

**Minutes - Standing Committee on Fiscal Issues - November 8, 2005**

**REPORTS**

**Minute No. 4            North End Water Pollution Control Centre Centrate Treatment  
Financial Status Report No. 4 for the period from May 1, 2005 to  
August 31, 2005  
File WS-7.1**

**STANDING COMMITTEE DECISION:**

The Standing Committee on Fiscal Issues concurred in the administrative recommendation and received the report as information.

**Minutes - Standing Committee on Fiscal Issues - November 8, 2005**

DECISION MAKING HISTORY:

Moved by Councillor Pagtakhan,

That the administrative recommendation be concurred in.

Carried

**RE: NORTH END WATER POLLUTION CONTROL CENTRE (NEWPCC)  
CENTRATE TREATMENT FINANCIAL STATUS REPORT NO. 4  
FOR THE PERIOD FROM MAY 1, 2005 TO AUGUST 31, 2005**

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**FOR SUBMISSION TO:** The Standing Committee on Fiscal Issues

**ORIGINAL REPORT SIGNED BY:** The Director of the Water and Waste Department

**REPORT DATE:** October 31, 2005

**RECOMMENDATION(S):** That this report be received as information.

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**REPORT SUMMARY**

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**KEY ISSUES:**

- Implementation of a Centrate Treatment Facility (CTF) at the NEWPCC is required to meet the Environment Act Licence No. 2684R issued on August 17, 2005.
- Additional funding may be required due to project scope definition being at a conceptual design level. The anticipated active construction market conditions in 2006 and beyond may also contribute to cost escalation. The need for a budget adjustment will be reviewed after completion of functional design at the end of October 2005 at which time a higher level of confidence cost estimate will be developed.
- Completion of commissioning of the phosphorus removal component of the facility is expected to be October 2006. Completion of commissioning of the nitrogen removal component of the facility is expected to be November 2007.

**IMPLICATIONS OF THE RECOMMENDATION(S):**

**General Implications**

- None  
 For the organization overall and/or for other departments  
 For the community and/or organizations external to the City of Winnipeg  
 Involves a multi-year contract  
Comment(s):

**Policy Implications**

- No  
 Yes - Comment(s):

**Environmental Implications**

- None

Yes - Comment(s): Reduction of nitrogen and phosphorus at the NEWPCC in the centrate sidestream, in concert with nutrient reduction at the WEPCC, will meet the interim nutrient reduction targets established for Lake Winnipeg by the Province in February 2003.

### Human Resources Implications

No  
 Yes - Comment(s): Additional staff will be required to maintain and operate the new facility.

### Financial Implications

Within approved current and/or capital budget  
 Current and/or capital budget adjustment required.  
Comment(s): Preliminary indications are that there may be a shortfall in 2006 funding requirements due to a contingency allowance requirement identified by the risk management consultant. This estimated shortfall of approximately \$5.85 million will be reevaluated after completion of the functional design phase in October 2005.

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## **REPORT**

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### **REASON FOR THE REPORT:**

At its meeting held on December 16, 1999, City Council adopted a policy whereby all Capital projects with a total estimated cost of \$10 million or more be submitted by the associated Civic Department to the Standing Committee on Fiscal Issues for review and recommendation prior to any bid solicitation being issued.

### **HISTORY:**

- 2003 In March, Council adopted the 2003 Capital Budget including an amount of \$1,000,000. for the NEWPCC Centrate Treatment Project (ammonia reduction only).
- 2003 In December, Council adopted the 2004 Capital Budget including an amount of \$9,946,000. for the NEWPCC Centrate Treatment Project (ammonia reduction only).
- 2003/4 On December 10, February 2 and February 24, meetings were held between the City and the Province to discuss plans for wastewater system improvements.
- 2004 On October 12, the Standing Policy Committee on Fiscal Issues received as information Financial Status Report No.1 for the NEWPCC Centrate Treatment Project.
- 2004 On December 13, Council adopted the 2005 Capital Budget including an amount of \$15,000,000 for the NEWPCC Centrate Treatment Facility.
- 2005 On February 8, the Standing Policy Committee on Fiscal Issues received as information Financial Status Report No.2 for the NEWPCC Centrate Treatment Project.
- 2005 On June 14, the Standing Committee on Fiscal Issues received as information Financial Status Report No. 3 for the NEWPCC Centrate Treatment Facility.

### **DISCUSSION:**

#### **1.0 INTRODUCTION**

Administrative policy for projects with a Capital cost exceeding \$10 million requires formation of Major Project Steering Committee. The Committee has been formed and its members are:

Barry D. MacBride - Director and Chair  
Mike Ruta - Corporate Controller – Alternate: Jason Ruby  
Bill Larkin - Director of Public Works  
Harry Finnigan - Director of Planning, Property and Development – Alternate: Ian Mckay

The Major Project Steering Committee has reviewed this report and recommended that the report be sent to the Fiscal Issues Committee.

## **2.0 SCOPE MANAGEMENT**

### **2.1 General**

Manitoba Conservation has established interim nutrient reduction targets of 13% nitrogen (N) and 10% phosphorous (P) for City discharges by the end of 2006 to protect Lake Winnipeg. These interim targets will be accomplished through the implementation of full biological nutrient reduction at the WEWPCC and significant nutrient reductions in the centrate sidestream at the NEWPCC. Manitoba Conservation issued Environment Act Licence No. 2684R on August 17, 2005 outlining effluent discharge requirements as well as the specifications, terms and conditions for the alteration and operation of the NEWPCC.

Licence No. 2684R stipulates that on or after December 31, 2006 centrate from the Centrate Treatment Facility effluent shall contain less than 119 kilograms per day of total phosphorus and the process shall remove no less than 838 kilograms per day of total nitrogen, both as determined by the thirty-day rolling average.

ETC commenced preliminary studies and conceptual design in July 2004. In January 2005 ETC issued a draft report recommending that two separate processes be used for the NEWPCC centrate treatment, namely chemical precipitation for phosphorus removal and biological oxidation for nitrogen.

#### **2.1.1 Phosphorous (P) Removal**

P removal will involve a chemical reaction process where a metal salt (ferric chloride or alum) is added to the digested sludge prior to dewatering to precipitate elemental phosphorus into a solid form. The solid phosphorus will then become part of the bio-solid cake after dewatering.

Full-scale pilot testing of the chemical precipitation process for phosphorus removal began on April 25, 2005 and was completed in May 2005.

Functional design of the P removal system is near completion. Detailed design is underway for the selected P removal system.

### **2.1.2 Nitrogen (N) Removal**

N removal from the centrate side stream will involve a biological oxidation process in a sequencing batch reactor. Centrate treatment using this process is not only a completely new treatment process for the City of Winnipeg, but also a treatment process relatively uncommon in North America. For scope management and quality management reasons a panel of experts, referred to as the Independent Review Team or IRT, was retained in May 2005 by the City to provide a second opinion on the recommended treatment processes prior to ETC commencing functional/detail design. Evaluation of an alternative operational strategy recommended by the IRT resulted in an improvement in the preferred alternative process, by combining two processes within one tank.

## **2.2 Sequential Multi-Contract Project Delivery Model**

Manitoba Conservation Environment Act Licence No. 2684R dated August 17, 2005 stipulates commissioning of the Centrate Treatment Facility on or before December 31, 2006 to remove phosphorus and nitrogen in approximate quantities identified earlier.

This represents a very tight time-line to implement these complex projects and requires that the City take measures to reduce equipment supply and installation activity durations.

As the different nutrients are being removed using different processes in different locations at the NEWPCC, it is anticipated that separate contracts will be issued for each process. Further, in that some process equipment has long delivery times and characteristics of this selected equipment affect the design of other components, it is anticipated that separate equipment procurement contracts will be issued.

Specific contract package details are being developed in the functional and detailed design phases. More information on contract packages will be provided in the next report.

## **3.0 QUALITY MANAGEMENT**

Several activities have been undertaken to ensure project quality. These include the following:

- In May 2005 the City retained the services of an Independent Review Team, made up of industry experts, for the independent review of the proposed NEWPCC Centrate Treatment processes.
- Pilot testing, in the form of full-scale chemical dosing trials for phosphorus removal from centrate, was conducted in April-May, 2005. Based on this pilot

testing, approximate chemical dosages under actual plant operating conditions have been determined.

- ETC retained the services of a Code Specialist to assist in interpretation of new Code guidelines pertaining to Electrical and HVAC systems in Aggressive Environments.
- Regular meetings of the City of Winnipeg, Water and Waste Department Technical Advisory Committee (TAC) made up of Senior Operations, Planning, Laboratory and Engineering personnel were convened to review the project process and progress and provide technical advice.
- Development of Contract Administration manual to establish protocols, lines of communication and reporting structures, contract documentation and filing.

#### 4.0 TIME (SCHEDULE) MANAGEMENT

Based on project activity information shown in ETC's August 23, 2005 schedule update, updated schedule information is summarized in the table below:

Description	Starting Date	Completion Date
<b>Phosphorus Removal (equipment in existing facility)</b>		
Preliminary/Conceptual design	July 2004	September 2005*
Risk assessment workshop	January 2005	February 2005
Independent review team	May 2005	August 2005
Functional/Detailed design	June 2005	February 2006
Tender and award	November 2005	February 2006
Facility construction	February 2006	September 2006
Commissioning	September 2006	October 2006
<b>Nitrogen Removal (CTF)</b>		
Preliminary/Conceptual design	July 2004	September 2005*
Risk assessment workshop	January 2005	February 2005
Independent review team	May 2005	August 2005
Functional/Detailed design	August 2005	July 2006
Tender and award	March 2006	July 2006
Facility construction	July 2006	July 2007
Commissioning	July 2007	November 2007

\* The completion dates of the phosphorus and nitrogen removal preliminary/conceptual/functional design components were subject to the results of the independent review process which was completed in August 2005.

Manitoba Conservation Licence 2684R requires the Centrate Treatment facility commissioning to be complete by December 31, 2006.

The Water and Waste Department will be dialoguing with the province with regards to the licencing dates.

ETC's current schedule shows a November 2007 completion date for the N removal system. Mitigation measures currently being utilized include:

- IRT review of construction schedule
- Risk Consultant review of construction schedule (discussed in later section)
- Risk register (discussed in later section lists schedule risk items and assigns individual responsibility
- Construction Management contract strategy, to accelerate portions of the Work that can be accelerated or removed from the critical path of the project
- More involved consultation with construction industry experts than usual, is being considered, for advice on other mitigation/acceleration measures that can be used in the contract strategy
- Weekly progress meetings for design/construction
- Ongoing monitoring and quick response to identified schedule risks/opportunities
- Additional Project Management Branch staff added to focus on critical project schedules

## **5.0 COMMUNICATIONS MANAGEMENT**

To promote internal project communications between the City and the Consultant, the following has been, or is being, done:

- Weekly project management coordination meetings, attended by ETC and City project management personnel, are held and minuted by ETC.

## **6.0 RISK MANAGEMENT**

CSC Project Management Services was contracted in February 2005 to conduct an integrated cost and schedule risk review and analysis of the NEWPCC Centrate Treatment Facility. A preliminary results package was provided on February 28<sup>th</sup>, 2005. The risk analysis was updated on April 29<sup>th</sup>, 2005 and again on September 2, 2005 based on cost estimates and project schedules provided by Earth Tech.

### **6.1 Cost Risks**

The overall project risk profile has remained essentially unchanged from the February 2005 analysis with some elimination of scope uncertainty through the IRT review. However this cost estimate has been revised to include escalation and this results in a projected cost of \$31,800,000. This amount includes a risk contingency allowance of \$2,691,000. A better definition of project costs is expected after the functional design stage is completed in October 2005.

## 6.2 Schedule risks

The September 2005 schedule risk analysis indicates expected completion dates are October 2006 for the phosphorus removal facility and January 2008 for the nitrogen removal facilities. While the expected completion date for the phosphorus removal project has not changed, the expected completion date for the nitrogen removal project has been extended by approximately 6 months from the expected completion date identified in the risk consultant's February 2005 analysis. The delay in the nitrogen removal facilities was caused by the delay in initiating and completing the IRT review process and will be further driven by the duration of construction activities, process acclimatization and equipment commissioning. While the risk consultant's expected completion for the phosphorus removal project agrees favorably with ETC's, CSC's expected completion date for the nitrogen project is approximately 2 months later.

## 6.3 Mitigation

Mitigation strategies will be developed to reduce delays in completing the project. A contracting strategy will be developed which will include pre-purchasing specialized process equipment and specifying completion dates for key components of the project. The phosphorus removal facility is scheduled to be tendered in November 2005.

The Risk Register completed by the Project team to identify specific actions, accountable parties, and target completion dates has recently been reviewed and updated. This will ensure that the risks are being managed and cleared and will identify any new risk items and appropriate action steps required.

## 7.0 COST MANAGEMENT

### 7.1 Cost Estimate Summary

Description	Previous Estimate (\$000's)	Current Estimate (\$000's)
Preliminary/Conceptual Design	\$ 608	\$ 222
Functional/Detailed Design	\$ 1,215	\$ 1,700
Contract Administration	\$ 1,200	\$ 1,763
Risk Assessment	\$ 4,610	\$ 2,691
P-Removal Facility		\$ 2,452
N-Removal Facility		\$ 22,972
Total Facility Construction	\$ 23,166	\$ 28,115
Total Cost	\$ 30,799	\$ 31,800

The total cost of \$31,800,000 is the Risk Manager's capital estimate and is based on a 90% probability that the project will come in under this amount. The most recent estimate received from ETC is \$29,109,000. We expect greater confidence in the cost estimate once the functional design is completed at the end of October 2005.

## 7.2 Budget Summary

Capital Budget Requirements (in \$000's) for NEWPCC Centrate Treatment Project

Year	Authorized Capital	Actual + Projected Cashflows	Cumulative Capital Budget Remaining
2003	\$ 1,000	\$ -	\$ 1,000
2004	\$ 9,946	\$ 164	\$ 10,782
2005	\$ 15,000	\$ 1,083	\$ 24,699
2006		\$ 14,575	\$ 10,124
2007		\$ 15,918	\$ (5,794)
2008		\$ 60	\$ (5,854)
Total	\$ 25,946	\$ 31,800	\$ (5,854)

### Notes:

1. Additional financial information is provided in Appendix 1.
2. Includes Risk Assessment Contingency Allowance which will be reevaluated in late October 2005.
3. The Water and Waste Department plans on transferring funds from the NEWPCC Disinfection project fund and other surplus cash flow forecasted funds to make up the estimated shortfall.

### Canada Strategic Infrastructure Funding

On March 19, 2004, the City, Provincial and Federal governments announced an Agreement in principle to provide strategic infrastructure funding for three key Winnipeg priorities including improvements to the City's wastewater treatment system.

The Water and Waste Department has provided all necessary information to Infrastructure Canada for financial support under the Canadian Strategic Infrastructure Fund for this project, and other related wastewater improvement projects in January, April and August 2005, and is awaiting ministerial approval. To date no approvals have been received, therefore the Department may need to delay tendering of the major contracts of this project until ministerial approval is obtained or risk losing Federal funding. This would result in additional delay to the completion date of this project.

The Water and Waste Department plans on transferring funds from the NEWPCC Disinfection project fund and other surplus cash flow funds to make up the estimated shortfall.



**CENTRATE TREATMENT - NEWPCC  
WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION  
APPENDIX 1**

**As at August 31, 2005**

Components	COSTS					PROJECTED COSTS TO COMPLETE				TOTAL	VARIANCE	NOTE		
	Total Budgeted Costs	Approved* Budget To Date	Costs Incurred up to last report	Costs submitted this report	Total Costs Incurred to Date (per G/L) 31-Aug-05	2005	2006	2007	2008	Total Costs Remaining to Complete	Total Project Cost	Variance from Budget ( Unfavourable )		
<b>ENGINEERING</b>														
A) PRELIMINARY/CONCEPTUAL DESIGN	222,000	365,000	172,230	-	172,230	49,770				49,770	222,000	143,000	3.1	4.1
B) FUNCTIONAL/DETAILED DESIGN	1,700,000	1,215,000	1,250	83,293	84,543	940,457	675,000			1,615,457	1,700,000	(485,000)		4.2
C) CONTRACT ADMIN/COMMISSIONING	1,763,000	1,200,000	-	-	-	-	675,000	1,028,000	60,000	1,763,000	1,763,000	(563,000)		4.3
<b>Total Engineering</b>	<b>3,685,000</b>	<b>2,780,000</b>	<b>173,480</b>	<b>83,293</b>	<b>256,773</b>	<b>990,227</b>	<b>1,350,000</b>	<b>1,028,000</b>	<b>60,000</b>	<b>3,428,227</b>	<b>3,685,000</b>	<b>(905,000)</b>		4.4
<b>FACILITIES CONSTRUCTION</b>														
A) BUILDING CONSTRUCTION														
P-Removal Facility	2,452,000						2,452,000			2,452,000	2,452,000			4.5
N-Removal Facility	22,972,000						9,082,000	13,890,000		22,972,000	22,972,000			4.6
Risk assessment contingency	2,691,000	0					1,691,000	1,000,000		2,691,000	2,691,000	(2,691,000)	3.2	4.7
<b>Total Facilities Construction</b>	<b>28,115,000</b>	<b>23,166,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13,225,000</b>	<b>14,890,000</b>	<b>-</b>	<b>28,115,000</b>	<b>28,115,000</b>	<b>(4,949,000)</b>		4.8
<b>Total</b>	<b>31,800,000</b>	<b>25,946,000</b>	<b>173,480</b>	<b>83,293</b>	<b>256,773</b>	<b>990,227</b>	<b>14,575,000</b>	<b>15,918,000</b>	<b>60,000</b>	<b>31,543,227</b>	<b>31,800,000</b>	<b>(5,854,000)</b>	3.3	4.9

Percentage Complete

1%

**CENTRATE TREATMENT - NEWPCC  
WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION  
APPENDIX 1  
As at August 31, 2005**

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\*Council approval provided for total budget of \$25.946 Million. Distribution of costs to project activities done by Water and Waste Department.

Notes:	Date	Amount
3.1- Revised to reflect additional activities.	4/30/2005	(\$242,628)
3.2 -Risk assesment contingency less \$242,628 identified in 3.1. This amount will vary throughout the project.	4/30/2005	(\$4,610,372)
3.3 -A risk assessment indicates an increase to the project contingency allowance may be required. This will not be determined until functional design is completed in October 2005, at which time capital budget revisions may be requested.	4/30/2005	(\$4,853,000)

\*Council approval provided for total budget of \$25.946 Million. Distribution of costs to project activities done by Water and Waste Department.

Notes:	Date	Amount
4.1 - Variance: Revised estimated cost of Preliminary Design (Conceptual) (365,000-222,000)	31/08/2005	143,000
4.2 - Variance: Revised estimated cost of Functional/Detailed Design (1,215,000-1,700,000)	31/08/2005	(485,000)
4.3 - Variance: Revised estimated cost of Contract Admin/Commissioning (1,200,000-1,763,000)	31/08/2005	(563,000)
4.4 - Variance: Revised estimated cost of Total Engineering (2,780,000-3,685,000)	31/08/2005	(905,000)
4.5 - Variance: Estimated cost of P Removal Facility (0-2,452,000)	31/08/2005	(2,452,000)
4.6 - Variance: Estimated cost of N Removal Facility (0-22,972,000)	31/08/2005	(22,972,000)
4.7 - Variance: Revised risk assessment contingency amount (0-2,691,000)	31/08/2005	(2,691,000)
4.8 - Variance: Revised estimated cost of Total Facilities Construction (23,166,000-28,115,000)	31/08/2005	(4,949,000)
4.9 - Variance Projected budget shortfall (25,946,000-31,800,000)	31/08/2005	(5,854,000)