
CITY OF KELOWNA

MEMORANDUM

Date: September 9, 2003
File No.: 5350-01
To: City Manager
From: Wastewater Manager
Subject: Partnership with OUC on re-use of the WWTF effluent

RECOMMENDATION :

That the Mayor and City Clerk be authorized to execute an Agreement with the Okanagan University College to allow OUC to connect to the Wastewater Treatment Facility effluent pipe and re-use the treated effluent for heat recovery and re-use for their KLO facilities.

BACKGROUND :

The City of Kelowna Wastewater Utility operates a tertiary Treatment Facility on Raymer Ave., immediately adjacent to the Okanagan University College KLO Campus. The effluent from the Facility is almost drinking water quality, and flows through a pipe that crosses the west side of the OUC Campus.

Last year, staff from OUC contacted the Wastewater Manager and initiated discussions on the re-use of the effluent to create energy savings and provide environmental benefits. It was determined that there were some exciting opportunities to explore. OUC engaged a Consultant to investigate the feasibility and cost effectiveness of re-using the effluent and found promising results. It was determined that if some of the effluent is transferred through a heat pump, allowing a portion of the inherent heat in the effluent to be extracted, that the heat can be used for heating the buildings at the OUC KLO Campus. This is possible since OUC has a central heating system. The buildings on the WWTF site are heated independently using natural gas, thereby minimizing the cost effectiveness of using the same system for our buildings.

A memorandum and executive summary from OUC regarding the proposed project are attached. The basis of the agreement, a copy of which is attached, will be that OUC is responsible for all costs of the proposed work, and will take any necessary steps to protect the City's infrastructure. The work must be done without any detrimental effect on the operation of the City Treatment facility. One limitation to the City, that may be a result of this agreement, is that OUC will have an expectation of utilizing all our effluent for heat recovery and this may limit our ability to supply effluent to other potential users for irrigation, as recommended in our Wastewater Management Plan.

The Wastewater Utility always strives to use innovation and technology to improve the living conditions and environment for our residents. This project will assist OUC, our neighbour, by reducing their operating costs, and will benefit the environment by reducing the temperature of the Plant effluent and improve the impact on fish near the discharge.

W.J. Berry, P.Eng.
Wastewater Manager

John Vos
Director of Works & Utilities

Attachment.



Memorandum

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TO: Bill Berry, P. Eng.
Wastewater Utility Manager

FROM: Aidan E. Kiernan, P. Eng.

DATE: June 16, 2003

RE: OUC – City of Kelowna Energy Recovery for Clear Water Discharge

I look forward to the opportunity to address Council on this exciting project. As I advised, OUC will be carrying out a major energy retrofit on both of our Kelowna Campuses. The cost of this \$2.5 million retrofit will be met through resulting guaranteed energy savings. A major portion of the project involves reclaiming heat from the City's clear water discharge to provide a major portion of the heating energy required for the South Kelowna (KLO) Campus.

As you will see from the attached Executive Summary, this project presents an all around win-win situation for both the City of Kelowna and OUC.

I look forward to hearing from you in the near future with details of time, etc., regarding this presentation to Council.

Aidan E. Kiernan, P. Eng.
AVP, Campus Development & Facilities Management

AEK/cp

Att:

EXECUTIVE SUMMARY

Using Waste Treatment Plant Clear Water Discharge as a Heat Source TO HEAT THE OUC SOUTH CAMPUS

Utilizing the clear water discharge from the adjacent Waste Treatment Plant as a heat source will provide a positive impact to the environment, increase overall energy efficiency of the University; reduce utility related operating costs; replace older heating equipment nearing the end of their useful life.

The concept

The concept is to supply and install new heat pump chillers tied into the existing heating water distribution for the campus to act as a base load heat source. The new heat pump units will transfer heat from the existing clear water discharge into the heating distribution system. Two new high efficiency boilers will be added to supplement the heating requirements when the heat pump cannot maintain the load. Two of the existing boilers will remain as an additional back up.

How the system works:

- Step 1: Water Treatment Plant Clear Water Discharge is piped to the Heatpump Condenser located in the Central Plant of South (KLO) Campus. The Heatpump Condenser captures the heat out of the Clear Water Discharge.
- Step 2: The Heatpump Condenser Clear Water Discharge is piped back to the Water Treatment Plant Discharge at a lower water temperature.
- Step 3: Once the hot water has been used for heating it is returned as warm water to the Heatpump Evaporator located in the Central Plant.
- Step 4: The Heatpump Evaporator transfers heat from the Clear Water to the warm water making it hot. The hot water is then supplied to all the buildings of the KLO campus through the existing underground heating lines.

Project Benefits

The proposed energy efficiency measure will reduce operating costs, maintain or enhance comfort conditions within OUC, and make a positive contribution to environmental improvement by reducing the emission of pollutants. In addition, the proposed project will have an added benefit of upgrading and modernizing core heating and cooling infrastructure.

Furthermore, OUC and the City of Kelowna will be recognised as a leaders and innovators by utilizing the clear water discharge from the adjacent Waste Treatment Plant as a heat source to meet part of OUC's heating requirements. The energy conservation measure will also improve the quality of the lake Okanagan by reducing the temperature of the water discharged into the lake, with no cost to the city!

Incentives

Natural Resources Canada (NRCAN) and the Office of Energy Efficiency offer incentives for energy retrofit feasibility studies and energy retrofit implementation projects. The NRCan Energy Retrofit Assistance Incentive for the implementation of this energy conservation project is \$47,079.

Environmental Impact

One of the most pressing environmental challenges is that of climate change. The international scientific community has concluded that the rapid increase in the concentration of GHG emissions in the atmosphere can be expected to increase the earth's surface temperature, change our climate, alter our environment and endanger our health. In 1995, the Government of Canada committed to reduce GHG emissions from its operations by at least 20 percent from 1990 levels by the year 2005 under the Kyoto Protocol.

The proposed Base Project will produce multiple benefits through energy efficiency, pollution prevention, and environmental enhancement. The energy savings will result in annual reductions of greenhouse-gas emissions, thereby helping to slow down the green house effect. Carbon dioxide (CO₂) is the principal greenhouse gas. It is given off whenever carbon-based fuels are burned. The estimated Base Project annual energy savings correspond to 313 tonnes of equivalent CO₂. The CO₂ reductions are equivalent to planting 160 acres of trees or taking 64 cars off the road annually. Thus, OUC with the support of the City of Kelowna will demonstrate its commitment to support Canada's Voluntary Climate Change Challenge Initiative.

Project Estimated annual energy savings

Energy savings are based on improving the overall efficiency of heating system through new higher efficiency boiler plants and heat pump chillers and utilizing a free source of heat. The estimated savings amount to \$ 99,564 per year.