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DUFFIN CREEK WATER POLLUTION CONTROL PLANT OPTIMIZATION UPGRADES PROJECT BUDGET INCREASE REQUEST PROJECT 79870 AND 79850

The Transportation and Works Committee recommends the adoption of the recommendations contained in the following report, April 22, 2005, from the Commissioner of Transportation and Works:

1. RECOMMENDATIONS

It is recommended that:

1. Regional Council concur with the major repair work to the incinerator No. 1 at the Duffin Creek WPCP.

2. The contract with Ontario Clean Water Agency (OCWA), (Purchase Order B7589) associated with Construction Contracts for Liquid Upgrades L1 and Solids Upgrades S2, be increased from $49,283,553.00 to $57,783.553.00, excluding GST.

3. The contract with OCWA, (Purchase Order B7517), associated with design and contract administration fees for Solids Upgrades, be increased from $2,327,871 to $3,302,871, excluding GST.

4. The contract (Purchase Order P-01-64) associated with OCWA Project Management fees, be increased from $700,300 to $875,300, excluding GST.

2. PURPOSE

This report recommends the increase of the current purchase orders associated with the on-going solids optimization and upgrade project at the Duffin Creek Water Pollution Control Plant (WPCP). The increases are required to facilitate unanticipated major repair work to incinerator No. 1. The change order to undertake the work is required on an urgent basis to enable the Ontario Clean Water Agency to initiate the work as soon as possible.

3. BACKGROUND

The Duffin Creek WPCP provides treatment for sewage flows from the Regional Municipalities of York and Durham. Currently, approximately eighty percent (80%) of the flow at the plant originates from The Regional Municipality of York (York Region), and the plant is jointly owned by the two Regions.

Presently, the average daily flow to the plant is 350 Mega-Litres per Day (MLD), with the current rated capacity as defined in the Certificate of Approvals, issued by the Ministry of the Environment (MOE) as 364 MLD. The Regions initiated optimization projects in 2002 to increase the liquids treatment capacity to 420 MLD and in conjunction, to increase the solids treatment disposal capacity.

On behalf of both Regions, OCWA were contracted to provide the following services:

- Project management services for the entire project.
- Directly retain and oversee engineering consultants to provide design and construction administration services.
- Directly contract with construction contractors to provide construction services for the liquids and solids capacity upgrades.

Four purchase orders have been issued to OCWA to carry out the above mentioned services and cover the engineering and construction costs. Increases are required to the three purchase orders to undertake additional remedial work to the incineration facility, as described in the subsequent sections.

3.1 Purchase Order B7589

This purchase order pays OCWA to defray the cost to construct the works at the plant in three contracts as follows:

- L1 – Liquid treatment upgrades valued at $28,872,000.
- S1 – Solids treatment upgrades valued at $700,000.
- S2 – Solids treatment upgrades valued at $18,744,000.

To date, Contract S1 has been completed and Contracts L1 and S2 are ongoing. It is anticipated L1 will be completed and fully commissioned before May 2005. Purchase Order B7589 was issued to cover the complete cost of all these contracts.

3.1.1 Contract S2

The Duffin Creek WPCP has two sludge incinerators (Nos. 1 and 2) that have been in service since the late 1970's. Contract S2 involves remedial work to both incinerator trains and replacing some ancillary equipment in order to operate the incinerators consistently at the rated capacity. Historically, the incinerators have been unable to operate consistently above 75% of their rated capacity.

In early October 2003, incinerator No. 2 was taken out of service to undertake the remedial work. An inspection revealed a number of additional serious deficiencies requiring an increase to the contract value at that time. The remedial work on incinerator No. 2 is almost complete with the refurbished incinerator ready for start-up during the spring of 2005.

In anticipation of the upcoming commissioning of incinerator No. 2, and the removal from service of incinerator No. 1, a thorough inspection of incinerator No. 1 and its associated equipment has been performed. This inspection has revealed serious defects that are worse than the defects found in incinerator No. 2. In addition to the scope of work that was to be carried out under the original terms of contract S2, the following additional work has now been identified for incinerator No. 1:

- The steel roof of the incinerator has experienced severe corrosion and subsequent erosion of the material. Many sections are down to less than 25% of the original material thickness. This requires the roof to be completely replaced. This will also require the ancillary equipment now located on the roof to be removed and re-installed.

- Downstream of the incinerator, extremely hot exhaust gases at temperatures greater than 750 degrees Celsius, are used to heat the incoming air through a heat exchanger. This heat exchanger has also experienced severe corrosion and erosion. Inspections have shown that this unit can not be successfully repaired, and as such, the complete heat exchanger unit must be replaced.

- After the heat exchanger, the remaining heat in the exhaust gas is recovered through a waste heat recovery boiler. The steam generated in this boiler is used to provide heating systems required elsewhere in the plant. The exterior of this boiler has been repaired on numerous occasions, however, internally, some structural members have failed through corrosion and erosion. This equipment cannot be repaired and must be replaced.

- To absorb the large thermal expansions and contractions generated by the immense heat, there are flexible expansion joints in the ductwork. These too have suffered serious corrosion and erosion and need to be replaced.

- In addition to the above, numerous appurtenant equipment required to make the system work also needs to be replaced.

In accordance with the Facilitation Agreement between OCWA, York Region and Durham Region, OCWA has retained the consultants and contractors to complete the works. Under this arrangement, OCWA is required to pay the consultants and the contractors prior to reimbursement by the two Regions. To compensate OCWA for the carrying charges, it was agreed that the two Regions would pay financing charges for each payment for a period of 30 days.

3.2 Purchase Order B7517

This purchase order pays OCWA to defray the engineering costs including construction administration for the construction contracts (S1, S2 and S3) that are related to the solids handling and disposal at the plant.

3.2.1 Contract S2

Additional fees of $975,000 will be required to cover the engineering tasks associated with the additional work and the replacement of additional equipment on incinerator No. 1. Additional contract administration fees will also be required for the additional work, and is included in the amount shown above.

3.3 Proposal P-01-64 Ontario Clean Water Agency Project Management Fees

This purchase order pays OCWA for project management fees. Additional fees of $175,000.00 are required for additional project management services associated with the additional work described above.

4. ANALYSIS AND OPTIONS

During the restoration and refurbishing of incinerator train No. 2, incinerator No. 1 is operated at a capacity about 70 dry tonnes per day. Approximately 85 dry tonnes of biosolids is generated every day. As such, the remaining 15 dry tonnes (60 wet tonnes) of biosolids per day are disposed of by trucking to a landfill site in Michigan at a cost of $100 per wet tonne.

A separate project to design and install two new incinerators to provide “firm” capacity for current and future biosolids production is underway, with the consulting engineering services to be initiated in May 2005. As part of this project, it was intended to replace the existing two new incinerators, one at a time after the two new incinerators are operational. This would provide the Regions with firm capacity to treat biosolids on-site for the next 25 years.

To meet the treatment needs until the two new units are operational, there are two alternatives as follows:

- Perform all the remedial work on incinerator train No. 1 now. This would require the engineering services for the design and pre-selection of the major pieces of equipment to commence immediately. It is estimated that the design, supply, delivery and installation would take place over a period of 18 months. During this period, incinerator No. 2 would be operating with any excess biosolids trucked to Michigan. Once upgraded, incinerator train No. 1 is expected to provide reliable operation for a further 15 to 20 years.

- Defer remedial work and include in the new contract for the plant expansion and continue to truck the excess biosolids to Michigan. This alternative delays the availability of additional biosolids disposal capacity until the first of the new incinerators is commissioned in mid-2009. During this four-year period, the excess biosolids would need to be trucked to Michigan for disposal. This would place an

undue operational strain on incinerator No. 2. Under this scenario, if shut-down maintenance was required then all biosolids produced will need to be trucked to Michigan. Significant trucking costs would result during periods of shutdowns. As such, this alternative is not the most cost-efficient option.

5. FINANCIAL IMPLICATIONS

The estimated costs for the remedial work is broken down in Table 1 as follows:

Table 1
Additional Cost of Remedial Work

Description of Expenditure	Estimated Cost
Roof Replacement of Reactor 1	$740,000
Supply and Installation of Waste Heat Boiler	3,500,000
Supply and Installation of Heat Exchanger	3,250,000
Supply and Installation of Expansion Joints	190,000
Other Work Presently Identified and Required (Turbine repair, New feed ports, cabling replace, etc.)	650,000
Contingency	250,000
Engineering Fees	975,000
OCWA Project Management Fees	175,000
OCWA Interim Financing	27,500
TOTAL ADDITIONAL COST	**$9,757,500**
Estimated Trucking Costs during Construction Period (Cost per wet tonne = $100) x 60 wet tonnes/day) = $6000 Number of days worked (6 days / week for 18 months) = 468	
TOTAL TRUCKING COST ($6000 x 468 days) =	**$2,808,000**

Table 2
Purchase Orders - Summary

Purchase Orders	Current Value	Recommended Increase	Revised Value
PO B7589	$49,283,553	$8,607,500	$57,891,053
PO 7517	2,327,871	975,000	3,302,871
P-01-64	700,300	175,000	875,300
TOTAL (excluding GST)	**$52,311,724**	**$9,757,500**	**$62,069,224**

The trucking costs of $2,808,000 have already been accounted for in the annual operational budget of the WPCP approved by the York Durham Sewage System Management Committee.

The York Durham Sewage System Management Committee have reviewed, discussed and approved the requirements for this work and the associated costs. As per the current cost sharing agreement for these projects, York Region's share is $7,728,000 and Durham's share is $2,029,500. The 10 year Wastewater Capital Plan for 2005 includes $13,000,000 for plant maintenance projects under the project titled "79850 YDSS Duffin Creek Upgrade." This amount is sufficient to cover the expenditures in 2005 associated with the additional work on incinerator No. 1 and other maintenance work planned in 2005 including the sludge haulage and disposal costs provided in Table 1.

5. LOCAL MUNICIPAL IMPACT

To maximize the available current treatment and biosolids disposal capacity at the Duffin Creek WPCP, the above described work must be completed in a timely manner. This project is considered critical to minimizing sludge haulage costs at the Duffin Creek WPCP over the next five years.

6. CONCLUSION

The immediate upgrade, restoration and replacement of the incineration and heat recovery equipment of train No. 1, provides the Regions with the most cost-effective approach to disposal of the biosolids produced at the Duffin Creek WPCP.

The Senior Management Group has reviewed this report.