately 0.020 mg/L in the treated water. The EPA maximum level goal for copper is 1.3 ppm and Canadian Water Quality Guidelines are (1.0 mg/L) of copper for raw drinking water.

"**POLYDEX™** has definitely made my life easier and it is operator friendly," says Campbell. His team has reduced the frequency of cleaning the system strainers from 2 to 4 times a week, to once every several weeks. There are also other cost savings: Eliminating carbon treatment has significantly reduced supply costs; there is no longer need for hydrochloric acid; and the usage of coagulants has declined by as much as 50%, due to the reduction of suspended solids. Campbell also appreciates that the product is safe - for operators, end-users and the environment. The application of **POLYDEX™** to water has minimal impact on the receiving environment. No longer biologically active, the mineral ions become bound by the target organic matter they kill and are to a large extent recycled naturally. In terms of human consumption, most multi-vitamins contain trace amounts of copper as an essential nutrient at levels that significantly exceed those received from drinking **POLYDEX™** treated water.

As far as Ed Campbell is concerned, the decision to switch to **POLYDEX™** has made a vast difference to the quality of water at Bow Island. A simple, user-friendly application, solid cost savings and an environmentally responsible product add up to a superior solution for Bow Island water treatment.

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