



STAFF REPORT ACTION REQUIRED

Research Contributions – Toronto Water

Date:	April 17, 2007
To:	Public Works and Infrastructure Committee
From:	General Manager, Toronto Water
Wards:	All
Reference Number:	P:\2007\Cluster B\TW\pw07013 (AFS# 4122)

SUMMARY

This report requests authority to continue contributions to the leading water and wastewater research organizations such as American Water Works Association Research Foundation (AWWARF), Water Environment Research Foundation (WERF), Ontario Water Works Research Consortium (OWWRC) and specific Universities. This report consolidates Toronto Water's contributions to various research organizations.

In order to maintain service excellence in the City's drinking water, wastewater and storm treatment systems, it is appropriate for Toronto Water to support and participate in ongoing research initiatives designed to investigate new technologies, apply new or improved treatment processes, and improve maintenance methods that can extend the life of the City's infrastructure.

RECOMMENDATIONS

The General Manager of Toronto Water recommends that:

1. authority be granted to provide our annual subscription to the American Water Works Association Research Foundation in the amount of \$150,000 for 2007, \$195,000 for 2008, \$250,000 for 2009 and \$300,000 for 2010;
2. authority be granted to provide our annual subscription to the Water Environment Research Foundation in the amount of \$108,600 for 2006, up to \$111,800 for

- 2007, up to \$115,200 for 2008, up to \$118,600 for 2009, and up to \$122,200 for 2010;
3. authority be granted to continue our partnership with and contribute up to \$25,000 per year to the Ontario Water Works Research Consortium for 2007, 2008, 2009 and 2010;
 4. authority be granted to contribute \$50,000 per year to the Research Chair in Water Treatment at the University of Waterloo for 2007, 2008, 2009, 2010, 2011 and 2012;
 5. authority be granted to contribute up to \$50,000 per year to an appropriate contract research firm subject to approval by the General Manager of Toronto Water; and
 6. Public Works and Infrastructure Committee authorize and direct the appropriate staff to take the necessary action to give effect thereto.

FINANCIAL IMPACT

The total estimated impact identified in this report is \$2,071,400 including all applicable taxes and charges over a six year time period. For 2006, contribution to the Water Environment Research Foundation (WERF) has been set up as a liability in the amount of \$108,600 within the 2006 Operating Budget cost centre WW4030. For all other requests, funding has been consolidated into one cost centre PW1056-5200 – Operations Efficiency. Funding for all 2007 research requests has been budgeted for in the Toronto Water Operating Account. Funds for future years will be provided in the appropriate future Annual Operating Budgets. The anticipated cash flows are as follows:

Year	AwwaRF	WERF	OWWRC	University of Waterloo*	Other	Total
2006		\$108,600				\$108,600
2007	\$150,000	\$111,800	\$25,000	\$50,000	\$50,000	\$386,800
2008	\$195,000	\$115,200	\$25,000	\$50,000	\$50,000	\$435,200
2009	\$250,000	\$118,600	\$25,000	\$50,000	\$50,000	\$493,600
2010	\$300,000	\$122,200	\$25,000	\$50,000	\$50,000	\$547,200
2011				\$50,000		\$50,000
2012				\$50,000		\$50,000
Total	\$895,000	\$576,400	\$100,000	\$300,000	\$200,000	\$2,071,400

*The University of Waterloo commitment is until 2012.

DECISION HISTORY

In the past, contributions made to various research organizations were budgeted in different cost centres within Toronto Water and separate staff reports were submitted to Committee and Council for approval. The report for WERF subscription can be found at: <http://www.toronto.ca/legdocs/2001/agendas/council/cc011002/wks14rpt/cl010.pdf>

The report for contributions to AwwaRF and other research organizations can be found at: <http://www.toronto.ca/legdocs/2004/agendascommittees/wks/wks040428/it034.pdf>

ISSUE BACKGROUND

Toronto Water has been an active participant in joint research projects for decades. This report outlines Toronto Water's continued involvement in leading industry research organizations in Canada and North America such as the American Water Works Association Research Foundation (AWWARF), the world leader in Water Research; Water Environment Research Foundation (WERF), the world leader in Wastewater Research; Ontario Water Works Research Consortium (OWWRC), which focuses on researching local provincial water issues; and University of Waterloo, a world-class university conducting leading edge, yet practically oriented research in drinking water treatment and quality issues.

COMMENTS

Toronto is Canada's largest city and sixth largest government, and home to a diverse population of more than 2.6 million people. In the past three years the City of Toronto has won more than 50 awards for quality and innovation in delivering public services. Toronto's government is dedicated to prosperity, opportunity and liveability for all its residents.

Toronto Water's mandate is to protect public health and the environment. The Division is recognized as a leader in providing water, wastewater and stormwater management services and must participate in ongoing research initiatives designed to investigate new technologies, apply new or improved treatment processes, and improve maintenance methods that can extend the life of the City's infrastructure. Participating in research associations allows staff to anticipate emerging issues and ensures that appropriate professional development is occurring. Details of the research activities are as follows:

American Water Works Association Research Foundation

The American Water Works Association (AWWA) is an organization of water utility operators, regulatory authorities, academic researchers and instructors, consulting engineers and equipment and material suppliers, with subscribers from all over the world. AWWA works very closely with the AWWA Research Foundation (AWWARF), a non-profit corporation set up by the water supply industry to research common problems. AWWARF has over 1,000 subscribers world wide including 45 subscribers from Canada. Additional information on AWWARF is available at www.awwarf.org.

By subscribing to AWWARF, members stay at the forefront of technology by joining a multi-million dollar, state-of-the-science research program providing access to a global network of experts and gaining early access to research results; influencing and participating in the research agenda; and pooling financial resources for much needed utility-based research.

In the past, the former Metro Toronto had been an active member of AWWARF for over 25 years and the former City of Toronto and Scarborough Public Utilities Commission were also members. In 2005 and 2006, the City of Toronto contributed \$90,000 and \$115,000 each year respectively towards AWWARF membership. These contributions represent roughly one-third of our full subscription rate based on the amount of water supplied.

AWWARF has expressed an interest in amending the subscription amount to reflect the size of the amalgamated city through progressive increases over several years. Full subscription would be achieved through annual increases of 30 to 35% for the next five years. We are seeking approval for subscription payments to the AWWARF in the amount of \$150,000 for 2007, \$195,000 for 2008, \$250,000 for 2009, and \$300,000 for 2010. For 2007, we have budgeted \$150,000 in the 2007 Annual Operating Budget. For future contributions, funds will be allocated in the 2008, 2009 and 2010 Operating Budgets.

Water Environment Research Foundation

Founded in 1928, the Water Environment Federation (WEF) is a not-for-profit technical and educational organization with members from varied disciplines who work toward the WEF vision of preservation and enhancement of the global water environment. The WEF network includes more than 100,000 water quality professionals from 76 Member Associations in 30 countries.

The Water Environment Research Foundation (WERF), established in 1989 by WEF, is a subscriber-supported, not-for-profit organization seeking to address the scientific and technological research needs of the water quality field. Additional information is available at www.werf.org.

WERF's research effort falls into one of six main topics as follows: Conveyance Systems, Infrastructure Management, Solids Treatment, Residuals and Reuse, Stormwater, Wastewater Treatment and Reuse, Watershed Management and Water Quality.

By subscribing to WERF, Toronto Water has been able to stay at the forefront of technology. The research projects sponsored by the Foundation involve technical experts and utilities from all over the world. The scope and depth of work provided by WERF is beyond the means of any local utility. It is appropriate for Toronto Water to continue to subscribe to WERF.

Wastewater utility subscribers make annual payments proportionate to the volume of wastewater they treat. The City of Toronto treats wastewater flows in excess of 320 million gallons per day and the subscription rate for 2006 was \$108,600.00. WERF subscriptions are normally paid in US dollars however; WERF has agreed that Toronto's subscription may be paid in Canadian dollars at par. The contributions for years 2007 through 2009 are estimated at a yearly increase of approximately 3 per cent as follows: up to \$111,800 for 2007, up to \$115,200 for 2008, up to \$118,600 for 2009, and up to \$122,200 for 2010.

Ontario Water Works Research Consortium

Formed in 2000, the Ontario Water Works Research Consortium (OWWRC) was created to link member utilities to government and university researchers and to facilitate the completion of research that is of value to the member communities. It has proven to be an effective model for cooperative research, bringing together municipalities that draw drinking water from Lake Ontario with federal government, provincial government and university researchers. OWWRC aims to assist member utilities with decision-making on process control options, the management of various taste and odour events and communicating water quality issues to drinking water customers. Additional information on OWWRC is available at www.owwrc.com.

The western basin of Lake Ontario is the source of drinking water for millions of Ontarians. In 1998 and 1999, residents of this region including the City of Toronto were impacted by prolonged and intense taste and odour episodes in their drinking water. Municipalities responded by initiating and funding intensive research into the cause and control of taste and odour events including investing millions of dollars in control technologies at water treatment plants.

Since its inception, the OWWRC has evolved and is focusing more on long-term, proactive and strategic protection of Lake Ontario as a drinking water source. The first change transformed the taste and odour research project into a Source Water Protection Research project. This ensures that critical data is collected and analyzed over the long-term thereby providing a better understanding of Lake Ontario as a drinking water source.

The second change involved expanding the membership to include a wider collaboration of source water protection stakeholders. This collaborative effort now includes

municipalities from Niagara Region to Prince Edward County as well as the various Conservation Authorities and a wider range of scientists and consultants. In 2006, Phase 1 of the "Collaborative Study to Protect Lake Ontario Drinking Water" was initiated. This research is directly funded through the Ministry of Environment's Source Protection Technical Studies Grant Program in support of the *Clean Water Act*. Phase 1 includes a detailed analysis of existing information, identification of hazards and threats and preliminary delineation of Intake Protection Zones (IPZs) for all the Ontario municipal water intakes on Lake Ontario.

Toronto Water's participation and support has been vital to the OWWRC. Participation in these research projects will directly contribute to fulfilling regulatory requirements to complete a source water protection plan for the City. Toronto Water's contribution to the OWWRC is up to \$25,000 per year for the years 2007, 2008, 2009 and 2010.

Research Chair in Water Treatment at the University of Waterloo

The Research Chair in Water Treatment at the University of Waterloo was set up through funding from the Natural Sciences and Engineering Research Council (NSERC) of Canada. Through this Chair, the University of Waterloo conducts leading-edge research in critical issues related to drinking water supply and also carries out knowledge and information transfer to partners and to the broader drinking water community. Additional information on the Chair in Water Treatment is available at:

<http://www.civil.uwaterloo.ca/watertreatment/>.

In 2003, the City of Toronto became a major partner with the Research Chair in Water Treatment with a five-year commitment. One of the principal benefits of participating as a major partner is that research will be conducted on an ongoing basis within facilities owned by the partners. These projects, defined together with Toronto Water staff, allow for research work to be completed that addresses the specific priorities of the City. For example, through a partnership project with the Chair, Toronto Water has been researching the effectiveness of the granular activated carbon (GAC) filters used to treat taste & odour events for future replacement. Information from this research project will be used to decide on replacing the GAC or changing to other control technologies.

Toronto Water has benefitted from past involvement with the Chair and is seeking to renew support for another 5 year period from January 1, 2008 to December 31, 2012. Annual contributions of \$50,000 per year (until 2012) will be required.

Other Research

From time to time, Toronto Water needs to investigate water related issues that are time sensitive and may require answers by conducting research under site specific conditions. One such example is the pilot research on application of ultra-violet (UV) oxidation for controlling taste and odours. The research project was managed by CH2M Hill Canada Ltd. with the objective of developing some site specific design parameters for this technology at the City's water treatment plants using Lake Ontario water. Contributions

for such special research projects are not expected to exceed \$50,000 per year and will only be made to the research agency following approval by the General Manager of Toronto Water.

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