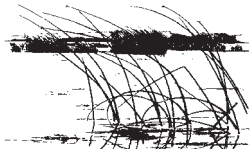
BUFFALO POUND WATER ADMINISTRATION BOARD

2011 annual report



CONTACT INFORMATION

The Buffalo Pound Water Treatment Plant is located approximately thirty kilometres northeast of the City of Moose Jaw, Saskatchewan, on Highway No. 301, seventeen kilometres north of the intersection with Highway No. 1.

The plant's mailing address is P.O. Box 1790, Regina, Saskatchewan, S4P 3C8.
The telephone number is 306-694-1377, fax 306-694-6050.

Plant management staff may be reached by email at the following addresses:

Ben Boots, Plant Superintendent: bboots@regina.ca
Dan Conrad, Assistant Superintendent/Chemist: dconrad@regina.ca
Tim Sedgewick, Plant Engineer: tsedgewick@regina.ca
Gene Berezowski, Plant Foreman, gberezowski@sasktel.net.

The City of Regina maintains a web site containing information about the Buffalo Pound Water Treatment Plant. This may be accessed by going to http://www.regina.ca/residents/water-sewer/learn_about_our_water_system/water-sewer-system/buffalo-pound/

Information about the Buffalo Pound Water Treatment Plant is also available from the City of Moose Jaw's website http://www.moosejaw.ca/?service=water-management

BUFFALO POUND WATER ADMINISTRATION BOARD

2011 annual report

City of Regina | REGINA Infinite Horizons

Moose Jaw
SURPRISINGLY UNEXPECTED

2011 annual report

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL REPORT - 2011

BOARD CHAIRPERSON'S LETTER

On behalf of the Board of the Buffalo Pound Water Treatment Plant I am pleased to present the 2011 Annual Report of the Buffalo Pound Water Administration Board.

This year, 2011, will be long remembered as one of the most challenging years in the history of the Buffalo Pound Water Treatment Plant. Three times extended plant outages required our municipal customers to request short term voluntary water rationing. As well, Buffalo Pound Lake water quality was detrimentally affected by abnormal weather stressing the ability of the plant to achieve our treatment objectives. From this experience, and to ensure continued performance in meeting our goals for a safe and abundant water supply to customers we have incorporated some risk analysis into plant initiatives.

Notwithstanding these challenges, the Buffalo Pound Water Treatment Plant did provide water to our customers that met or exceeded regulatory requirements and our own standards.

The Board is grateful for the continued dedication of plant management and staff in efficiently operating and maintaining the treated water supply for Moose Jaw and Regina. Several times every day customers give a quiet vote of appreciation for the work done ensuring safe, high quality water is available for their use.

Derrick Bellows, P.Eng., FEC, ICD.D
Chairperson
Buffalo Pound Water Administration Board

BUFFALO POUND WATER ADMINISTRATION BOARD
2011 ANNUAL REPORT

INTRODUCTION

This report summarizes the activities and major events at the Buffalo Pound Water Treatment Plant during 2011. The report outlines the Mission and Goals, achievements and areas of concern. It is intended as an information source for city administration personnel, elected officials and the general public. This report also contains the Drinking Water Quality and Compliance Report required by provincial regulations.

BUFFALO POUND WATER ADMINISTRATION BOARD

The Buffalo Pound Water Administration Board was created in 1951 by an official agreement between the City of Regina and the City of Moose Jaw. In accordance with the agreements the Board is composed of two senior members of the City of Regina administration and one senior member of the City of Moose Jaw administration.

BOARD MEMBERS

Mr. D. Bellows, P.Eng., FEC, ICD.D,
Board Chairperson
Director of Environmental Services
Public Works Division
City of Regina

Mr. Mokles Rahman, P.Eng., MDM, MBA
Director of Engineering Services
City of Moose Jaw

Mr. Chuck McDonald, B.A., B.B.Admin, CMA
Director of Finance
City of Regina

WATER TREATMENT PLANT MANAGEMENT

Mr. B. Boots, P.Eng., FEC	Plant Superintendent
Mr. D. Conrad, P.Chem.	Assistant Superintendent / Plant Chemist
Mr. T. Sedgewick, P.Eng.	Plant Engineer
Mr. E. Berezowski	Plant Foreman

MANAGEMENT REPRESENTATION LETTER

The Buffalo Pound Water Treatment Plant is the source of drinking water for the cities of Regina and Moose Jaw, as well as other smaller nearby communities. Providing safely treated water on a continuous basis for more than 230,000 people is a huge responsibility placed upon plant management and staff.

In 2011 the challenges to provide safely treated water and meet that responsibility were substantial.

An outage caused by an unexpected underground cable failure in the plant yard and two extended SaskPower outages caused by summer storms certainly created nervous times in the cities.

Because the Buffalo Pound Water Treatment Plant is remote from Regina and Moose Jaw decisions were made long ago that the cities would maintain sufficient reservoir storage instead of constructing stand-by electrical generation facilities at the plant. Reservoir storage addresses extended outages at the water treatment plant whether the outage is caused by electrical problems, intake blockages, supply pipeline failures or other problems. Reservoir storage in the cities can provide up to one day of normal water consumption in the summer and up to two days in the winter. Reservoir storage in the cities addresses a multiple of issues whereas on-site electrical generation only covers power outages. In addition to reservoir storage the City of Regina can use its groundwater supply in emergency situations.

And while 2011 had its share of nervous moments, during which citizens only partially reduced their consumption, these plans essentially worked. Power was restored, the cable was repaired and the Buffalo Pound Water Treatment Plant was able to resume stable operation in a timely fashion to replenish the city reservoirs.

While the plans 'essentially worked' in the three extended outages in 2011 it is important that these plans be reviewed. Both cities have grown substantially since their last reservoir was constructed. Consumer's expectations and the regulation of distributed water quality have certainly changed. In accordance with the agreements creating the Buffalo Pound Water Administration Board, the Board administers the operation of the plant as a non-profit entity. Funding for major capital works is beyond the financial capability of the Board. Additional major equipment installations at the plant, or reservoirs in the cities, are funded by the two cities' water utility capital budgets.

Buffalo Pound Lake water quality was severely impacted in 2011 by the large spring runoff in April and heavy rains in June that caused the Moose Jaw River to flood into the lake. Flood water from the Moose Jaw River is much poorer in quality than water released from Lake Diefenbaker. Requests to the Saskatchewan Watershed Authority to improve Buffalo Pound Lake quality with a small increase in releases from Lake Diefenbaker were only partially answered. The plant's chemical costs soared and all available granular activated carbon contactors were required to address the lake water quality challenges. The treated water quality met all applicable guidelines and taste and odour problems were averted, but this was achieved with significantly increased operating costs.

The challenges faced in 2011 were more serious than in recent past years; I commend all plant staff for their dedication in meeting these and challenges and achieving the Buffalo Pound Water Administration Board's Mission and Goals.

Ben Boots

Ben Boots, P.Eng., FEC
Plant Superintendent

MISSION AND GOALS

MISSION

* To provide for the cities of Regina and Moose Jaw a reliable and affordable supply of safe, high-quality drinking water which meets the needs and expectations of consumers.

GOALS

* Treated water that meets the quality expectations of the citizens of Moose Jaw and Regina, and meets or exceeds all government regulated parameters.

* Operational practices and controls that ensure a continuous and safely-treated supply of water within an environmentally-responsible and cost-efficient operation.

* Judicious monitoring of the treated water from the plant to the end of the cities' distribution systems. Appropriate monitoring of the water in Buffalo Pound Lake, the Upper Qu'Appelle River and Lake Diefenbaker to identify long-term trends and areas of concern to protect the water supply.

* Water quality research to identify possible chemical and microbiological contaminants as well as to test and implement the best available treatment technologies, thus ensuring that the water treatment plant can meet current and future expectations for regulated parameters.

RESOURCES

WATER SOURCE

Water for Regina and Moose Jaw is taken from Buffalo Pound Lake, a shallow reservoir in the Qu'Appelle Valley. The lake is 29 km long, 1 km wide but has an average depth of only 3 metres. The surface area of Buffalo Pound Lake is 2900 hectares inferring it has a capacity of 90 million cubic metres at the "full supply level" of 509.3 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the Saskatchewan Watershed Authority and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. Mean annual water releases of 5 to 1 cubic metres per second are typical. Thus the average residence time of water in the lake varies from six to thirty months. Very little water enters Buffalo Pound Lake from rain or spring runoff except in abnormally wet years. The principal source of the water is rain and snow-melt in the mountains of Alberta, collected by various tributaries draining to the South Saskatchewan River and stored in Lake Diefenbaker. As such, the water is potentially affected by discharges from point sources (upstream cities) and non-point sources (agricultural and recreational).

Buffalo Pound Lake is generally free of industrial pollution but is naturally rich in nutrients (phosphate, nitrogen and dissolved organic carbon) which encourage the growth of phytoplankton (typically diatoms in the winter and green algae or cyanobacteria in the summer). Weed growth can also be extensive. Algae and weeds pose many treatment challenges such as high chemical demands and undesirable tastes or odours. The lake and watershed appear to also be impacted by ground waters infusing minerals.

PLANT TREATMENT

Raw water from Buffalo Pound Lake passes through a series of treatment stages designed to remove impurities such as algae, bacteria, clay particles and dissolved organic materials. The objective of this treatment is to produce water that is clear, colourless, odour-free, aesthetically pleasing and safe to drink.

The treatment process consists of six stages: chlorination, cascade de-gasification, coagulation flocculation, clarification, filtration and carbon adsorption.

Lake water enters a pumping station located on the south shore of Buffalo Pound Lake through two submerged intakes. Raw water is chlorinated and then pumped to the treatment plant via two pipelines connecting the pumping station to the main treatment plant. The pipelines are 1.05 and 1.35 metres in diameter, extend a distance of 3000 metres and rise 82 metres. After reaching the plant, water is initially divided into two streams, each of which has cascade de-gasification, coagulation/flocculation and clarification. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption and further chlorination.

Cascade operation is normally used during periods of excessive dissolved gas levels in the raw lake water. Excessive dissolved gases are most commonly produced by photosynthetic bacteria and algae. During cascade de-gasification, the water falls over a series of steps which releases excess dissolved gasses and prevents the formation of gas bubbles in later treatment processes. Clarification and filtration processes could be impeded by gas bubbles that attach to particles of floc, causing them to float, rather than sink, and by causing air binding in the filters.

If conditions warrant, powdered activated carbon (PAC) is added to reduce taste and odour. The use of powdered activated carbon while relatively infrequent is occasionally necessary when granular activated carbon contactors are off line or to temporarily reduce the odour loading when the contactors are on-line.

Coagulation and flocculation are the next steps in treatment. Aluminium sulphate (alum) is vigorously mixed with the water. In the process of coagulation, the alum neutralizes surface charges on particulate matter contained in the water and forms a fluffy precipitate (floc) that entraps suspended algae and clay particles. The water is then stirred slowly in flocculation tanks to allow floc particles to become larger and denser prior to their removal.

The floc-bearing water then flows through clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle by gravity to the bottom while clear water is constantly removed from the top. Settled floc is removed from the clarifiers as sludge and pumped to holding lagoons where it is further separated into clear water (returned to the lake) and solid sludge (removed for disposal).

Any floc that was not removed by clarification is separated in the filtration stage. Water is passed through mixed-media filters consisting of a top layer of coarse anthracite followed by successive layers of fine silica sand, and even finer garnet sand. Any remaining particulate matter or floc is trapped by the filters. Filters are cleaned by backwashing with clean water. The filtration step completes the removal of particulate impurities. The removal of dissolved organic impurities, which are responsible for taste and odour, is accomplished next in the carbon adsorption stage of treatment. Large rectangular tanks (contactors) contain granular activated carbon (GAC) to a depth of 3 metres. Water is lifted by Archimedes screw pumps from the bottom of the filters and taken to the top of the contactors where it is allowed to flow by gravity down through the GAC. GAC contains many microscopic pores which adsorb dissolved chemical impurities. Water is in contact with the GAC for 15 to 30 minutes, depending on flow rates, and emerges freed of the dissolved organic materials which cause objectionable taste and odour. The GAC filtration process at Buffalo Pound was designed for taste and odour removal and is used during periods of poor taste and odour in the raw water; the normal period of operation is from May until December.

All stages of water treatment are now essentially complete. Prior to delivery by pipeline to the consumers, chlorine levels are adjusted, if necessary, to provide adequate disinfection and to counteract any possible contamination encountered during its travel to the cities' reservoir and distribution systems. Water delivered to the City of Moose Jaw is also fluoridated prior to pumping.

The carbon used in the contactors retains its effectiveness for taste and odour improvement up to six months, after which time it must be regenerated or replaced. GAC is a relatively expensive treatment component and it has been found to be cost effective as well as environmentally responsible to regenerate the used GAC rather than to discard it and purchase new. Regeneration is accomplished by heating the spent GAC to 850^{o} C in an oxygen-free atmosphere contained in a fluidized bed gas-fired furnace. Spent GAC is transferred by pipeline as a slurry from the contactors to the furnace, regenerated to process specifications, and returned to the contactors for reuse. Carbon regeneration is usually performed at Buffalo Pound from mid-October to mid-April.

ENVIRONMENTAL PROTECTION AND CONSERVATION

The Buffalo Pound Water Treatment Plant, like any large industrial facility, has the potential to affect the environment. The plant has facilities in place to handle all process wastes including alum sludge, off gases from the carbon regeneration facility, laboratory wastes, various solid wastes generated by plant operations, and sewage. The plant uses a considerable quantity of electrical energy in its operation; conservation efforts give returns in the form of reduced demands on the environment and lower operating costs.

A series of sludge lagoons is used in the treatment of the alum sludge waste stream. This form of sludge management can be very effective in ensuring that the sludge is retained. Sludge is exposed to a natural freeze-thaw cycle that dewaters it to produce a nearly dry granular material which is transported to a landfill site. Buffalo Pound is one of the few water treatment plants in Canada with the ability to manage waste sludge in this manner.

Because the plant's lagoons were identified as being undersized in the 2005 and 2010 Water Works System Assessments the Upgrade Project includes plans to improve residuals management.

The natural gas-fired furnace in the carbon regeneration facility produces off gases which are thoroughly scrubbed before release to the atmosphere.

Waste disposal agencies are contracted to handle laboratory wastes and solid wastes generated by the plant. As it becomes necessary, firms specializing in hazardous waste disposal are contracted to dispose of chemical wastes.

Sewage generated by the plant is pumped to treatment and evaporation lagoons located on plant property. The primary lagoon has a geotextile fabric and bentonitic clay liner to prevent seepage.

Efforts are continually made to utilize electrical energy in the most efficient fashion possible. The biggest consumers of power are the large pumps located at the lake pumping station and the units that pump water to the cities.

WATER QUALITY MONITORING

A well-equipped accredited laboratory is located on site and used to monitor the quality of raw and treated water as well as water quality at several intermediate steps in the treatment process. Major process control parameters (turbidity, pH, chlorine residual, particle counts, dissolved oxygen and temperature) are monitored continuously by instrumentation communicating with the plant process computer system. Analyses are performed for most regulated parameters on a daily to monthly schedule; for other parameters (most trace-level organics and metals) samples are sent to commercial laboratories. Analytical results are compared to Canadian Federal guidelines and to Saskatchewan Ministry of Environment (MOE) objectives. All criteria for safe drinking water were satisfied by the Buffalo Pound Water Treatment Plant in 2011.

Analyses for a wide variety of physical, chemical, and microbiological parameters are performed in the Buffalo Pound Laboratory. Some 65 different constituents are routinely determined and approximately 25,000 tests are done yearly. The 2011 results are summarized in Appendix 1, together with results for metals and organics obtained from commercial laboratories.

The quality of the regenerated granular activated carbon is monitored by plant staff for a variety of physical and chemical parameters.

A vigorous in-house quality control program is maintained to ensure data generated by the Buffalo Pound Water Treatment Plant Laboratory is valid. The laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA) for 31 different chemical and bacteriological parameters.

PLANT OPERATIONS AND MAINTENANCE

WATER PRODUCTION

Water Production and sales (in megaliters) were as shown in Table 1. (See also related Graphs 1 and 2.) Total sales to the cities in 2011 were 27,482 ML to Regina and 6,150 ML to Moose Jaw. Sales to Regina increased 5.9% from 2010, and sales to Moose Jaw increased 14.9%.

Sales to the SaskWater Corporation in 2011 increased by 5.2%, to 192.6 ML. Sales to SaskWater represent less than one percent of the plant's production. It is worthwhile to note that the total amount of water sold to the SaskWater Corporation in all of 2011 is equivalent to 30 hours of combined sales to Regina and Moose Jaw in July.

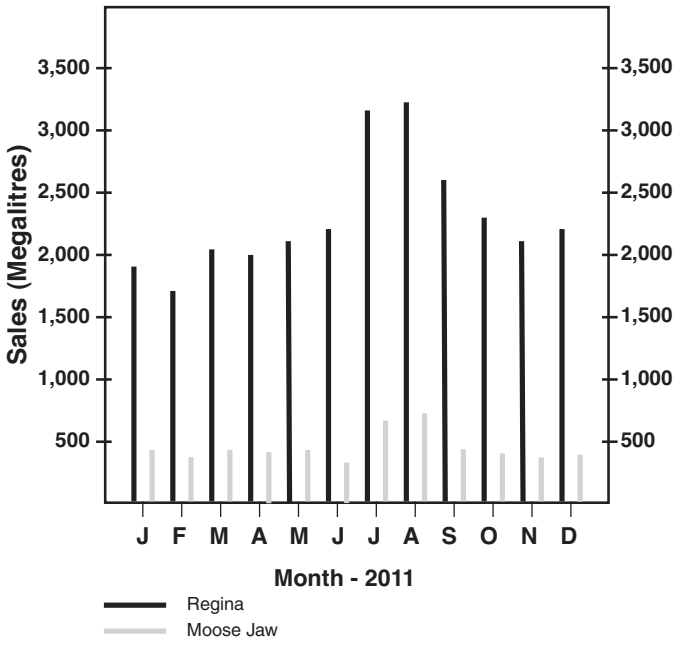
Graph 3 shows annual water production by year since the plant began operation in 1955.

Table 1: 2011 WATER SALES (MEGALITRES)
BUFFALO POUND WATER TREATMENT PLANT

MONTH	REGINA	MOOSE JAW	SASK WATER CORP.
January	1,985.0	411.6	13.0
February	1,851.2	410.6	11.6
March	2,124.9	463.7	13.6
April	2,030.6	453.3	13.1
May	2,215.8	515.9	16.4
June	2,183.1	481.7	15.7
July	3,023.9	767.5	21.1
August	3,106.8	784.5	25.3
September	2,566.3	572.0	21.5
October	2,243.5	442.8	21.3
November	2,046.9	429.1	11.2
December	2,104.4	417.0	9.0
Totals	**27,482.3**	**6,149.5**	**192.6**

Graph 1

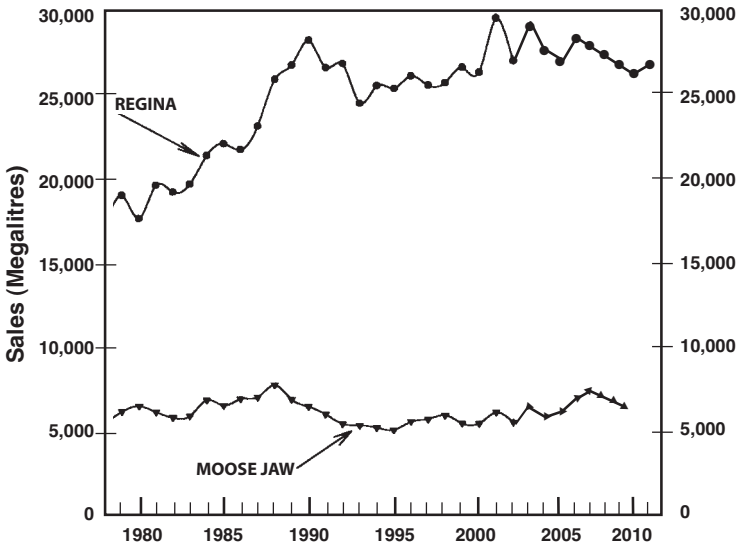
BUFFALO POUND WATER TREATMENT PLANT
MONTHLY SALES TO REGINA & MOOSE JAW - 2011



TOTALS
Regina **27,482.3 ML** Moose Jaw **6,149.5 ML**

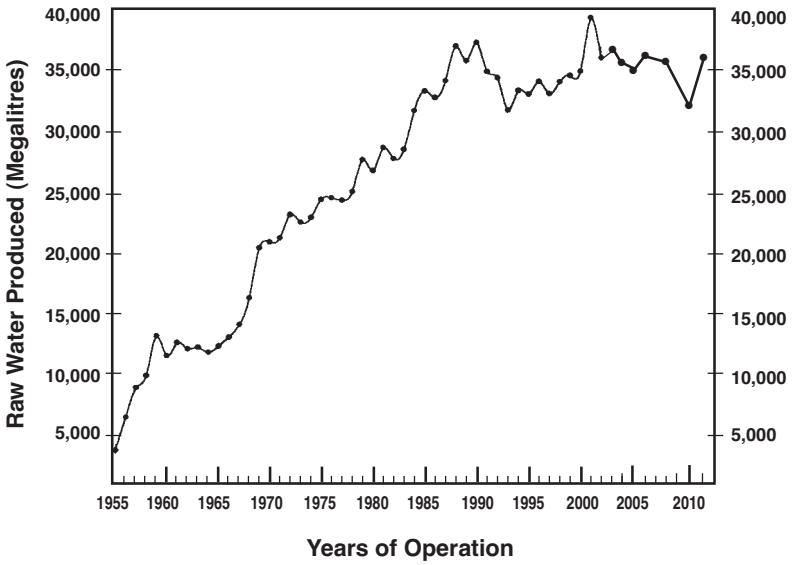
Graph 2

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL SALES TO REGINA & MOOSE JAW
1979 - 2011



Graph 3

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL RAW WATER CONSUMPTION
1955 - 2011



PLANT OPERATIONS

The processes employed at the Buffalo Pound Water Treatment Plant are modified during the year as determined by the water quality in Buffalo Pound Lake.

Ice cleared the lake on April 28, 10 days later than the average. Chemical dosages were generally quite high throughout 2011, being impacted by the Moose Jaw River flooding into Buffalo Pound Lake. The granular activated contactors were put into operation on May 10 and because of the poor lake water quality were still in service at year end.

In the fall of 2011 the lake froze over November 16. The lake water was impacted by a large bloom of green algae (Chlorella) in December.

CARBON REGENERATION FACILITY

The carbon is regenerated in the winter so that it can be used to remove taste and odour from the water in the following summer. The 2010 / 2011 regeneration system was from October 27, 2010 to March 7, 2011. The 2011 / 2012 regeneration season commenced October 17.

MAINTENANCE AND CAPITAL PROJECTS

Effective maintenance plays a key role in keeping the water treatment plant running efficiently producing high quality water. All vessels are drained, cleaned and inspected at least annually. All critical plant equipment is inspected, tested and maintained at least annually to help ensure satisfactory operation during peak flow demands. All water quality monitoring instruments are checked or calibrated frequently. The results from major on-line instruments are compared to laboratory instruments.

Several projects were completed with funds from the Capital Replacement Reserve for a total cost of $214,262. Progress was made on the replacement of the filter valves on the original eight mixed-media filters. Further progress was made on the project updating the process and instrumentation drawings. Automatic valve closures were installed on the Lake Pumping Station chlorine systems. A new Ion Chromatograph was acquired for the laboratory.

In addition to the projects funded by the Capital Replacement Reserve other projects were completed. The plant's turbidimeters and particle counters were inspected and maintained by manufacturer's representatives.

A new header was fabricated for the plant's pre-chlorine system. The inspection ladder in the GAC contactor "I" was replaced, new effluent valves were installed in Contactors "I" and "K." The pump shaft, seal and bearings were replaced and the impellor repaired in the train "A" sludge pump. The pump check valve was resurfaced while the unit was down. A resistor and new batteries were installed in a uninterruptible power supply (UPS) that failed after the January 6th power disruption. Plant staff and Associated Engineering replaced the SCADA servers. A new portable man-lift was acquired. Roof repairs on the 'barrel roofing' over the clarifiers were completed. The west boiler in the main plant was overhauled with new tubes, "fire-eye", pressure regulator and gas pressure cut-offs. A shaft in LPS Pump "D" failed; the pump was pulled and the motor sent for an overhaul while the unit is out of service. The section of pipe between the two control valves on the GAC backwash supply line was replaced; this section is subjected to pressure reduction and potential cavitation. The second floor rug and both control room's flooring was replaced. The Plant Engineer's office and the main plant control room were painted.

Plant staff in conjunction with crews contracted by the City of Moose Jaw replaced the bottom impellor of Moose Jaw's "B" pump.

An internal inspection of the original intake line and an external viewing of the intake structure were conducted using a submersible 'remote-operated-vehicle.' The line's interior is in reasonably good shape, even individual rivets of the joints in the corrugated metal steel pipe could be observed. Very little silt or other foreign material was observed in the pipeline.

UPGRADE PROJECT

The Cities have committed funds to upgrade the Buffalo Pound Water Treatment Plant. The project is intended to add ultraviolet disinfection to address protozoa, improve processes to deal with treated water taste and odour, better address treatment plant residuals. Plans to increase the size of the plant's clearwell have been discontinued and corrosion concerns have been determined to be less of a priority.
AECOM submitted all technical memoranda and the code and condition assessment report required in the Conceptual Study phase. The final draft of the Conceptual Design Report was received in late September.

The Ozone – BAC pilot plant commenced October 4. AECOM submitted proposals for pre-design engineering services for Residuals Treatment, UV Disinfection and Treated Water Storage and High Lift Pumping.
The steering committee met with staff from the Winnipeg Water Treatment Plant on November 4 and toured that plant. AECOM was the prime consultant for that new plant and is recommending several processes that are employed at the Winnipeg Water Treatment Plant.

Laboratory staff has commenced sampling and analysis of the Ozone- BAC pilot plant.

OPERATIONAL CHALLENGES

On Thursday, January 6, 2011 at 3:40 AM power was lost to the pretreatment transformer due to a cable-shorting failure. This 4160 volt, 265 amps, 1500 KVA transformer provides electrical power to chemical feed pumps, flash mixers, flocculators, clarifier rake drives, the Control Room SCADA UPS supplies, the plant's laboratory and the recycle pumphouse. Repairs to the cable were made by plant staff and contracted personnel through Thursday night and Friday morning. At approximately 8:30 am Friday after being off-line for 30 hours the plant was re-started; pumping to the cities and SaskWater started within a few hours. A meeting was held January 14 for all of the affected parties to share what happened and what was learned from the experience.
Plant management attended a meeting on January 19 at the Provincial Emergency Operations Centre which discussed the January 6th plant outage with various government agencies. Effective communications within impacted city and provincial agencies was identified as an area for improvement. A planned outage was held September 28 to complete the repair from the January 6 cable failure; the new cable was initially routed into the side of the cabinet on a temporary basis and was re-rerouted to the proper bottom location during the outage.

An extended power outage occurred June 29/30 as a result of a thunder-storm damaging a high-voltage switch on the power line to the plant.

A third extended power outage occurred July 29/30 as a result of a thunder-storm damaging three poles on the power line to the plant. When power was restored three 4,160 volt fuses on the supply to a 4,160 to 480 volt transformer blew. Because power was lost for about 16 hours condensation developed in the switchgear, and related equipment including the transformer, causing the fuses to blow when they were re-energized. The transformer in this application is a dry, air-cooled type and was dampened with condensation making it non-operational. Plant production was off from 23:45 July 29 to 1:00 July 31 when production was restored using a rented emergency generator to power what the transformer normally powered.

The Moose Jaw River levels flooded the Qu'Appelle River such that the river entered Buffalo Pound Lake the 'wrong' way on two occasions, once in April and again in late June. The impacts of the Moose Jaw River and other local runoff increased raw water odours, dissolved organic carbon and dissolved oxygen. Moose Jaw River flood waters contained finely divided particulates (silts and organics) which have proven exceedingly difficult to treat with existing plant processes. Total and dissolved organic carbon levels in the flood water were approximately doubled from that normally found in Buffalo Pound Lake over the last several years. The nature of the organic carbon is more humic in character as indicated by its higher specific UV absorbance. Higher doses of chlorine and alum were required as a result. Powdered activated carbon was required in early May prior to the GAC's being started and again in late June and early July in an attempt to 'ballast' rising floc.

Poor raw water quality in the lake increased chlorine demands and produced chloroform levels that are among the highest measured at the plant in the last 10 years.

Plant management requested the Saskatchewan Watershed Authority increase releases from Lake Diefenbaker to 7 cubic meters per second (cms) to improve the Buffalo Pound Lake water quality. SWA was reluctant to do that because they were endeavoring to lower Last Mountain Lake and flow in the lower Qu'Appelle River. SWA eventually increased releases to 4 cms from Diefenbaker and adjusted releases from Buffalo Pound to 2 cms.

WASTEWATER FACILITY

The clarifier underflow removes particulate matter (alum sludge) from the raw water. The effluent stream is directed to alum sludge lagoons where the sludge is deposited and the clear water overflow returns to Buffalo Pound Lake. The sludge from the east winter and north east summer lagoons was excavated to the stockpile location.

REGULATORY AND GOVERNMENTAL AFFAIRS

In December 2002 the provincial government introduced new Water Regulations dealing with water and wastewater facilities. These comprehensive regulations are intended to improve water quality and reporting accountability. Saskatchewan Environment conducted two inspections of the plant in 2011 in February and September; no deficiencies were noted.

One requirement of the regulations is that the laboratory analytical work required by a water treatment plant's Permit to Operate must be done by an accredited laboratory. The Buffalo Pound laboratory fulfilled all requirements to maintain accreditation from the Canadian Association for Laboratory Accreditation (CALA). The laboratory participated in four sets of proficiency test analyses and a laboratory technician attended a course on ISOIEC 17025 requirements in Calgary.

The Water Regulations require that the plant submit results of the weekly bacteriological, monthly trihalomethane and quarterly major ion analyses promptly to Saskatchewan Environment and that a Drinking Water Quality and Compliance Report be published annually. The required Drinking Water Quality and Compliance Report is provided in the Appendix. The Buffalo Pound Water Treatment Plant met all sample submission requirements of the plant's operating permit. The plant is in full compliance with the Water Regulations. The plant's Quality Assurance / Quality Control policy was updated in and approved by the Buffalo Pound Water Administration Board in April, 2011.

Plant operations are subject to the federal National Pollutant Release Inventory (NPRI) Legislation, Canadian Nuclear Safety Commission (CNSC), as well as the Environmental Emergency Regulations. The required inventory submissions were made to the NPRI program. Radioactive substances are used in the laboratory's electron capture detectors. Although the licence requirements for electron capture detectors have been terminated by the CNSC, swipe tests are still conducted as part of the general maintenance program. Swipe tests ensuring the integrity of these detectors were sent to Saskatchewan Labour for analysis; no leakage above the guidelines was detected.

HUMAN RESOURCES

In 2011 the Buffalo Pound Water Treatment Plant employed a total staff of 28, consisting of three out-of-scope managers, nine operating staff, five laboratory technologists, five journeyman maintenance persons, four maintenance persons, and two labourers.

The in-scope staff is represented by the Communication, Energy and Paperworker's Union Local 595. Proposals were exchanged on January 13 and discussions were held on April 18 and 19 resulting in a memorandum of agreement for a three-year contract.

A laboratory technician submitted her resignation effective July 15; another laboratory technician has been hired on a temporary (14 month) basis to replace this person during the pilot plant project work.

A new Plant Engineer joined the plant management team on October 24.

The plant's Senior Electrician retired effective October 28, 2011. His position was filled internally and recruitment of another journeyman electrician was still in progress as of year-end.

The Buffalo Pound Water Administration Board was presented with a Certificate of Achievement Award from the provincial Worker's Compensation Board for the plant's safety record. This is the twenty-fourth consecutive year the plant has been presented with this award. During 2011 there were no lost-time accidents or medical-aid case injuries.

Plant staff participates in the Regina Civic Employees Pension Plan. The plant superintendent attended many meetings to attempt to address the Pension Plan's large unfunded liabilities. The issue remains unresolved as of yearend.

WATERSHED PROTECTION

The Buffalo Pound Water Treatment Plant continues to be involved in consultation processes dealing with watershed protection in the Upper Qu'Appelle River and Buffalo Pound Lake. The Watershed Advisory Committee finalized the Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan. The organization leading source water protection is known as WUQWATR (Wascana Upper Qu'Appelle Watersheds Association Taking Responsibility, Inc.) The plant superintendent attended the annual meeting of the Upper Qu'Appelle Watershed Advisory Committee. The Saskatchewan Watershed Authority and the South Central Enterprise Region are studying options to plan for a flowrate of up to 25 cubic meters per second in the Upper Qu'Appelle River; more than three times the volume the current channel can presently accommodate. One suggestion is the construction and operation of a channel out of the valley, on the south side of the river. The plant superintendent participated in various meetings with WUQWATR, the South Central Enterprise Region and the Regina Regional Opportunities Commission discussing the proposed channel and design parameters.

MISCELLANEOUS

A researcher with Agriculture Canada was provided with about 0.15 cubic meters, and later, three cubic meters, of freeze-dried alum sludge. It is well known in the research that alum sludge will bind phosphorous. The researcher is investigating the ability of sludge to remove phosphorous from various waste streams in a 'bio-reactor.'

A Master's student from the University of Saskatchewan who coincidentally was doing similar research, was provided with 75 litres of clarifier blow-down slurry. Plant management introduced the two researchers to each other to assist collaboration on their studies.

A Master's student from the University of Regina was assisted by obtaining regular lake water samples. This student is studying in-lake nutrient production.

Six staff attended the annual Saskatchewan Water and Wastewater Association Annual Conference in November. Meetings of the City of Regina Water Quality Emergency Response Plan Task Force were held in April and October. The plant chemist presented a paper entitled "Raw Water Bromide's Impact on Disinfection By-Products" at the WCWWA annual conference held in Saskatoon in September.

There were several media inquiries concerning dead fish in Buffalo Pound Lake in July. Most of the fish that were dead were small perch; the cause of the fish kill was determined to be a protozoa.

RESEARCH AND ANALYTICAL PROGRAM

SUPPLEMENTAL MONITORING

In addition to process monitoring which is required under the terms of the operating permit issued by Saskatchewan Environment, the Buffalo Pound Water Administration Board undertakes supplementary monitoring as follows:

- Distribution System Monitoring for the City of Regina and Moose Jaw
- Buffalo Pound Lake Monitoring
- Upper Qu'Appelle/Lake Diefenbaker Monitoring

The distribution system monitoring program surveys twelve locations in Regina and five in Moose Jaw on a monthly basis. This data assists the cities in their operations and required monitoring. Laboratory resources are also used on an occasional basis to assist the cities in responding to complaints and other issues related to water quality.

Monitoring of Buffalo Pound Lake provides information on the quality of the raw water supply; this facilitates the operation of Plant processes. Considering this longer-term data base is invaluable in evaluating the health of our drinking water source. The eutrophic status of Buffalo Pound Lake and its production of algae blooms that challenge our water treatment processes are well known. The historical data base of lake water quality coupled with hydrological records has demonstrated that moderate inflows from Lake Diefenbaker released by the Qu'Appelle Dam are beneficial in reducing the residence time of water in Buffalo Pound Lake and so moderating the potential for algae blooms. Unfortunately, high water flows through the light alluvial soils of the Upper Qu'Appelle River promotes erosion and the transport of phosphorus, an essential nutrient for algae growth into Buffalo Pound Lake. Cyanobacteria often predominate in natural waters that are deficient in nitrogen as many of those species can "fix" atmospheric nitrogen. By limiting phosphorus, the growth advantage of cyanobacteria over the more benign green algae is reduced.

Monitoring of the Upper Qu'Appelle River / Lake Diefenbaker system provides a database of water quality information that may allow an assessment of long-term water quality trends. The plant's database is frequently requested by provincial agencies and university researchers. The data is provided freely as a public service and as a means of encouraging new research into limnology and water treatment.

Monitoring of the Upper Qu'Appelle River watershed including Buffalo Pound Lake is typically carried out on an annual basis. In 2011 watershed sampling was carried out on June 8th. Results of the monitoring for pharmaceuticals and halogens are discussed elsewhere. The results in 2011 are not typical due to the low diversion rates of Lake Diefenbaker water via the Qu'Appelle Dam and two flooding events involving the Moose Jaw River. Lake Diefenbaker water is of generally better quality than Buffalo Pound Lake water especially when local runoff within the watershed compromises a larger portion of Buffalo Pound Lake's inflow.

Buffalo Pound Lake received flood waters from the Moose Jaw River that over-topped the Buffalo Pound Lake Dam in April and June. These flood waters eventually constituted as much as 60% of the volume of Buffalo Pound Lake. The flood water contained levels of organic matter and odour that were much higher than those normally encountered. The levels and nature of this organic matter required higher additions of treatment chemicals (alum and chlorine) and produced higher levels of chlorinated disinfection by-products. Additional GAC contactors were brought on line in August to deal with the poor raw water quality. Unfortunately, high water levels within the Qu'Appelle lakes did not permit any large increases to water releases from Lake Diefenbaker.

Over the past year, researchers from both the University of Regina and University of Saskatchewan have requested and received copies of our raw water data to stimulate new research in water quality monitoring and modelling.

Diversions from Lake Diefenbaker via the Upper Qu'Appelle River and Buffalo Pound Lake will increase if irrigated agriculture and industries are developed in Southern Saskatchewan. The watershed data collected since 1979 will provide a baseline for assessing the impacts of these future developments.

DISINFECTION BY-PRODUCTS SOURCES AND EFFECTS OF TREATMENT

Chemical disinfectants can react with the naturally occurring compounds found in water and generate new compounds that might be of concern to human health. Some of these compounds containing bromine and iodine can potentially be incorporated into disinfection by-products. Although the individual bromine and iodine by-products are not presently regulated, it is prudent to evaluate their potential for formation and identify their sources. A project to better understand these novel by-products was initiated in 2009. The project was expanded to include not only identifying the sources and level of bromine and iodine but to study their fate and effects during water treatment as well.

The study was continued throughout 2010-2011 and evaluated various plant processes for the production and removal of various disinfection byproducts (DBPs), adsorbable organic halides, bromine and iodine. The results were compiled and reported in a paper presented at the Western Canada Water and Wastewater Association Annual Conference held in Saskatoon in September 2011. (Effect of Raw Water Bromide on Disinfection By-Products, Daniel Conrad) Bromide in Buffalo Pound Lake originates with the soils and bedrock in its watershed. Increased raw water bromide was associated with greater bromine incorporation into DBPs. Bromine demonstrated different reaction kinetics than chlorine. Its incorporation into DBPs was unaffected by colder water temperatures.

Conventional water treatment (coagulation, clarification, and filtration) has some benefit in removing a portion of bromine that has been incorporated into organic compounds (that are likely of higher weight). GAC adsorption proved well suited for the removal of brominated DBPs.

Bromide that occurs naturally in Buffalo Pound Lake water can react with various chemical oxidants and could eventually require changes in disinfection treatment processes.

PERSONAL CARE PRODUCTS AND PHARMACEUTICALS IN BUFFALO POUND LAKE

We all use various pharmaceuticals and chemicals in our everyday lives. These chemicals as well as their metabolites eventually find their way into surface waters and may impact downstream users of that water. Some components such as caffeine, pain killers (ibuprofen and acetaminophen) are often found immediately downstream of human wastewater sources. Measuring these compounds can therefore provide a means of measuring the impact of human activities on the receiving water. In considering various scientific studies, it appears that the risk to humans from the various metabolites of pharmaceuticals and other products that are excreted or disposed of in wastewater is very small. The main environmental risk seems to be associated with changes in the health of various organisms (e.g. fish) in the immediate vicinity of the waste water discharge.

Surveys for various pharmaceutical metabolites and personal care products have been carried out since 2009 in the Upper Qu'Appelle River and Buffalo Pound Lake to identify if any potential problem or concern exists. The suite of analytes tested for has been expanded and now includes musks, hormones, sweeteners and many other compounds.

Sampling was carried out in Buffalo Pound Lake in March and from selected sites including Lake Diefenbaker, the Upper Qu'Appelle River and Buffalo Pound Lake in June. Samples taken at that time would have been impacted by the Moose Jaw River flood waters of April and June. Only two compounds, acetaminophen (a pain killer) and acesulfame (an artificial sweetener) were detected in Buffalo Pound Lake at part per trillion levels. Even lower levels of these compounds were detected in Lake Diefenbaker. Higher concentrations of acetaminophen, acesulfame were found in the Upper Qu'Appelle River along with some antibiotics. These greater numbers of detectable compounds may be reflective of lower volumes of water diverted from Lake Diefenbaker in 2011 and hence the greater impact of wastewater discharges within the watershed on that stream.

Although pharmaceutical compounds seem to be diluted or removed within Buffalo Pound Lake the fact that they can be detected shows that there are impacts of human use on our water source. This emphasizes the importance of watershed practices that minimize those impacts.

OPERATIONS BUDGET

The 2011 water rate for the cities of Regina and Moose Jaw increased by 2.85% from the 2010 rate to $210.59 per Megaliter. The electrical rate was set at $0.07714 per KWH for 2011, a 6.0% increase from 2010.

Total sales to the cities in 2011 were 27,482 ML to Regina and 6,150 ML to Moose Jaw. Sales to Regina increased 5.9% from 2010, and sales to Moose Jaw increased 14.9%.

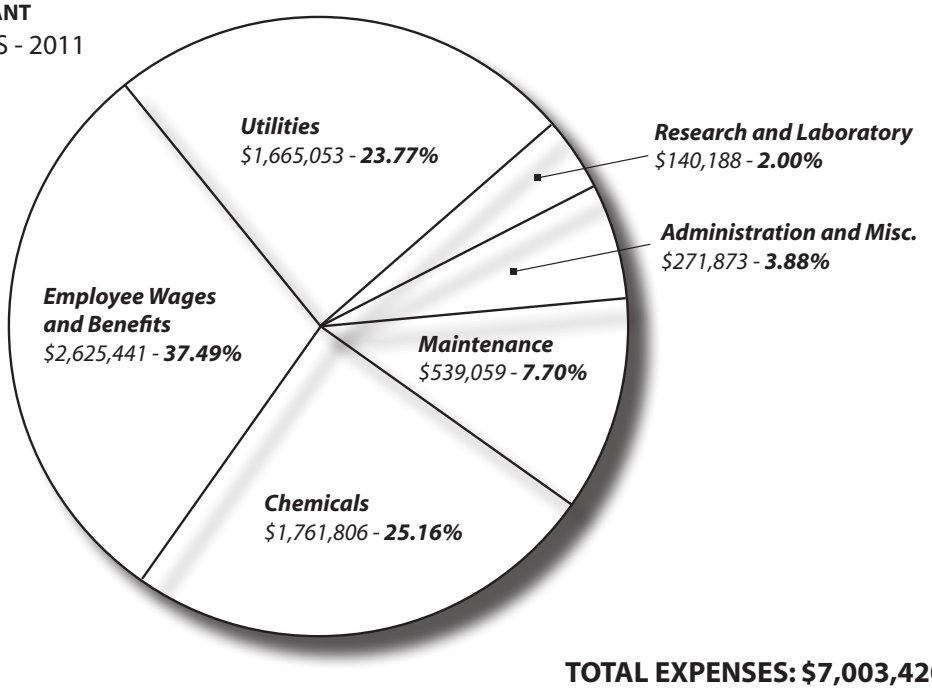
Sales were impacted by the wet weather in the spring and early summer. Operations at the Buffalo Pound Water Treatment Plant resulted in a surplus of approximately $114,400 in 2011.

Utility costs were under budget as forecasted electrical rate increases were not implemented. Chemical expenditures were significantly over plan due the spring flooding of the Moose Jaw River into Buffalo Pound Lake. Maintenance costs were under plan despite "High Power Electrical Maintenance" costs being above plan due to the electrical challenges faced in 2011. Employee Salary and Benefit costs were under budget primarily due to the timing of hiring the Plant Engineer later in the budget year.

Audited financial statements are contained in Appendix 2. Graph 4 summarizes expenses for 2011 as a percent of the total budget.

Graph 4

BUFFALO POUND WATER TREATMENT PLANT
SUMMARY OF OPERATING EXPENSES - 2011



TOTAL EXPENSES: $7,003,420

APPENDICES

Appendix 1: Water Quality Data – 2011

~ Drinking Water Quality and Compliance Report for 2011
~ Buffalo Pound Water Treatment Plant Laboratory
~ Organics Analysis – Saskatchewan Research Council
~ Metals Analysis – Saskatchewan Research Council
~ Organics Analysis – Alberta Research Council

Appendix 2: Audited Financial Statements – 2011

Water Quality Data - 2011

BUFFALO POUND WATER TREATMENT PLANT LABORATORY

Analytical Data - 2011

Moose Jaw / Regina, Saskatchewan
December 2011

BUFFALO POUND WATER TREATMENT PLAN

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2010

INTRODUCTION

Saskatchewan Environment requires each Permittee to monitor water quality as stipulated under its Permit to Operate a Waterworks. Permittees are also required to prepare an annual report to their customers and Saskatchewan Environment summarizing the analytical results of the monitoring in a report entitled "Drinking Water Quality and Compliance Report."

For more information about the meaning and type of sample refer to Saskatchewan Environment's "Municipal Drinking Water Quality Monitoring Guidelines, November, 2002 EPB 202" or the associated website www.saskh20.ca.

Wherever the "less than sign" (<) is used it means that the parameter was not detected at the level indicated.

WATER QUALITY STANDARDS – BACTERIOLOGICAL QUALITY

According to its Permit to Operate a Waterworks the Buffalo Pound Water Treatment Plant is required to analyze one sample every week from the treated water for Bacteriological Quality. Coliforms were never detected in the treated water.

Parameter	Limit	Number of Samples Submitted	Number of Samples Exceeding Limit
Total Coliforms	0 per 100 ml	52	0
Background Organisms	<200 per 100 ml	52	0

WATER QUALITY STANDARDS – FILTER TURBIDITY

The Buffalo Pound Water Treatment Plant is required to monitor the effluent turbidity from all twelve filters on a Continuous Basis. The turbidity from each individual filter shall be less than 0.3 NTU, 95% of the time. The turbidity shall not exceed 0.3 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU. If, on those rare occasions when the monthly average of the source water turbidity is less than 1.5 NTU, the water turbidity levels from each filter must be less than 0.2 NTU, 95% of the time, the turbidity shall not exceed 0.2 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU.

This Plant's SCADA Control System automatically generates an alarm if a filter effluent turbidity exceeds 0.3 NTU. If the turbidity exceeds 0.4 NTU at any time, the Plant's SCADA Control System automatically closes the filter effluent valve, turning off the filter. The plant's operating permit requires on-line turbidity monitoring on the effluent of each of its twelve filters. A problem with the turbidity monitor or data transfer system to the plant's SCADA requires a shutdown of the affected filter. To address this possibility the plant has a second independent turbidimeter on each filter so that continuous monitoring can be maintained even if the first turbidimeter fails.

WATER QUALITY STANDARDS – FLUORIDE

The Buffalo Pound Water Treatment Plant adds fluoride to the water pumped to the City of Moose Jaw and is required to monitor the fluoride level in that water on a continuous basis. The Maximum Acceptable Concentration (MAC) is 1.5 mg/l. Alarms signal a high residual dose at 1.3 mg/L. The maximum recorded level of fluoride via a laboratory analysis for water pumped to Moose Jaw was 0.80 mg/L. The annual average recorded was 0.68 mg/L which is essentially equal to the optimal concentration of 0.7 mg/L suggested by Health Canada. Health Canada endorses this level as it provides optimal dental health and is well below the MAC to protect against adverse effects.

WATER QUALITY STANDARDS – CHLORINE RESIDUAL

To ensure adequate disinfection the Buffalo Pound Water Treatment Plant must monitor the chlorine residual of the treated water on a continuous basis and the free chlorine residual shall not be less than 0.1 milligrams per litre. The normal operating range for the free chlorine residual in the treated water is 0.9 to 1.1 mg/l. The SCADA control system will automatically shut off pumping to the Cities if the chlorine level is less than 0.5 mg/l. A high level chlorine alarm will alert the operator if chlorine levels in the clearwell exceed 1.3 mg/L.

WATER QUALITY STANDARDS – CHEMICAL – GENERAL

As part of the plant's "Permit to Operate" a general chemical analysis is required once in every three month period from the treated water. Only two of these parameters have an established Maximum Acceptable Concentration (MAC) limit. Eight others have an Aesthetic Objective (AO) which is desirable but has no impact on human health.

Parameter (mg/l) unless stated	Feb 24	May 25	Sept 19	Nov 30	Limit MAC	No. of Samples Exceeding MAC or AO
Nitrate	0.71	0.75	0.30	0.56	45	0
Fluoride	0.12	0.07	0.08	0.11	1.5	0
					Limit AO	
Alkalinity	156	79	84.5	129	500*	0
Chloride	28.55	19.7	26.4	24.6	250*	0
Hardness	244	162	185	218	800*	0
Magnesium	26.5	16.8	21.2	25.2	200*	0
pH (pH units)	7.19	6.80	6.81	7.18	6.5 – 8.5*	0
Sodium	79.9	47.1	62.2	77.8	300*	0
Sulphate	215.1	154	231.6	222	500*	0
Total Dissolved Solids	510	342	438	486	1500*	0
Carbonate	ND	ND	ND	ND		
Calcium	52.4	37.2	41.6	45.3		
Conductivity (uS/cm)	800	534	666	757		
Bicarbonate	190	96	103	157		

ND – Not Detected

WATER QUALITY STANDARDS – CHEMICAL – HEALTH

The Buffalo Pound Water Treatment Plant is required to sample the treated water for the following parameters once in every six month period.

Parameter (mg/l)	May 17	Nov 28	Limit MAC	Number of Samples Exceeding Limit
Barium	0.071	0.067	1.0	0
Cadmium	<0.00001	<0.00001	0.005	0
Chromium	<0.0005	<0.0005	0.05	0
Lead	<0.0010	<0.0001	0.01	0
Selenium	0.0005	0.0004	0.01	0
			Limit IMAC*	
Arsenic	0.0005	0.0004	0.025*	0
Boron	0.05	0.09	5.0*	0
Uranium	0.0002	0.0003	0.02*	0
			Operational Guideline**	
Aluminum	0.043	0.015	0.1**	0
			Limit AO***	
Copper	<0.0002	0.0003	1.0***	0
Iron	0.0007	<0.0005	0.3***	0
Manganese	0.0010	<0.0005	0.05***	0
Zinc	<0.0005	<0.0005	5.0***	0

WATER QUALITY STANDARDS – PESTICIDES

Once per year the Buffalo Pound Water Treatment Plant is required to have the treated water analyzed for the following pesticides. Those noted on the permit are indicated below; the entire pesticide analysis is noted in the Appendix.

Parameter (mg/l)	July 14	Limit MAC	Number of Samples Exceeding Limit
Carbofuran	<0.002	0.09	0
Chlorpyrifos	<0.000005	0.09	0
Dicamba	<0.000005	0.12	0
Diclofop-methyl	<0.00002	0.009	0
Dichlorprop 2-4DP	<0.000005	N/A	0
Malathion	<0.00005	0.19	0
Pentachlorophenol	<0.0001	0.06	0
		Limit IMAC*	
Atrazine	<0.000005	0.005*	0
Bromoxynil	<0.000005	0.005*	0
Dichlorophenoxyacetic Acid 2,4 (2,4-D)	0.000014	0.1*	0
Dimethoate	<0.00005	0.02*	0
Picloram	<0.000005	0.19*	0
Trifluralin	<0.000005	0.045*	0
		Limit Operational	
		Guideline**	
Glyphosate	<0.0002	0.28**	0
Ethalfluralin	<0.000005	N/A	0
MCPA	<0.000005	N/A	0
Triallate	<0.000005	N/A	0

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – TRIHALOMETHANES

As part of the plant's "Permit to Operate" an analysis for Trihalomethanes is required once per month from the treated water. The MAC is 0.1 milligrams per litre, or, 100 micrograms per litre (parts per billion) for total trihalomethanes on an annual average. While one sample may have reached this concentration, the annual average of 47 micrograms per litre is well below the MAC.

Parameter (ug/l)	Jan 4	Feb 07	Mar 07	Apr 04	May 16	Jun 13
Chloroform	18	19	23	25	<1	11
Bromodichloromethane	11	13	15	18	<1	<1
Dibromochloromethane	5	6	8	8	<1	<1
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	34	38	46	51	<1	11
	Jul 14	Aug 08	Sep 12	Oct 03	Nov 07	Dec 05
Chloroform	53	83	56	41	26	26
Bromodichloromethane	3	17	19	18	14	16
Dibromochloromethane	<1	<1	2	2	2	4
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	56	100	77	61	42	46

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – HALOACETIC ACIDS (HAA5'S)

The Buffalo Pound Water Treatment Plant is obligated to sample for Haloacetic Acids every three months. The annual average of quarterly samples (15 ug/L) was well below the MAC. The results are as follows:

Parameter (ug/l)	Jan 11	Apr 5	Jul 05	Oct 04	Annual Average	Limit MAC	Number of Samples Exceeding Limit
HAA5	17	35	<5	9	15	80	0

WATER QUALITY STANDARDS – CYANIDE AND MERCURY

The Buffalo Pound Water Treatment Plant is required to submit two (2) samples per year for analysis for Cyanide and Mercury.

Parameter (mg/l)	May 17	Nov 28	Limit MAC	Number of Samples Exceeding Limit
Cyanide	<0.0001	<0.0001	0.2	0
Mercury	<0.00001	<0.00001	0.001	0

WATER QUALITY STANDARDS – ORGANICS PLUS MICROCYSTIN

The Buffalo Pound Water Treatment Plant is required to submit one (1) sample per year for analysis for various organics including Microcystin. Those noted on the permit are indicated below; the entire organic analysis is noted in the Appendix.

Parameter (mg/l)	June 14	Limit MAC	Number of Samples Exceeding Limit
Benzene	<0.0001	0.005	0
Benzo(a)pyrene	<0.00001	0.00001	0
Carbon Tetrachloride	<0.0001	0.005	0
Dichlorobenzene 1,2	<0.0001	0.2	0
Dichlorobenzene 1,4	<0.0001	0.005	0
Dichloroethylene 1,1	<0.0001	0.014	0
Dichloromethane	<0.002	0.005	0
Dichlorophenol 2,4	<0.00001	0.9	0
Ethylbenzene	<0.0001	0.0024	0
Monochlorobenzene	<0.0001	0.08	0
Toluene	<0.0001	0.024	0
Tetrachlorophenol 2,3,4,6	<0.0001	0.1	0
Trichloroethylene	<0.0001	0.05	0
Trichlorophenol 2,4,6	<0.0001	0.005	0
Vinyl Chloride	<0.0005	0.002	0
Xylenes	<0.0001	0.300	0
Microcystin	<0.0005 (July 11)	0.0015	0
		Limit IMAC*	
Dichoroethane 1,2	<0.0001	0.005*	0

2011 - BUFFALO POUND WATER QUALITY DATA
RAW LAKE WATER

PAGE 1

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
PHYSICAL																
Colour (Apparent)	Pt/Co	10	15	15	25	40	30	55	50	35	25	25	20	29	10	55
Conductivity	µS/cm	761	788	834	818	537	611	616	652	684	737	738	808	700	511	835
Bench Diss. Oxygen	mg/L	8.1	5.0	5.1	6.9	10.2	8.3	8.4	5.9	7.6	8.5	10.8	14.9	7.6	3.9	14.9
Bench Diss. Oxygen	%	59.9	37.2	37.9	53.3	92.5	87.0	95.7	68.6	82.2	77.3	78.1	109.7	65.4	29.5	109.7
ON-LINE Diss. Oxygen	%	57.5	41.0	36.9	66.8	109.2	99.7	112.0	94.0	93.3	97.8	104.3	138.2	85.6	31.0	143.7
Odour	T.O.N.	12	9	11	33	67	84	99	61	56	30	27	45	45	6	160
pH	pH units	7.83	7.72	7.63	7.74	8.42	8.35	8.78	8.52	8.35	8.18	8.33	8.72	8.21	7.59	8.91
Temperature	° C	2.7	3.2	3.3	4.6	11.4	17.1	22.3	21.4	16.3	10.2	2.6	2.8	9.8	1.2	24.0
Turbidity	NTU	0.7	0.8	0.8	4.4	5.6	2.8	6.6	4.2	4.3	5.5	4.0	2.0	3.5	0.7	10.8
TDS	mg/L	486	500	540	532	353	377	400	424	466	480	458	534	454	334	540
TDS	mg/L(calc)	589	617	654	645	415	475	469	510	538	578	581	634	555	394	656
Langelier Index (RTW)	pH units (calc)	0.08	0.00	0.01	0.09	0.61	0.49	1.05	0.84	0.74	0.40	0.52	0.92	0.49	0.00	1.05
MAJOR CONSTITUENTS																
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	2	1	7	3	1	<DL	<DL	8	2	<DL	10
Alkalinity(total)	mg/L CaCO3	184	192	204	203	135	152	142	142	150	161	170	186	169	126	207
Bicarbonate	mg/L	223	234	249	248	160	182	155	166	179	196	208	207	201	146	253
Carbonate	mg/L	<DL	<DL	<DL	<DL	2	2	4	3	2	<DL	<DL	9	2	<DL	12
Calcium	mg/L	50	52	57	58	40	45	42	42	43	45	46	52	47	37	58
Magnesium	mg/L	27	27	28	30	18	21	21	22	24	25	25	28	24	17	30
Hardness (total)	mg/L CaCO3	232	245	264	264	171	192	188	189	196	206	219	243	214	161	272
Sodium	mg/L	75	81	82	79	49	57	62	64	71	76	78	85	69	48	85
Potassium	mg/L	5.9	5.9	6.0	6.3	7.2	7.4	8.6	8.5	8.3	8.5	7.9	8.9	7.4	5.9	8.9
Sulphate	mg/L	182	186	199	195	121	146	156	177	189	199	193	214	175	116	214
Chloride	mg/L	23.5	24.1	25.7	24.7	13.9	15.7	15.5	18.8	21.0	22.7	22.3	24.4	20.3	13.3	25.7
TRACE CONSTITUENTS																
Aluminum (dissolved 0.45µ)	ugL	<DL	<DL	<DL	<DL	17	<DL	21	15	9	9	6	11	8	<DL	21
Ammonia N	mg/L N	0.24	0.27	0.29	0.18	<DL	0.11	0.11	0.05	0.12	0.13	0.08	<DL	0.12	<DL	0.33
BOD (5-day)	mg/L	1.6	1.1	3.8	3.0		2.7	4.4	4.1	2.5	2.5	3.2	5.2	3.1	1.1	5.2
Bromide	mg/L	0.09	0.10	0.10	0.10	<DL	0.06	0.06	0.09	0.10	0.10	0.11	0.11	0.08	<DL	0.12
Chlorophyll a	µg/L	5	3	5	19	39	16	33	29	22	11	11	33	20	3	54
Fluoride	mg/L	0.18	0.19	0.20	0.18	0.13	0.15		0.17	0.18	0.19	0.18	0.20	0.18	0.13	0.20
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	0.03	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.03
Manganese (dissolved)	mg/L	0.11	0.34	0.40	0.12	<DL	<DL	0.01	<DL	0.01	<DL	<DL	<DL	0.08	<DL	0.40
Nitrate	mg/L	<DL	0.16	0.24	0.17	0.07	0.10	0.07	0.07	0.06	0.11	0.19	<DL	0.11	<DL	0.24
Organic N	mg/L N	<DL	0.51	0.49	0.54	0.82	0.66	0.83	0.84	0.77	0.82	0.71	0.80	0.70	0.41	0.96
Raw TOC	mg/L C (UV)	5.5	5.4	5.6	6.1	7.7	6.9	10.0	7.9	7.7	7.2	6.7	7.5	7.0	5.3	11.6
Raw DOC (GF diss)	mg/L C (UV)	5.3	5.4	5.4	5.5	6.8	6.1	8.6	6.8	6.5	6.4	6.3	6.8	6.3	5.1	9.7
UV absorbance @ 254nm	Abs 10cm	0.981	0.998	1.041	1.143	1.743	1.445	2.124	1.483	1.370	1.267	1.218	1.331	1.347	0.974	2.636
SUVA	L / mg m	1.844	1.859	1.936	2.067	2.570	2.360	2.523	2.225	2.115	1.972	1.922	1.965	2.117	1.750	2.718
PreFM UV abs @ 254nm	Abs 10cm	0.850	0.844	0.916	0.927	1.359	1.115	1.665	1.174	1.082	1.012	1.003	1.103	1.089	0.828	2.135
Phosphate(ortho)	µg/L P	31	43	48	15	9	7	34	36	31	46	45	7	26	3	48
Phosphate(total)	µg/L P	54	64	70	65	106	67	98	110	95	105	95	64	84	54	142
Silica (SiO3)	mg/L	5.8	6.2	6.5	5.5	4.6	4.5	6.5	8.4	8.3	8.1	7.6	6.4	6.3	3.4	8.4
Sulphide	µg/L															

2011 - BUFFALO POUND WATER QUALITY DATA
RAW LAKE WATER

PAGE 2

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
TRACE CONSTITUENTS																
PreFM																
TTHM's (total)	µg/L(calc)	31	31	34	46	96	90	128	87	75	59	42	46	64	29	163
Chloroform	µg/L	18	18	19	27	81	67	104	58	46	33	23	25	43	16	141
Bromodichloromethane	µg/L	9	9	10	13	14	20	23	24	22	19	13	15	16	8	26
Chlorodibromomethane	µg/L	4	4	5	6	<DL	4	2	5	7	8	6	6	5	<DL	8
Bromoform	µg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
BIOLOGICAL																
Blue Green Algae (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	492	10672	700	664	67	<DL	<DL	1002	<DL	38888
Green Algae (x10^-3)	per litre	398	192	340	2017	3371	1850	4817	2049	1403	839	1303	11428	2466	89	28556
Diatoms (x10^-3)	per litre	36	28	46	486	200	44	256	89	78	28	25	53	114	<DL	1311
Flagellates (x10^-3)	per litre	30	36	24	256	784	1053	2983	871	1047	906	478	775	758	<DL	5555
Crustaceans	per litre	<3	<3	<3	<3	4	5	32	61	32	211	124	53	50	<3	570
Nematodes (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Rotifers (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	22
Other (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Total Green & B-G	per litre	403	192	340	2017	3371	2342	15489	2749	2066	906	1303	11428	1791	378	5289
BACTERIOLOGICAL																
Total Coliforms	per 100 ml	1	<DL	1	<DL	20	43	3663	6500	2000	3788	68	3	1391	<DL	15000
Total Coliforms (background)	per 100 ml	113	118	10	970	1590	1858	10513	56800	30500	10513	1702	35	10157	5	108000
Faecal Coliforms	per 100 ml	<DL	<DL	<DL	<DL	2	<DL	2	6	14	5	<DL	<DL	2	<DL	30
Standard Plate Count	per 1 ml	12	8	6	597	221	133	584	1838	586	344	137	9	399	3	4240
CHEMICAL DOSES																
Alum	mg/L	61	60	57	63	77	89	110	108	101	90	73	83	81	50	130
Alum\Raw DOC	ratio	11.52	11.17	10.60	11.28	11.42	14.46	13.38	16.24	15.63	13.97	11.52	12.17	12.75	9.43	18.46
Alum-DOC Stoich	ratio	0.93	0.91	0.86	0.91	0.93	1.17	1.09	1.32	1.27	1.13	0.93	0.99	1.03	0.77	1.50
Chlorine-pre	mg/L	4.2	4.8	5.0	4.6	5.9	4.7	6.8	5.3	5.0	4.5	2.8	3.0	4.7	2.4	7.9
Chlorine-intermed	mg/L															
Chlorine-post	mg/L	0.9	0.9	0.9	0.8	1.2	1.5	1.8	1.7	1.5	1.5	1.4	1.5	1.3	0.5	2.3
Plant Flow	MLD	95.0	91.3	81.6	77.8	96.6	100.5	132.8	144.6	121.5	100.8	92.2	95.3	102.6	57.0	170.0
Qu'Appelle Dam Flow	cu m/s	1.4	1.0	1.0	0.0	0.0	0.7	1.2	2.5	3.5	3.5	3.1	1.7	1.6	0.0	3.5
Fluoride (Set Point for MJ)	mg/L	0.65	0.65	0.65	0.65	0.65	0.49	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.00	0.65
Powdered Carbon	mg/L								25.0					25.0	25.0	25.0
CPAC Train A	mg//L															
Chlorine Residuals Exit Plant (week avg.)																
Free Chlorine	mg/L	1.09	1.10	1.11	1.11	1.08	1.06	1.09	1.11	1.09	1.10	1.10	1.10	1.09	1.04	1.18
Combined Chlorine	mg/L	0.31	0.33	0.35	0.40	0.14	0.11	0.21	0.18	0.16	0.16	0.22	0.26	0.23	0.05	0.41

2011 - BUFFALO POUND WATER QUALITY DATA
TREATED WATER

PAGE 3

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
PHYSICAL																
Colour (Apparent)	Pt/Co	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Conductivity	µS/cm	772	800	844	837	534	631	652	666	699	755	757	828	731	534	844
Diss. Oxygen	mg/L	10.5	8.8	7.3	8.2	12.2	8.2	8.5	7.4	8.4	9.3	12.0	13.0	9.5	7.3	13.0
% Sat. Diss. Oxygen	%	77.6	65.8	54.4	63.4	108.5	84.3	97.0	85.6	91.2	86.5	88.1	96.1	83.2	54.4	108.5
Odour(Dechlorinated)	T.O.N.	4	3	5	7	4	<1	<1	1	1	1	2	3	2	<1	10
PreGAC Odour	T.O.N.					16	15	36	33	24	13	8	10	20	7	45
Odour Removal by Coagulation and Filtration	%	66.7%	63.3%	56.6%	78.2%	90.1%	82.4%	60.8%	39.4%	57.5%	57.0%	66.2%	76.8%	66.0%	8.3%	100.0%
Odour Removal Overall	%	66.7%	63.3%	56.6%	78.2%	93.6%	100.0%	99.7%	98.8%	98.2%	95.6%	92.4%	93.8%	86.7%	50.0%	100.0%
PreFM pH	pH units	7.57	7.43	7.43	7.55	7.82	7.93	8.17	8.09	7.92	7.83	8.07	8.55	7.86	7.24	8.79
Coagulation pH - Channel 1	pH units	7.03	7.16	7.05	7.08	6.84	6.86	6.68	6.69	6.73	6.88	7.08	7.09	6.93	6.58	7.53
Coagulation pH - Channel 2	pH units	7.09	7.06	7.05	7.08	6.87	6.88	6.68	6.73	6.77	6.88	7.12	7.11	6.94	6.62	7.19
Clearwell pH	pH units	7.16	7.12	7.08	7.09	6.89	6.94	6.77	6.82	6.85	6.99	7.16	7.14	7.00	6.69	7.23
Temperature	° C	2.8	3.2	3.2	4.2	11.4	17.2	22.6	21.7	16.7	11.1	2.7	2.9	9.9	1.6	24.0
Turbidity	NTU	0.09	0.07	0.08	0.07	0.07	0.07	0.09	0.08	0.08	0.07	0.06	0.07	0.07	0.05	0.10
Total Dissolved Solids	mg/L	496	510	550	532	342	400	422	438	468	490	486	546	473	342	550
Total Dissolved Solids	mg/L(calc)	576	604	641	634	384	465	475	502	516	561	567	628	546	384	641
Turbidity Log Removal	(calc)	0.90	1.04	1.02	1.71	1.85	1.61	1.85	1.73	1.75	1.90	1.81	1.48	1.56	0.84	2.25
Langelier Index (RTW)	pH units (calc)	-0.75	-0.64	-0.66	-0.65		-0.99	-1.09	-1.07	-1.07	-0.94	-0.80	-0.82			
MAJOR CONSTITUENTS																
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Alkalinity(total)	mg/L CaCO3	146	156	170	166	79	105	83	85	90	110	129	138	121	79	170
Bicarbonate	mg/L	178	190	208	203	96	127	101	103	110	134	157	168	148	96	208
Carbonate	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Calcium	mg/L	50	52	56	57	37	44	41	42	42	44	45	52	47	37	57
Magnesium	mg/L	26	27	29	29	17	20	20	21	23	25	25	28	24	17	29
Hardness (total)	mg/L CaCO3	233	244	260	262	162	187	190	185	194	207	218	241	215	162	262
Sodium	mg/L	74	80	83	80	47	56	61	62	70	75	78	85	71	47	85
Potassium	mg/L	6.0	5.9	6.1	6.4	7.2	7.3	8.6	8.5	8.4	8.6	8.0	8.9	7.5	5.9	8.9
Sulphate	mg/L	210	215	224	224	154	186	214	232	231	240	222	253	217	154	253
Chloride	mg/L	27.2	28.6	29.8	28.8	19.7	20.2	23.1	26.4	25.1	27.0	24.6	27.1	25.6	19.7	29.8
TRACE CONSTITUENTS																
CLEAR WELL																
Aluminum (dissolved 0.45µ)	µg/L Chart	36	16	31	23	18	8	7	8	7	6	11	16	16	6	36
Aluminum (total)	µg/L Chart	60	33	45	39	22	8	6	8	7	7	11	24	22	6	60
Aluminum (total 12 mo avg)	µg/L	56	46	42	43	42	41	40	39	39	38	28	22			
Aluminum (particulate)	µg/L (Calc)	23	17	14	16	<DL	<DL	<DL	<DL	<DL	<DL	<DL	8	7	<DL	23
Mixed Media Filter A																
Aluminum (total)	µg/L	54	32	46	42	21	19	21	22	25	24	68	63	36	19	68
Mixed Media Filter L																
Aluminum (total)	µg/L	49	43	38	35	19	18	30	26	24	26	58	74	37	18	74
PREGAC																
Aluminum (dissolved)	µg/L						16	16	18	20	20	33	43	24	16	43
Aluminum (total)	µg/L Chart						19	19	27	25	21	65	64	34	19	65
Ammonia N	mg/L N	<DL	<DL	<DL	<DL	0.06		<DL	0.04	<DL	0.07	0.04	<DL	<DL	<DL	0.07
Bromide	mg/L	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Fluoride	mg/L	0.12	0.15	0.13	0.13	0.08	0.08	0.07	0.08	0.08	0.10	0.11	0.11	0.10	0.07	0.15
Fluoride (MJ dose by ISE)	mg/L (wk avg)	0.66	0.70	0.73	0.65	0.68	0.62	0.65	0.74	0.64	0.62	0.62	0.63	0.66	0.56	0.80
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Iron (total)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Manganese (dissolved)	mg/L	0.01	<DL	<DL	<DL	<DL	<DL	0.01	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.01
Manganese (total)	mg/L	0.01	0.01	<DL	<DL	<DL	<DL	0.01	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.01
Nitrate	mg/L N	<DL	0.16	0.24	0.23	0.17	0.06	0.06	0.07	0.07	0.08	0.13	<DL	0.11	<DL	0.24
Organic N	mg/L N	0.29	0.30	0.32	0.34	0.24		0.11	0.16	0.18	0.18	0.26	0.30	0.24	0.11	0.34
CW TOC	mg/L C	3.7	3.8	4.1	4.1	1.5	0.6	1.8	2.0	2.1	2.7	3.5	4.1	2.8	<0.5	4.6
CW DOC (GF diss)	mg/L C	3.8	3.8	3.9	4.1	1.5	0.6	1.8	2.0	2.1	2.7	3.5	4.1	2.8	<0.5	4.4
PreGAC DOC (GF diss)	mg/L C					3.8	3.8	4.8	4.0	3.9	4.2	4.4	4.9	4.2	3.3	5.2
DOC Removal by Coagulation & Filtration	% Removal	29.0%	30.2%	26.7%	25.4%	44.5%	37.6%	44.5%	41.6%	40.1%	35.3%	30.0%	28.0%	34.5%	21.4%	51.4%
DOC Removal by GAC Filtration	% Removal					96.2%	83.5%	62.8%	49.2%	46.4%	34.4%	22.1%	16.3%	45.6%	12.8%	96.2%
Total DOC (% Removal)	% Removal	29.0%	30.2%	26.7%	25.4%	65.7%	89.7%	79.1%	70.3%	67.9%	57.5%	45.4%	39.8%	51.5%	21.4%	97.7%
CW Organic Carbon (diss @ 254nm)	Abs 10cm	0.534	0.536	0.578	0.594	0.233	0.037	0.153	0.208	0.205	0.258	0.364	0.482	0.348	0.016	0.628
PreGAC Organic Carbon (diss @ 254nm)	Abs 10cm					0.599	0.554	0.707	0.596	0.576	0.588	0.624	0.670	0.614	0.526	0.799
Conventional SUVA	L / mg m	1.416	1.431	1.465	1.443	1.554	1.450	1.510	1.527	1.488	1.415	1.407	1.377	1.459	1.316	1.734
CW SUVA	L / mg m	1.416	1.431	1.465	1.443		0.574	0.852	1.014	0.996	0.943	1.049	1.182			
Phosphate(ortho)	µg/L P	<DL	<DL	5	4	<DL	10	4	<DL	7	<DL	<DL	<DL	3	<DL	10
Phosphate(total)	µg/L P	4	4	<DL	6	5	9	6	9	5	7	6	7	6	<DL	9
Silica (SiO3)	mg/L	5.4	5.9	6.4	5.2	5.5	4.3	6.1	7.6	7.1	7.5	6.6	5.9	6.2	4.3	7.6
Sulphide	µg/L															

Continued...

2011 - BUFFALO POUND WATER QUALITY DATA
TREATED WATER

PAGE 4

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
TRACE CONSTITUENTS																
CLEARWELL																
TTHM's (total)	µg/L(calc)	39	42	47	62	35	16	82	89	70	55	43	48	53	1	107
Chloroform	µg/L	20	22	24	33	21	15	74	67	51	37	26	27	35	<DL	94
Bromodichloromethane	µg/L	12	14	16	20	6	<DL	8	20	18	17	14	17	13	<DL	26
Chlorodibromomethane	µg/L	6	7	8	9	1	<DL	<DL	2	2	2	3	4	4	<DL	9
Bromoform	µg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
CHANNEL																
TTHM's (total)	µg/L(calc)	35	36	41		80	81	107	74	74	65	46	47	63	35	107
Chloroform	µg/L	19	18	22		69	57	87	48	44	35	25	25	41	18	87
Bromodichloromethane	µg/L	11	12	13		11	20	20	21	23	21	15	15	17	11	25
Chlorodibromomethane	µg/L	5	6	6		<DL	4	<DL	5	7	9	6	7	5	<DL	9
Bromoform	µg/L	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
PreGAC																
TTHM's (total)	µg/L(calc)					91	87	99	75	69	60	44	49	70	39	106
Chloroform	µg/L					71	62	78	49	40	32	23	26	46	20	90
Bromodichloromethane	µg/L					18	22	20	22	22	20	15	16	19	13	24
Chlorodibromomethane	µg/L					1	4	2	5	7	8	6	7	5	<DL	8
Bromoform	µg/L					<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
BIOLOGICAL																
Blue Green Algae	per litre	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Green Algae	per litre	<DL	<DL		55555	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	5050	<DL	55555
Diatoms	per litre	<DL	<DL		<DL	<DL	<DL	<DL	11111	<DL	<DL	<DL	<DL	1010	<DL	11111
Flagellates	per litre	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Crustaceans	per litre	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nematodes	per litre	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Rotifers	per litre	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Other	per litre	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
BACTERIOLOGICAL																
Total Coliforms	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
* Total Coliforms (background)	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	1
Faecal Coliforms	per 100 ml															
Standard Plate Count	per 1 mL	<DL	<DL	<DL	<DL	<DL	<DL	6.5	1.0	2.0	2.8	0.6	<DL	1.0	<DL	18.0

*Note: Faecal Coliforms analyzed ONLY if Total Coliforms Detected.

SRC Group # 2011-4233

SRC ANALYTICAL

May 31, 2011

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
2476 Victoria Avenue
Box 1790
Regina, SK S4P 3C8
Attn: Dan Conrad

Sample # **14746**
Date Sampled: **May 17, 2011**
Sample Matrix: **WATER**
Description: **RAW WATER**

Client PO #: **16634**
Date Received: **May 18, 2011**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.18	0.0005
Arsenic	ug/L	1.9	0.1
Barium	mg/L	0.068	0.0005
Boron	mg/L	0.06	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	0.0014	0.0002
Iron	mg/L	0.19	0.0005
Lead	mg/L	0.0003	0.0001
Manganese	mg/L	0.036	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0004	0.0001
Uranium	ug/L	1.3	0.1
Zinc	mg/L	0.0070	0.0005

"<": not detected at level stated above.

SRC Group # 2011-12018

SRC ANALYTICAL

Dec 07, 2011

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board
2476 Victoria Avenue
Box 1790
Regina, SK S4P 3C8
Attn: Dan Conrad

Sample #: **2011044372**
Date Sampled: **Nov 28, 2011**
Sample Matrix: **WATER**
Description: **11/28/2011 07:30 RAW WATER**

Client PO #: **16634**
Date Received: **Nov 30, 2011**

Analyte	Units	Result	DL	Date Entered
Inorganic Chemistry				
Total Cyanide (S.A.D.)	ug/L	1	1	Dec 07, 2011
ICP				
Aluminum	mg/L	0.094	0.0005	Dec 02, 2011
Arsenic	ug/L	2.6	0.1	Dec 02, 2011
Barium	mg/L	0.079	0.0005	Dec 02, 2011
Boron	mg/L	0.09	0.01	Dec 02, 2011
Cadmium	mg/L	<0.00001	0.00001	Dec 02, 2011
Chromium	mg/L	<0.0005	0.0005	Dec 02, 2011
Copper	mg/L	0.0009	0.0002	Dec 02, 2011
Iron	mg/L	0.061	0.0005	Dec 02, 2011
Lead	mg/L	<0.0001	0.0001	Dec 02, 2011
Manganese	mg/L	0.0057	0.0005	Dec 02, 2011
Mercury	ug/L	<0.01	0.01	Dec 01, 2011
Selenium	mg/L	0.0004	0.0001	Dec 02, 2011
Uranium	ug/L	1.6	0.1	Dec 02, 2011
Zinc	mg/L	0.0014	0.0005	Dec 02, 2011

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

SRC Group # 2011-12018

SRC ANALYTICAL

Dec 07, 2011

Buffalo Pound Water Admin. Board

Sample #: **2011044373**
Date Sampled: **Nov 28, 2011**
Sample Matrix: **WATER**
Description: **11/28/2011 08:29 RODI**

Client PO #: **16634**
Date Received: **Nov 30, 2011**

Analyte	Units	Result	DL	Date Entered
ICP				
Aluminum	mg/L	<0.005	0.005	Dec 07, 2011
Barium	mg/L	<0.001	0.001	Dec 07, 2011
Beryllium	mg/L	<0.001	0.001	Dec 07, 2011
Boron	mg/L	<0.002	0.002	Dec 07, 2011
Cadmium	mg/L	<0.001	0.001	Dec 07, 2011
Chromium	mg/L	<0.001	0.001	Dec 07, 2011
Cobalt	mg/L	<0.001	0.001	Dec 07, 2011
Copper	mg/L	<0.001	0.001	Dec 07, 2011
Iron	mg/L	<0.001	0.001	Dec 07, 2011
Lead	mg/L	<0.002	0.002	Dec 07, 2011
Manganese	mg/L	<0.001	0.001	Dec 07, 2011
Molybdenum	mg/L	<0.001	0.001	Dec 07, 2011
Nickel	mg/L	<0.001	0.001	Dec 07, 2011
Phosphorus	mg/L	<0.01	0.01	Dec 07, 2011
Silicon, soluble	mg/L	<0.01	0.01	Dec 07, 2011
Silver	mg/L	<0.001	0.001	Dec 07, 2011
Strontium	mg/L	<0.001	0.001	Dec 07, 2011
Titanium	mg/L	<0.001	0.001	Dec 07, 2011
Vanadium	mg/L	<0.001	0.001	Dec 07, 2011
Zinc	mg/L	<0.005	0.005	Dec 07, 2011
Zirconium	mg/L	<0.001	0.001	Dec 07, 2011

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

SRC Group # 2011-4232

SRC ANALYTICAL

May 31, 2011

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
2476 Victoria Avenue
Box 1790
Regina, SK S4P 3C8
Attn: Dan Conrad

Sample # **14745** Client PO #: **16634**
Date Sampled: **May 17, 2011** Date Received: **May 18, 2011**
Sample Matrix: **WATER**
Description: **SK05JG0017 BUFFALO POUND WATER - CLEARWELL**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.0043	0.0005
Arsenic	ug/L	0.5	0.1
Barium	mg/L	0.071	0.0005
Boron	mg/L	0.05	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	<0.0002	0.0002
Iron	mg/L	0.0007	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	0.0010	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0005	0.0001
Uranium	ug/L	0.2	0.1
Zinc	mg/L	<0.0005	0.0005

"<": not detected at level stated above.

SRC Group # 2011-12020

Dec 07, 2011

SRC ANALYTICAL

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board
2476 Victoria Avenue
Box 1790
Regina, SK S4P 3C8
Attn: Dan Conrad

Sample #: **2011044363**
Date Sampled: **Nov 28, 2011**
Sample Matrix: **WATER**
Description: **11/28/2011 08:29 CLEARWELL**

Client PO #: **16634**
Date Received: **Nov 30, 2011**

Analyte	Units	Result	DL	Date Entered
Inorganic Chemistry				
Total Cyanide (S.A.D.)	ug/L	1	1	Dec 07, 2011
ICP				
Aluminum	mg/L	0.015	0.0005	Dec 02, 2011
Arsenic	ug/L	0.4	0.1	Dec 02, 2011
Barium	mg/L	0.067	0.0005	Dec 02, 2011
Boron	mg/L	0.09	0.01	Dec 02, 2011
Cadmium	mg/L	<0.00001	0.00001	Dec 02, 2011
Chromium	mg/L	<0.0005	0.0005	Dec 02, 2011
Copper	mg/L	0.0003	0.0002	Dec 02, 2011
Iron	mg/L	<0.0005	0.0005	Dec 02, 2011
Lead	mg/L	<0.0001	0.0001	Dec 02, 2011
Manganese	mg/L	<0.0005	0.0005	Dec 02, 2011
Mercury	ug/L	<0.01	0.01	Dec 01, 2011
Selenium	mg/L	0.0004	0.0001	Dec 02, 2011
Uranium	ug/L	0.3	0.1	Dec 02, 2011
Zinc	mg/L	<0.0005	0.0005	Dec 02, 2011

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1540

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

EXTRACTABLE PRIORITY POLLUTANTS
METHOD: IE340 | TimeLines (days)
SCAN: EPP | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 23-Jun-11 by: drc 7 9 *
Date Analyzed : 24-Jun-11 by: drc 21 10 ok
Raw DataFile : E1540

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100730	1,2,4-Trichlorobenzene	0.0		.1	.1	100734	1,2-Diphenylhydrazine	0.0		.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0		.1	.2	100708	2,4,6-Trichlorophenol	0.0		.1	.2
100700	2,4-Dichlorophenol	0.0		.1	.2	100701	2,4-Dimethylphenol	0.0		.2	.2
100703	2,4-Dinitrophenol	0.0		.1	.2	100732	2,4-Dinitrotoluene	0.0		.1	.1
100733	2,6-Dinitrotoluene	0.0		.1	.1	100725	2-Chloronaphthalene	0.0		.1	.1
100699	2-Chlorophenol	0.0		.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0		.1	.2
100704	2-Nitrophenol	0.0		.1	.2	100738	4-Bromophenyl phenyl ether	0.0		.1	.1
100698	4-Chloro-3-methylphenol	0.0		.1	.2	100742	4-Chlorophenyl phenyl ether	0.0		.1	.1
100705	4-Nitrophenol	0.0		.1	.2	100709	Acenaphthene	0.0		.1	.1
100710	Acenaphthylene	0.0		.1	.1	100711	Anthracene	0.0		.1	.1
100731	Benzidine	0.0		.2	.2	100712	Benzo(a)anthracene	0.0		.1	.1
100716	Benzo(a)pyrene	0.0		.1	.2	100713	Benzo(b)fluoranthene	0.0		.1	.1
100715	Benzo(ghi)perylene	0.0		.2	.1	100714	Benzo(k)fluoranthene	0.0		.1	.1
100739	Bis(2-chloroethoxy)methane	0.0		.1	.1	100740	Bis(2-chloroethyl)ether	0.0		.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0		.1	.1	100748	Bis(2-ethylhexyl)phthalate	.4	H	.1	.1
100743	Butylbenzylphthalate	0.0		.1	.1	100717	Chrysene	0.0		.1	.1
100744	Di-n-butylphthalate	.2	H	.1	.1	100747	Di-n-octyl phthalate	0.0		.1	.1
100718	Dibenzo(ah)anthracene	0.0		.5	.1	100745	Diethyl phthalate	0.0		.1	.1
100746	Dimethyl phthalate	0.0		.1	.1	100719	Fluoranthene	0.0		.1	.1
100720	Fluorene	0.0		.1	.1	100726	Hexachlorobenzene	0.0		.1	.1
100727	Hexachlorobutadiene	0.0		.5	.1	100728	Hexachlorocyclopentadiene	0.0		.1	.1
100729	Hexachloroethane	0.0		.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0		.1	.1
100749	Isophorone	0.0		.1	.1	100737	N-Nitroso-di-n-propylamine	0.0		.2	.1
100736	N-Nitrosodiphenylamine	0.0		.1	.1	100722	Naphthalene	0.0		.1	.1
100735	Nitrobenzene	0.0		.1	.1	100706	Pentachlorophenol	0.0		.1	.2
100723	Phenanthrene	0.0		.1	.1	100707	Phenol	0.0		.1	.2
100724	Pyrene	0.0		.1	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Date: 30-Jun-11
Bag 4000, Vegreville, Alberta
Contact No. (780) 632-8455 T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 2

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1542

POLYCYCLIC AROMATIC HYDROCARBONS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: - - - | TimeLines (days)
SCAN: PAH | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 16-Jun-11 by: rmr 11 2 ok
Date Analyzed : 23-Jun-11 by: rmr 21 9 ok
Raw DataFile : P1542

GC/MSD SIM DATA

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL
107977	1-Methylnaphthalene	.01	H	.01	107978	2-Methylnaphthalene	.01	HX	.01
103142	3-Methylchloranthrene	0.00		.01	103143	7,12-Dimethylbenz(a)anthracen	0.00		.01
103144	Acenaphthene	0.00		.01	103145	Acenaphthylene	0.00		.01
103146	Acridine	0.00		.01	103147	Anthracene	0.00		.01
103148	Benzo(a)anthracene	0.00		.01	103149	Benzo(a)pyrene	0.00		.01
103150	Benzo(b,j,k)fluoranthene	0.00		.01	103151	Benzo(c)phenanthrene	0.00		.01
103152	Benzo(e)pyrene	0.00		.01	103153	Benzo(ghi)perylene	0.00		.01
103154	Chrysene	0.00		.01	103155	Dibenzo(a,h)pyrene	0.00		.01
103156	Dibenzo(a,i)pyrene	0.00		.01	103157	Dibenzo(a,l)pyrene	0.00		.01
103158	Dibenzo(ah)anthracene	0.00		.01	103159	Fluoranthene	0.00		.01
103160	Fluorene	0.00		.01	103161	Indeno(1,2,3-cd)pyrene	0.00		.01
103162	Naphthalene	.01	H	.01	107132	Perylene	0.00		.01
103163	Phenanthrene	0.00		.01	103164	Pyrene	0.00		.01
103761	Retene	0.00		.01					

ARC Remarks:
Sample received at 14.4 degrees C

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit
flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Date: 27-Jun-11
Bag 4000, Vegreville, Alberta
Contact No. (780) 632-8455 T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1539

VOLATILE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE505 | TimeLines (days)
SCAN: VPP | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 15-Jun-11 by: SS 7 1 ok
Date Analyzed : 16-Jun-11 by: SS 7 2 ok
Raw DataFile : V1539

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100651	1,1,1,2-Tetrachloroethane	0.0		.1	.1	95227	1,1,1-Trichloroethane	0.0		.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0		.1	.1	95228	1,1,2-Trichloroethane	0.0		.1	.1
95214	1,1-Dichloroethane	0.0		.1	.1	95216	1,1-Dichloroethylene	0.0		.1	.1
100645	1,1-Dichloropropylene	0.0		.1	.1	100652	1,2,3-Trichlorobenzene	0.0		.1	.1
100655	1,2,3-Trichloropropane	0.0		.1	.1	100653	1,2,4-Trichlorobenzene	0.0		.1	.1
100656	1,2,4-Trimethylbenzene	0.0		.1	.1	100640	1,2-Dibromo-3-chloropropane	0.0		.3	.1
100641	1,2-Dibromoethane	0.0		.1	.1	95211	1,2-Dichlorobenzene	0.0		.1	.1
95215	1,2-Dichloroethane	0.0		.1	.1	95218	1,2-Dichloropropane	0.0		.1	.1
100657	1,3,5-Trimethylbenzene	0.0		.1	.1	95212	1,3-Dichlorobenzene	0.0		.1	.1
100644	1,3-Dichloropropane	0.0		.1	.1	95213	1,4-Dichlorobenzene	0.0		.1	.1
100643	2,2-Dichloropropane	0.0		.1	.1	95207	2-Chloroethoxyethylene	0.0		.4	.1
100638	2-Chlorotoluene	0.0		.1	.1	100639	4-Chlorotoluene	0.0		.1	.1
95200	Benzene	0.0		.1	.1	100634	Bromobenzene	0.0		.1	.1
95201	Bromodichloromethane	0.0		.1	.1	95202	Bromoform	0.0		.5	.1
95203	Bromomethane	0.0		.1	.1	95204	Carbon tetrachloride	0.0		.1	.1
95205	Chlorobenzene	0.0		.1	.1	95206	Chloroethane	0.0		.1	.1
95208	Chloroform	0.0		.1	.1	106204	Chloromethane	0.0		.5	.1
95209	Dibromochloromethane	0.0		.1	.1	95210	Dibromomethane	0.0		.1	.1
95221	Ethyl benzene	0.0		.1	.1	100646	Hexachlorobutadiene	0.0		.3	.1
100647	Isopropylbenzene	0.0		.1	.1	102608	MTBE	0.0		.1	.1
95222	Methylene chloride	0.0		2.0	.1	100649	Naphthalene	0.0		.1	.1
95223	Styrene	0.0		.1	.1	100397	TRIHALOMETHANES	0.0		.1	.1
95225	Tetrachloroethylene	0.0		.3	.1	95226	Toluene	0.0		.1	.1
100654	Trichloroethylene	0.0		.1	.1	95229	Trichlorofluoromethane	0.0		.1	.1
95232	Vinyl chloride	0.0		.5	.1	100407	XYLENES	0.0		.1	.1
100642	cis-1,2-Dichloroethylene	0.0		.1	.1	95219	cis-1,3-Dichloropropylene	0.0		.3	.1
95234	m,p-Xylene	0.0		.1	.1	100637	n-Butylbenzene	0.0		.1	.1
100650	n-Propylbenzene	0.0		.1	.1	95233	o-Xylene	0.0		.1	.1
100648	p-Isopropyltoluene	0.0		.1	.1	100635	sec-Butylbenzene	0.0		.1	.1
100636	tert-Butylbenzene	0.0		.1	.1	95217	trans-1,2-Dichloroethylene	0.0		.1	.1
95220	trans-1,3-Dichloropropylene	0.0		.3	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Date: 16-Jun-11
Contact No. (780) 632-8455

Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1539

VOLATILE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE505 | TimeLines (days)
SCAN: VPP | from sample date

| Max | Actual
Date Received : 15-Jun-11 by: JMP | - | 1 | --
Date Extracted: 15-Jun-11 by: SS | 7 | 1 | ok
Date Analyzed : 16-Jun-11 by: SS | 7 | 2 | ok
Raw DataFile : V1539

ESTIMATED CONCENTRATION

TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

Laboratory's comments regarding this sample:
Sample received at 13.1 degrees C

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -
Inappropriate Temperature -
Inappropriate Headspace -
Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.
Estimated concentrations for tentively identified compounds are calculated assuming an equal response to internal standards.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4
Date: 16-Jun-11
Contact No. (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"
Please check the mailing information and inform the lab if changes are required.

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1541

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443 | TimeLines (days)
SCAN: PESTE | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 16-Jun-11 by: KLS 10 2 ok
Date Analyzed : 21-Jun-11 by: IDG 20 7 ok
Raw DataFile : p1541

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100667	2,4-D	.116	H	.005	.005	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboxin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalfluralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fenoxaprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluroxypyr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl(Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Linuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalaxyl-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4
Date: 24-Jun-11
Contact No. (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1541

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443 | TimeLines (days)
SCAN: PESTE | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1
Date Extracted: 16-Jun-11 by: KLS 10 2 ok
Date Analyzed : 21-Jun-11 by: IDG 20 7 ok
Raw DataFile : p1541

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
99891	Propiconazole	0.000		.050	.008	102614	Pyridaben	0.000		.020	.004
102611	Quinclorac	0.000		.005	.002	99896	Quizalofop	0.000		.030	.004
103824	Simazine	0.000		.010	.004	100695	Terbufos	0.000		.030	.004
74474	Thiamethoxam	0.000		.050	.008	100696	Triallate (Avadex BW)	0.000		.005	.002
103825	Triclopyr	0.000		.010	.004	100697	Trifluralin (Treflan)	0.000		.005	.002
97932	Vinclozolin	0.000		.010	.004	100670	alpha-BHC	0.000		.005	.002
100671	alpha-Endosulfan	0.000		.005	.002	100672	gamma-BHC (Lindane)	0.000		.005	.002
100673	p,p-Methoxychlor	0.000		.030	.004						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4
Date: 24-Jun-11
Contact No. (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1543

GLYPHOSATE, AMPA AND GLUFOSINATE

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Raw Water
Matrix : 9
SmpDate: 14-Jun-11 @ 0723 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EC/16 | TimeLines (days)
SCAN: GLYPH | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 16-Jun-11 by: IDG 10 2 ok
Date Analyzed : 28-Jun-11 by: IDG 60 14 ok
Raw DataFile : g1543

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
103453	Aminomethyl Phosphonic Acid	.331	HX	1.000		103626	Glufosinate	0.000		1.000	
103452	Glyphosate	.214	H	.200							

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Date: 6-Jul-11
Bag 4000, Vegreville, Alberta
Contact No. (780) 632-8455 T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1545

EXTRACTABLE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE340 | TimeLines (days)
SCAN: EPP | from sample date

	Max	Actual
Date Received : 15-Jun-11 by: JMP	-	1 --
Date Extracted: 23-Jun-11 by: drc	7	9 *
Date Analyzed : 24-Jun-11 by: drc	21	10 ok
Raw DataFile : E1545		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100730	1,2,4-Trichlorobenzene	0.0		.1	.1	100734	1,2-Diphenylhydrazine	0.0		.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0		.1	.2	100708	2,4,6-Trichlorophenol	0.0		.1	.2
100700	2,4-Dichlorophenol	0.0		.1	.2	100701	2,4-Dimethylphenol	0.0		.2	.2
100703	2,4-Dinitrophenol	0.0		.1	.2	100732	2,4-Dinitrotoluene	0.0		.1	.1
100733	2,6-Dinitrotoluene	0.0		.1	.1	100725	2-Chloronaphthalene	0.0		.1	.1
100699	2-Chlorophenol	0.0		.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0		.1	.2
100704	2-Nitrophenol	0.0		.1	.2	100738	4-Bromophenyl phenyl ether	0.0		.1	.1
100698	4-Chloro-3-methylphenol	0.0		.1	.2	100742	4-Chlorophenyl phenyl ether	0.0		.1	.1
100705	4-Nitrophenol	0.0		.1	.2	100709	Acenaphthene	0.0		.1	.1
100710	Acenaphthylene	0.0		.1	.1	100711	Anthracene	0.0		.1	.1
100731	Benzidine	0.0		.2	.2	100712	Benzo(a)anthracene	0.0		.1	.1
100716	Benzo(a)pyrene	0.0		.1	.2	100713	Benzo(b)fluoranthene	0.0		.1	.1
100715	Benzo(ghi)perylene	0.0		.2	.1	100714	Benzo(k)fluoranthene	0.0		.1	.1
100739	Bis(2-chloroethoxy)methane	0.0		.1	.1	100740	Bis(2-chloroethyl)ether	0.0		.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0		.1	.1	100748	Bis(2-ethylhexyl)phthalate	0.0		.1	.1
100743	Butylbenzylphthalate	0.0		.1	.1	100717	Chrysene	0.0		.1	.1
100744	Di-n-butylphthalate	.1	H	.1	.1	100747	Di-n-octyl phthalate	0.0		.1	.1
100718	Dibenzo(ah)anthracene	0.0		.5	.1	100745	Diethyl phthalate	0.0		.1	.1
100746	Dimethyl phthalate	0.0		.1	.1	100719	Fluoranthene	0.0		.1	.1
100720	Fluorene	0.0		.1	.1	100726	Hexachlorobenzene	0.0		.1	.1
100727	Hexachlorobutadiene	0.0		.5	.1	100728	Hexachlorocyclopentadiene	0.0		.1	.1
100729	Hexachloroethane	0.0		.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0		.1	.1
100749	Isophorone	0.0		.1	.1	100737	N-Nitroso-di-n-propylamine	0.0		.2	.1
100736	N-Nitrosodiphenylamine	0.0		.1	.1	100722	Naphthalene	0.0		.1	.1
100735	Nitrobenzene	0.0		.1	.1	100706	Pentachlorophenol	0.0		.1	.2
100723	Phenanthrene	0.0		.1	.1	100707	Phenol	0.0		.1	.2
100724	Pyrene	0.0		.1	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4
Date: 30-Jun-11
Contact No. (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 2

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1544

VOLATILE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE505 | TimeLines (days)
SCAN: VPP | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 15-Jun-11 by: SS 7 1 ok
Date Analyzed : 16-Jun-11 by: SS 7 2 ok
Raw DataFile : V1544

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100651	1,1,1,2-Tetrachloroethane	0.0		.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0		.1	.1
95214	1,1-Dichloroethane	0.0		.1	.1
100645	1,1-Dichloropropylene	0.0		.1	.1
100655	1,2,3-Trichloropropane	0.0		.1	.1
100656	1,2,4-Trimethylbenzene	0.0		.1	.1
100641	1,2-Dibromoethane	0.0		.1	.1
95215	1,2-Dichloroethane	0.0		.1	.1
100657	1,3,5-Trimethylbenzene	0.0		.1	.1
100644	1,3-Dichloropropane	0.0		.1	.1
100643	2,2-Dichloropropane	0.0		.1	.1
100638	2-Chlorotoluene	0.0		.1	.1
95200	Benzene	0.0		.1	.1
95201	Bromodichloromethane	.7	H	.1	.1
95203	Bromomethane	0.0		.1	.1
95205	Chlorobenzene	0.0		.1	.1
95208	Chloroform	15.3	H	.1	.4
95209	Dibromochloromethane	.2	H	.1	.1
95221	Ethyl benzene	0.0		.1	.1
100647	Isopropylbenzene	0.0		.1	.1
95222	Methylene chloride	0.0		2.0	.1
95223	Styrene	0.0		.1	.1
95225	Tetrachloroethylene	0.0		.3	.1
100654	Trichloroethylene	0.0		.1	.1
95232	Vinyl chloride	0.0		.5	.1
100642	cis-1,2-Dichloroethylene	0.0		.1	.1
95234	m,p-Xylene	0.0		.1	.1
100650	n-Propylbenzene	0.0		.1	.1
100648	p-Isopropyltoluene	0.0		.1	.1
100636	tert-Butylbenzene	0.0		.1	.1
95220	trans-1,3-Dichloropropylene	0.0		.3	.1
95227	1,1,1-Trichloroethane	0.0		.1	.1
95228	1,1,2-Trichloroethane	0.0		.1	.1
95216	1,1-Dichloroethylene	0.0		.1	.1
100652	1,2,3-Trichlorobenzene	0.0		.1	.1
100653	1,2,4-Trichlorobenzene	0.0		.1	.1
100640	1,2-Dibromo-3-chloropropane	0.0		.3	.1
95211	1,2-Dichlorobenzene	0.0		.1	.1
95218	1,2-Dichloropropane	0.0		.1	.1
95212	1,3-Dichlorobenzene	0.0		.1	.1
95213	1,4-Dichlorobenzene	0.0		.1	.1
95207	2-Chloroethoxyethylene	0.0		.4	.1
100639	4-Chlorotoluene	0.0		.1	.1
100634	Bromobenzene	0.0		.1	.1
95202	Bromoform	0.0		.5	.1
95204	Carbon tetrachloride	0.0		.1	.1
95206	Chloroethane	0.0		.1	.1
106204	Chloromethane	0.0		.5	.1
95210	Dibromomethane	0.0		.1	.1
100646	Hexachlorobutadiene	0.0		.3	.1
102608	MTBE	0.0		.1	.1
100649	Naphthalene	0.0		.1	.1
100397	TRIHALOMETHANES	16.2	H	.1	.2
95226	Toluene	0.0		.1	.1
95229	Trichlorofluoromethane	0.0		.1	.1
100407	XYLENES	0.0		.1	.1
95219	cis-1,3-Dichloropropylene	0.0		.3	.1
100637	n-Butylbenzene	0.0		.1	.1
95233	o-Xylene	0.0		.1	.1
100635	sec-Butylbenzene	0.0		.1	.1
95217	trans-1,2-Dichloroethylene	0.0		.1	.1

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Date: 16-Jun-11
Contact No. (780) 632-8455

Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1547

POLYCYCLIC AROMATIC HYDROCARBONS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: - - - | TimeLines (days)
SCAN: PAH | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 16-Jun-11 by: rmr 11 2 ok
Date Analyzed : 23-Jun-11 by: rmr 21 9 ok
Raw DataFile : P1547

GC/MSD SIM DATA

VMV_CODE	COMPOUND NAME	ug/L	MDL	flag	VMV_CODE	COMPOUND NAME	ug/L	MDL	flag
107977	1-Methylnaphthalene	0.00	.01		107978	2-Methylnaphthalene	0.00	.01	
103142	3-Methylchloranthrene	0.00	.01		103143	7,12-Dimethylbenz(a)anthracen	0.00	.01	
103144	Acenaphthene	0.00	.01		103145	Acenaphthylene	0.00	.01	
103146	Acridine	0.00	.01		103147	Anthracene	0.00	.01	
103148	Benzo(a)anthracene	0.00	.01		103149	Benzo(a)pyrene	0.00	.01	
103150	Benzo(b,j,k)fluoranthene	0.00	.01		103151	Benzo(c)phenanthrene	0.00	.01	
103152	Benzo(e)pyrene	0.00	.01		103153	Benzo(ghi)perylene	0.00	.01	
103154	Chrysene	0.00	.01		103155	Dibenzo(a,h)pyrene	0.00	.01	
103156	Dibenzo(a,i)pyrene	0.00	.01		103157	Dibenzo(a,l)pyrene	0.00	.01	
103158	Dibenzo(ah)anthracene	0.00	.01		103159	Fluoranthene	0.00	.01	
103160	Fluorene	0.00	.01		103161	Indeno(1,2,3-cd)pyrene	0.00	.01	
103162	Naphthalene	0.00	.01		107132	Perylene	0.00	.01	
103163	Phenanthrene	0.00	.01		103164	Pyrene	0.00	.01	
103761	Retene	0.00	.01						

ARC Remarks:
Sample received at 14.6 degrees C

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit
flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader mail to: MWWS Buffalo Pound Water Treatment Plant
Organic Environmental Monitoring attn: Dan Conrad
_____ Alberta Innovates - Technology Futures
Date: 27-Jun-11 Bag 4000, Vegreville, Alberta Box 1790
Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1546

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443 | TimeLines (days)
SCAN: PESTE | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 16-Jun-11 by: KLS 10 2 ok
Date Analyzed : 21-Jun-11 by: IDG 20 7 ok
Raw DataFile : p1546

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100667	2,4-D	0.000		.005	.002	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboxin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalfluralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fenoxaprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluroxypyr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl(Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Linuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalaxyl-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Date: 24-Jun-11
Contact No. (780) 632-8455

Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1546

PESTICIDE ANALYSIS

Contact: MwWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443 | TimeLines (days)
SCAN: PESTE | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1
Date Extracted: 16-Jun-11 by: KLS 10 2 ok
Date Analyzed : 21-Jun-11 by: IDG 20 7 ok
Raw DataFile : p1546

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
99891	Propiconazole	0.000		.050	.008	102614	Pyridaben	0.000		.020	.004
102611	Quinclorac	0.000		.005	.002	99896	Quizalofop	0.000		.030	.004
103824	Simazine	0.000		.010	.004	100695	Terbufos	0.000		.030	.004
74474	Thiamethoxam	0.000		.050	.008	100696	Triallate (Avadex BW)	0.000		.005	.002
103825	Triclopyr	0.000		.010	.004	100697	Trifluralin (Treflan)	0.000		.005	.002
97932	Vinclozolin	0.000		.010	.004	100670	alpha-BHC	0.000		.005	.002
100671	alpha-Endosulfan	0.000		.005	.002	100672	gamma-BHC (Lindane)	0.000		.005	.002
100673	p,p-Methoxychlor	0.000		.030	.004						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Date: 24-Jun-11
Bag 4000, Vegreville, Alberta
Contact No. (780) 632-8455 T9C 1T4

mail to: MwWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T11-1548

GLYPHOSATE, AMPA AND GLUFOSINATE

Contact: MwWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 14-Jun-11 @ 0840 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EC/16 | TimeLines (days)
SCAN: GLYPH | from sample date
| Max Actual
Date Received : 15-Jun-11 by: JMP - 1 --
Date Extracted: 6-Jul-11 by: IDG 10 22 *
Date Analyzed : 6-Jul-11 by: IDG 60 22 ok
Raw DataFile : g1548

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
103453	Aminomethyl Phosphonic Acid	0.000		1.000		103626	Glufosinate	0.000		1.000	
103452	Glyphosate	0.000		.200							

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk
Team Leader
Organic Environmental Monitoring
Alberta Innovates - Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4
Date: 14-Jul-11
Contact No. (780) 632-8455

mail to: MwWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

QUALITY ASSURANCE LABORATORY ANALYTICAL REPORT

EPCOR

Mail:
10065 Jasper Avenue
Edmonton, Alberta
T5J 3B1

Location:
Water Laboratory
Rossdale Water
Treatment Plant
9469 Rossdale Road
Edmonton, Alberta
T5K 0A5

Tel: 780-412-7614
Fax: 780-412-7717

Submission:	2011-07-12-011	Date Logged:	12-Jul-11, 13:20
Results To:	DAN CONRAD	Tel:	(306) 694-1377x3
Address:	BUFFALO POUND PO BOX 1790 REGINA, SK S4P 3C8	Fax:	(306) 694-6050
		Customer PO:	
		Project ID:	BUFFALO POUND DBP
		Receiving Temp (Deg Cel):	12

Report Id: VRS CRCBS7 28-Jul-11, 16:55

Sample ID	Sample Date	Client ID	Location	Sample Point	Method	Analyte	Result	Unit	Entry Date	Entry By	MDL
BA48382	Sample Condition: COLD,SAMPLE INTACT, DOCUMENTED										
BA48382	11-Jul-11 08:00	RAW WATER	BUFFALO POUND	RAW WATER	106151	Microcystin	<0.5	ug/L	15-Jul-11	BYEE	0.5
BA48383	Sample Condition: COLD,SAMPLE INTACT, DOCUMENTED										
BA48383	11-Jul-11 08:00	CLEARWEL L	BUFFALO POUND	CLEARWELL	106151	Microcystin	<0.5	ug/L	15-Jul-11	BYEE	0.5

Report Date: July 29, 2011

CERTIFIED BY: JBehavad

Rajendra Kothavade (Microbiologist)

The results relate only to the samples tested. This report should not be reproduced except in full, without written approval of the laboratory.

Financial Statements - 2011

BUFFALO POUND WATER ADMINISTRATION BOARD
DECEMBER 31, 2011

Deloitte & Touche LLP
900 - 2103 11th Ave
Bank of Montreal Building
Regina SK S4P 3Z8
Canada

Tel: 306-565-5200
Fax: 306-757-4753
www.deloitte.ca

INDEPENDENT AUDITOR'S REPORT

To the Chairman and Members of the Buffalo Pound Water Administration Board

We have audited the accompanying financial statements of the Buffalo Pound Water Administration Board, which comprise the statement of financial position at December 31, 2011, and the statements of operations, reserve for replacement of capital assets, change in net financial assets (liabilities) and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Buffalo Pound Water Administration Board as at December 31, 2011, and the results of its operations, change in its net financial assets (debt) and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Deloitte & Touche LLP

Chartered Accountants

March 21, 2012
Regina, Saskatchewan

Member of Deloitte Touche Tohmatsu

Buffalo Pound Water Administration Board

STATEMENT OF FINANCIAL POSITION

[in dollars]

As at December 31

	2011	2010
FINANCIAL ASSETS		
Cash	**1,765,730**	1,866,782
Accounts receivable		
City of Regina	**588,305**	582,623
City of Moose Jaw	**361,170**	221,931
Other (Note 9)	**407,142**	114,612
Total financial assets	**3,122,347**	2,785,948
FINANCIAL LIABILITIES		
Accounts payable and accrued liabilities	**292,257**	245,587
20% Refundable rate (Note 2)		
City of Regina	**1,045,854**	944,619
City of Moose Jaw	**370,716**	337,437
Surplus refundable (Note 1)		
City of Regina	**93,483**	428,464
City of Moose Jaw	**20,925**	88,318
Employee benefit obligations (Note 5)	**441,160**	404,397
Total financial liabilities	**2,264,395**	2,448,822
Net financial assets (liabilities)	**857,952**	337,126
NON-FINANCIAL ASSETS		
Inventory of chemicals	**112,048**	163,781
Prepaid expenses	**1,500**	4,838
Tangible capital assets (Note 6)	**25,666,832**	26,886,863
Accumulated surplus (Note 8)	**26,638,332**	27,392,608

See accompanying notes.

SIGNED ON BEHALF OF THE BOARD

Board Member

Board Member

Buffalo Pound Water Administration Board

STATEMENT OF OPERATIONS

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2011**	2010
REVENUES			
General water rate charges			
City of Regina operating contributions	5,896,520	**5,787,498**	5,314,763
City of Moose Jaw operating contributions	1,284,599	**1,295,017**	1,095,517
City of Regina capital contributions	589,652	**578,750**	531,476
City of Moose Jaw capital contributions	128,460	**129,502**	109,552
	7,899,231	**7,790,767**	7,051,308
Refundable water rate	1,436,224	**1,416,570**	1,282,056
Power charges	250,705	**246,597**	179,368
Miscellaneous water sales	100,400	**91,584**	85,695
Interest	20,000	**27,227**	16,233
Other	7,400	**4,760**	4,942
	9,713,960	**9,577,505**	8,619,602
EXPENSES (Schedule 2)			
Employee wages and benefits	2,671,800	**2,625,441**	2,417,999
Amortization of tangible capital assets (Schedule 3)	1,790,471	**1,790,471**	1,761,643
Utilities	1,803,000	**1,665,053**	1,587,998
Chemicals	1,640,000	**1,761,806**	997,080
Refundable water rate	1,436,224	**1,416,570**	1,282,056
Waterworks assessment	-	**6,912**	44,921
Equipment maintenance	789,500	**422,494**	510,048
Miscellaneous	211,000	**223,748**	232,631
Laboratory supplies and maintenance	168,000	**140,188**	122,972
Building and ground maintenance	219,100	**116,565**	93,960
Administration	57,000	**48,125**	37,720
	10,786,095	**10,217,373**	9,089,028
Deficiency of revenues over expenses before refundable surplus	(1,072,135)	**(639,868)**	(469,426)
Surplus refundable from operations allocated as follows:			
City of Regina		**(93,483)**	(428,464)
City of Moose Jaw		**(20,925)**	(88,318)
Change in accumulated surplus		**(754,276)**	(986,208)
Accumulated surplus, beginning of year		**27,392,608**	28,378,816
Accumulated surplus, end of year		**26,638,332**	27,392,608

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

[in dollars]

For the year ended December 31

	2011	2010
Balance, beginning of year	**910,142**	489,162
Contributions		
City of Regina capital contributions	**578,750**	531,476
City of Moose Jaw capital contributions	**129,502**	109,552
Interest earned (Note 4)	**8,528**	6,793
Expenditures from reserve for replacement of capital assets (Schedule 1)	**(214,262)**	(226,841)
Balance, end of year (Note 8)	**1,412,660**	910,142

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF CHANGE IN NET FINANCIAL ASSETS (DEBT)

[in dollars]

For the year ended December 31

	2011	2010
Change in accumulated surplus	**(754,276)**	(986,208)
Acquisition of tangible capital assets	**(570,440)**	(403,335)
Amortization of tangible capital assets	**1,790,471**	1,761,643
Proceeds on disposal of tangible capital assets	**-**	10,000
Loss on the disposal of tangible capital assets	**-**	24,115
Surplus of capital expenses over expenditures	**1,220,031**	1,392,423
Acquisition of inventory of chemicals	**(1,710,073)**	(984,865)
Acquisition of prepaid expense	**(1,500)**	(4,838)
Consumption of inventory of chemicals	**1,761,806**	997,080
Use of prepaid expenses	**4,838**	6,436
Surplus of expenses of other non-financial assets over expenditures	**55,071**	13,813
Increase in net financial assets	**520,826**	420,028
Net financial assets (debt), beginning of year	**337,126**	(82,902)
Net financial assets, end of year	**857,952**	337,126

See accompanying notes.

Buffalo Pound Water Administration Board
STATEMENT OF CASH FLOWS
[in dollars]

For the year ended December 31

	2011	2010
OPERATING ACTIVITIES		
Change in accumulated surplus	**(754,276)**	(986,208)
Add back non-cash items		
Amortization of tangible capital assets	**1,790,471**	1,761,643
Loss on disposal of tangible capital assets	**-**	24,115
Net change in non-cash working capital balances		
Increase in accounts receivable	**(437,451)**	(130,212)
Increase (decrease) in accounts payable and accrued liabilities	**46,670**	(29,450)
Increase (decrease) in 20% refundable rate	**134,514**	(922,920)
Decrease in surplus refundable	**(402,374)**	(554,884)
Increase in employee benefits obligations	**36,763**	14,765
Decrease in inventory of chemicals and prepaid expenses	**55,071**	13,813
Cash provided by (used in) operating activities	**469,388**	(809,338)
CAPITAL ACTIVITIES		
Acquisition of tangible capital assets	**(570,440)**	(403,335)
Proceeds on disposal of tangible capital assets	**-**	10,000
Decrease in cash position	**(101,052)**	(1,202,673)
Cash, beginning of year	**1,866,782**	3,069,455
Cash, end of year	**1,765,730**	1,866,782

See accompanying notes.

Buffalo Pound Water Administration Board

NOTES TO THE FINANCIAL STATEMENTS

[in dollars]

For the year ended December 31, 2011

1. BASIS OF OPERATIONS

The Buffalo Pound Water Administration Board (the Board) has been formed under a 1951 agreement, amended in 1991, between the cities of Moose Jaw and Regina for the purpose of operating the water treatment facility at Buffalo Pound Lake to provide a water supply to the two cities at cost (the Agreement). Any surplus (deficit) in a particular fiscal year is distributed to (charged to) the cities according to their respective usage.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Board are the representation of management and have been prepared in accordance with Canadian public sector accounting standards, as recommended by the Canadian Institute of Chartered Accountants (CICA). Significant aspects of the accounting policies adopted by the Board are as follows:

Use of estimates

The preparation of financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and use assumptions that affect the reported amounts of assets and liabilities at the date of the financial statement and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

Employee benefit obligations

Employee benefit obligations relating to severance or retirement benefits are recognized to the extent that they are vested and could be taken in cash by an employee on termination.

Pension benefit obligations

The Board is one of the sponsors of a multi-employer defined benefit pension plan. The Board follows defined contribution accounting under which pension expense is limited to the Board's contributions to the plan. The Board's share of any unfunded pension obligations is not recognized as pension expense.

Inventory of chemicals

Inventory of chemicals are valued at the lower of net realizable value and average cost.

Capital contributions

The funding for capital assets is through one of two means, from the Reserve for Replacement of Capital Assets or through a separate funding agreement between the cities of Moose Jaw and Regina (the cities).

Article 3 of the Agreement between the cities requires an additional contribution from each city equal to 10% of the general water rate for every mega litre of water sold. This contribution funds the Reserve for Replacement of Capital Assets from which capital assets may be funded. For major capital projects that the reserve is unable to fund, a separate agreement between the two cities may be struck in order to provide funding for the project. Contributions from the cities under Article 3 of the Agreement or through a separate agreement are shown as capital contributions for financial statement purposes.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2011

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Operating contributions

Under the terms of the Agreement, each city pays the Board for water and electricity used based upon the following rates established by the Board:

	2011	2010
General water rate, per mega litre	**210.59**	204.75
Electricity rate, per kilowatt hour	**0.07714**	0.07278

These revenues are recognized as the water is delivered to the cities' water distribution systems. Other revenues are recognized when earned and measurable.

Refundable water rate

Under Article 5 of the Agreement, the Board receives an additional 20% of the general water rate from the cities for every mega litre of water sold. At each fiscal year end, the proceeds of these payments are refunded in proportion to the cities' respective capital investment in the Board.

Financial instruments

The fair value of cash, accounts receivable, accounts payable and accrued liabilities, the 20% refundable rate and the surplus refundable approximates the carrying value given their short term nature.

Tangible capital assets

Tangible capital assets are recorded at cost which includes all amounts that are directly attributable to acquisition, construction, development or betterment of the asset. The cost, less residual value, of the tangible capital assets are amortized on a straight-line basis over their estimated useful lives as follows:

General	
Land improvements	20 years
Vehicles and equipment	7 to 20 years
Office and information technology	5 to 10 years
Infrastructure	
Plants and facilities	5 to 40 years
Roads	25 years

Assets under construction are not amortized until the asset is available for productive use.

Tangible capital assets received as contributions are recorded at their fair value at the date of receipt and also are recorded as revenue.

Leases are classified as capital or operating leases. Leases which transfer substantially all of the benefits and risks incidental to ownership of property are accounted for as capital leases and recorded as tangible capital assets. All other leases are accounted for as operating leases and the related lease payments are charged to expenses as incurred.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2011

3. NEW STANDARDS NOT YET ADOPTED

A number of new standards and amendments to standards, are not yet effective for the year ended December 31, 2011, and have not been applied in preparing these financial statements. In particular, the following new and amended standards which become effective for annual periods on or after April 1, 2012 are:

PS 3450, Financial Instruments
PS 1201, Financial Statment Presentation
PS 3410, Government Transfers
PS 3260, Liability for Contaminated Sites

The extent of the impact on adoption of these standards is not known at this time..

4. RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

The Statement of Reserve for Replacement of Capital Assets shows allocated interest to the Reserve of 8,528 (6,793 in 2010). This represents the interest earnings for the year and is transferred in accordance with Article 3 of the Agreement. The interest is calculated by applying the prescribed rate, being bank prime less 1.2%, to the average monthly reserve balance to a maximum of the actual interest earned on the funds.

5. EMPLOYEE BENEFIT OBLIGATIONS

The unfunded employee benefit obligations accrued at year end are as follows:

	2011	2010
Vacation pay	**163,232**	150,395
Vested termination payments	**277,928**	254,002
	441,160	404,397

Based upon an agreement with the Communications, Energy and Paperworkers' Union, termination payments for union employees vest after 15 years of service or upon retiring at the age of 65 after 10 years of continuous service. The amount payable on termination after vesting is 20 hours pay for each completed year of service.

For out-of-scope employees the termination payments vest after 10 years of service. The amount payable on termination after vesting is the wages the employee would have been paid had the employee worked for a time equal to their unused sick days on termination date. The maximum termination payment to an out-of-scope employee is 78 days pay.

Buffalo Pound Water Administration Board is a member of the City of Regina Civic Employees' Superannuation and Benefit Plan (the Plan), which is overseen by its own Administrative Board. All eligible permanent and probation employees of the Board are members of the Plan. This multi-employer Plan provides defined retirement benefits and is integrated with the Canada Pension Plan (CPP). The Plan provides a lifetime monthly pension based on an employee's years of service and the average of the best three consecutive years of earnings. For 2011 employees contributed 9.42% (2010 - 9.42%) of their earnings below the CPP maximum and 13.96% (2010 - 13.96%) of earnings above the CPP maximum and the Board matches employee contributions.

Preliminary financial statement projections as at December 31, 2011 indicate the Plan had a deficit (unfunded liability) of net assets available to pay accrued pension benefits of 292,818,000 (2010 - 209,006,000).

The Plan is a multi-employer defined benefit plan; therefore neither benefits nor contributions are segregated by employer. The percentage of active Plan members employed by the Board at year end was 0.7%. The Plan managers have been unable to determine the portion of any unfunded liability attributable to each employer. Accordingly, no portion of the deficiency has been recognized as a liability or expense in the financial statements.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2011

5. EMPLOYEE BENEFIT OBLIGATIONS (Continued)

The Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of pension expense is equal to the contributions required for the year. Pension costs of 232,372 (222,042 in 2010) based on employer contributions were expensed during 2011.

Buffalo Pound Water Administration Board is a member of the Regina Civic Employees' Long-term Disability Plan (the Disability Plan). Preliminary financial statement projections as of December 31, 2011 indicate a surplus of net assets available for benefits of 12,204,000 (2010 - 13,760,000).

The Disability Plan is a multi-employer plan and consequently, identification of individual employer's assets is not available from the Disability Plan managers. Accordingly, no portion of the surplus has been recognized as an asset or expense reduction in the financial statements. Disability benefits are based on 65% of the member's salary and will be paid either throughout the duration of the disability, until the member elects voluntary early retirement, reaches age 65 or upon death, whichever occurs first. The Disability Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of benefit expense is equal to the contributions required for the year. Member contributions are made to the Plan at a rate of 0.92%, with the employer matching contributions. The Board recorded disability premium costs for 2011 of 18,601 (18,836 in 2010).

Dental and medical plans are also provided for most employees and are paid for by the Board.

6. TANGIBLE CAPITAL ASSETS

	NET BOOK VALUE	
	2011	2010
General		
Land improvements	**-**	-
Vehicles and equipment	**346,076**	345,814
Office and information technology	**15,778**	7,961
Infrastructure		
Plants and facilities	**25,188,359**	26,391,235
Roads	**-**	-
Assets under construction	**116,619**	141,853
	25,666,832	26,886,863

For additional information, see the Schedule of Tangible Capital Assets (Schedule 3). During the year there were no write-downs of assets (2010- $nil). In addition, there were no assets contributed to the Board (2010- $nil).

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2011

7. CAPITAL INVESTMENT

The Capital Investment represents the contributions made by each of the cities under Article 3 of the Agreement, as well as those made under separate agreement, which have been used for capital purposes. Each City's investment is proportionate to the amount contributed. For additional information, see Capital Investment (Schedule 1).

	2011			2010
	Regina	**Moose Jaw**	**Total**	Total
Balance - beginning of year	**55,908,627**	**21,015,294**	**76,923,921**	76,697,080
Additions funded by:				
Reserve for replacement of capital assets	**158,190**	**56,072**	**214,262**	226,841
Balance - end of year	**56,066,817**	**21,071,366**	**77,138,183**	76,923,921

8. ACCUMULATED SURPLUS

Accumulated surplus represents the equity of an organization. In determining accumulated surplus, revenues and expenses are recognized as they are earned and incurred, according to Canadian public sector accounting standards as recommended by the CICA.

	2011	2010
Investment in tangible capital assets	**25,666,832**	26,886,863
Reserve for replacement of capital assets	**1,412,660**	910,142
Employee benefit obligations (Note 5)	**(441,160)**	(404,397)
Accumulated surplus	**26,638,332**	27,392,608

9. RELATED PARTY TRANSACTIONS

Related party transactions, in accordance with the agreement between the cities, are disclosed separately in the financial statements and notes to the financial statements, except as follows:

Included in accounts receivable other is 257,762 receivable from the City of Regina (87,019 included in accounts payable and accrued liabilities payable to City of Regina in 2010).

Included in administration expenses is an administration fee paid to the City of Regina of 29,114 (29,100 in 2010).

Buffalo Pound Water Administration Board **Schedule 1**

CAPITAL INVESTMENT

[in dollars]

For the year ended December 31

	2011	2010
Balance - beginning of year	**76,923,921**	76,697,080
Additions financed by reserve for replacement of capital assets		
Filter-contactor flow meters	**-**	23,990
Instrumentation drawings	**41,472**	25,234
Chlorine safety upgrades	**112,906**	14,296
Filter valve replacement	**8,982**	89,130
Lab equipment	**-**	8,167
Waterworks assessment	**6,912**	44,921
Crew cab truck	**-**	21,103
Lab Equipment maintenance	**43,990**	-
	214,262	226,841
Balance - end of year	**77,138,183**	76,923,921

Distribution of capital investment		
City of Regina	**56,066,817**	55,908,627
City of Moose Jaw	**21,071,366**	21,015,294
	77,138,183	76,923,921

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2011**	2010
EMPLOYEE WAGES AND BENEFITS			
Wages - permanent employees	2,118,900	**2,038,916**	1,905,944
Employee benefits - permanent employees	410,200	**391,567**	375,563
Overtime wages - permanent employees	107,900	**81,563**	81,817
WCB premiums	27,800	**29,039**	17,719
Premium pay - permanent employees	-	**14,274**	13,552
Car allowance	4,000	**4,938**	6,445
Clothing and boot allowance	3,000	**3,626**	2,194
Wages - casual employees	-	**22,820**	-
Employee benefits - vacation, sick and termination	-	**36,763**	14,765
Employee benefits - casual employees	-	**1,795**	-
Overtime pay - casual employees	-	**140**	-
	2,671,800	**2,625,441**	2,417,999
UTILITIES			
Electricity	1,378,000	**1,236,959**	1,117,038
Natural gas	425,000	**428,094**	470,960
	1,803,000	**1,665,053**	1,587,998
CHEMICALS			
Alum	1,180,000	**1,353,004**	714,340
Granular activated carbon	210,000	**209,403**	173,431
Chlorine	150,000	**131,021**	103,582
Miscellaneous chemicals	100,000	**68,378**	5,727
	1,640,000	**1,761,806**	997,080
EQUIPMENT MAINTENANCE			
Filtration plant	325,800	**117,858**	222,331
Wastewater system	158,300	**108,008**	98,584
Regeneration plant	145,500	**88,637**	74,513
Pump station	71,900	**36,174**	30,099
Computer and communications	64,000	**63,897**	45,949
High power electrical	11,000	**4,042**	9,751
Pipeline	13,000	**3,878**	28,821
	789,500	**422,494**	510,048

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES (CONTINUED)

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2011**	2010
MISCELLANEOUS			
Insurance	68,000	**65,131**	62,987
General supplies	21,000	**37,426**	15,340
Telephone	16,000	**15,051**	12,832
Professional and membership fees	24,000	**22,005**	20,516
Travel and conventions	23,000	**15,173**	15,599
Maintenance - vehicles	18,000	**26,019**	25,461
Stationary and office supplies	21,000	**20,285**	18,742
Awards and gifts	-	**6,215**	5,904
Education and training	15,000	**11,043**	28,513
Contracted services	5,000	**5,400**	2,622
Tangible capital asset (gain)/loss	-	**-**	24,115
	211,000	**223,748**	232,631
LABORATORY SUPPLIES AND MAINTENANCE			
Laboratory supplies	65,000	**62,704**	53,795
Laboratory equipment	40,000	**32,680**	25,046
Contract analytical	8,000	**3,813**	7,933
Accreditation program and research	55,000	**40,991**	36,198
	168,000	**140,188**	122,972
BUILDING AND GROUND MAINTENANCE			
Filtration plant	197,400	**100,243**	72,444
Regeneration plant	12,200	**11,349**	9,214
Lake pump station	9,500	**4,973**	12,302
	219,100	**116,565**	93,960
ADMINISTRATION			
City of Regina administration	32,000	**29,114**	29,100
Audit services	12,000	**11,890**	8,620
Travel and conventions-Board Members	13,000	**7,121**	-
	57,000	**48,125**	37,720

Buffalo Pound Water Administration Board **Schedule 3**

SCHEDULE OF TANGIBLE CAPITAL ASSETS

[in dollars]

For the year ended December 31

	General			Infrastructure				
	Land Improvements	**Vehicles and Equipment**	**Office and Information Technology**	**Plants and Facilities**	**Roads**	**Assets Under Construction**	**2011**	2010
Cost								
Beginning of year	11,373	891,004	9,365	76,457,433	2,321	141,853	**77,513,349**	77,752,410
Add:								
Additions during year	-	55,846	9,214	505,380		-	**570,440**	403,335
Transfers from assets under construction	-	-	-	25,234		-	**25,234**	-
Less:								
Disposals during year	-	-	-	-	-	25,234	**25,234**	642,396
End of year	11,373	946,850	18,579	76,988,047	2,321	116,619	**78,083,789**	77,513,349
Accumulated amortization								
Beginning of year	11,373	545,190	1,404	50,066,198	2,321	-	**50,626,486**	49,473,124
Add:								
Amortization	-	55,584	1,397	1,733,490	-	-	**1,790,471**	1,761,643
Less:								
Accumulated amortization on disposals	-	-	-	-	-	-	**-**	608,281
End of year	11,373	600,774	2,801	51,799,688	2,321	-	**52,416,957**	50,626,486
Net Book Value	**-**	**346,076**	**15,778**	**25,188,359**	**-**	**116,619**	**25,666,832**	26,886,863

2011 annual report