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## Department of Utilities

**To:** Chairman Joe Martin and Members of the Utilities Committee

**From:** Chris Stempa, Utilities Deputy Director

**cc:** Chris Shaw, Utilities Director

**Date:** January 8, 2014

**Re:** *Benefit-Cost analysis regarding two alternatives for the diesel generators at the Appleton Water Treatment Facility (AWTF) – Recommend Alternative 2 Modified WPPI Capacity Contract*

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### **BACKGROUND:**

The Utility Air Permitting & Emissions Control Project awarded to Short Elliott Hendrickson (S.E.H.) was approved for recommendation by Utilities Committee on June 25, 2013 then subsequently approved by Common Council on July 10<sup>th</sup>, 2013. This project was divided to represent emissions at both the water and wastewater treatment plants. For the Appleton Wastewater Treatment Plant (AWWTP) the primary task was to satisfy federal and state air pollution permitting requirements. This memo deals with the Appleton Water Treatment Facility (AWTF) project task to critically evaluate alternatives that would satisfy EPA Reciprocating Internal Combustion Engine (RICE) maximum achievable control technology (MACT) requirements for on-site emergency generators.

Since 2001, the AWTF has been engaged in a capacity program contract with Wisconsin Public Power Inc. (WPPI). The agreement provides WPPI emergency electrical power during outages. In return the Utility receives approximately \$100,000 in annual revenues. However, the existing WPPI capacity agreement sets generator operation thresholds above allowable EPA limits for this defined use (considered “non-emergency” by the generator owner or emissions source). Therefore, if generator emissions control devices are not installed, the City would risk federal non-compliance penalties and no longer be able to contract with WPPI. As the emissions project developed this year and meetings with WPPI occurred it became apparent that there could be a viable alternative to a large capital expenditure associated with installation of pollution control equipment on the generators. Out of these efforts S.E.H. was asked to conduct economic benefits and costs analysis.

**BENEFIT-COST ANALYSIS**

The limited benefit-cost analysis was considered essential to better understand not only the cost and benefits of each alternative but also potential risk(s). Three alternatives were initially considered, they are:

1. Continue operations under the current WPPI agreement, which **would** require installation of pollution control equipment.
2. Modify the WPPI agreement and restrict hours of operations, which would **not** require installation of pollution control equipment.
3. Terminate WPPI capacity program agreement, which would **not** require installation of pollution control equipment.

Alternative 3 was not pursued as part of this analysis because the annual economic return to the Utility (+\$100, 000 annually) vastly outweighed the investment to install emission control equipment. Table 1 summarizes the benefits and costs of the net present value (NPV) analysis completed by S.E.H.

Table1: Summary of Quantifiable Benefits and Costs & NPV Calculation

<b>Alternative 1 Non-Emergency Classification Install Pollution Control</b>	<b>Alternative 2 Emergency Classification Revise WPPI Contract</b>
<u>Benefits:</u> <ul style="list-style-type: none"> <li>• WPPI capacity credit at \$4/kW per month (Maximum Demand) and \$1.5/kW per month (Export Capacity)</li> </ul>	<u>Benefits:</u> <ul style="list-style-type: none"> <li>• WPPI capacity credit at \$3/kW per month (Maximum Demand) and \$1.5/kW per month (Export Capacity)</li> </ul>
<u>Costs:</u> <ul style="list-style-type: none"> <li>• Purchase and install emission control device \$187,231</li> <li>• Compliance Emission Testing of \$4,000 every three years</li> </ul>	<u>Costs:</u> <ul style="list-style-type: none"> <li>• No additional costs</li> </ul>
Net Present Value = \$670,660	Net Present Value = \$750,917

Note: Year one through four of the tested capacity and maximum demand are identical for the two alternatives. In the fifth year of the analysis period (2019) the maximum demand is reduced by 112 kW consistent with an anticipated change from membrane filtration treatment to ultraviolet (UV) treatment.

Alternative 2 requires restrictions on the hours of operation to avoid the pollution control devices. This is necessary to avoid conflict between the operations required by the WPPI agreement and federally mandated operational thresholds under RICE. This alternative also has a slightly higher net present value than Alternative 1 suggesting that it is the financially preferable alternative.

S.E.H. highlighted that the selection of an alternative should be made only after the City properly considered non-quantifiable benefits, costs, and risks. The existing WPPI agreement

requires 200 hours per year of generator engine availability. This exceeds the 100 hour per year total runtime allowance by EPA [63.6640(f)] for non-emergency generator operation.

WPPI recognizes the mutual benefit of the capacity agreement and need for facilities engaged in such contracts to be compliant with air emissions requirements. Therefore, the modified WPPI capacity agreement within Alternative 2 generously decreases the generator operational requirement from 200 hours to 50 hours per year. It also concurrently reduces the 'maximum demand' rate from \$4/kW to \$3/kW to compensate for the aforementioned operational reduction. This rate reduction would represent an annual decrease in revenue to the Utility of approximately \$14,000 at the existing tested maximum plant demand of 1,200 kW. However, this option offsets the need to install a costly emissions control device while still providing 50 hours per year for the AWTF to operate the generators for maintenance, non-emergency operation, and annual WPPI capacity program testing which ultimately preserves a significant percentage of revenue through a capacity program arrangement.

The Utility believes it can effectively and consistently satisfy the conditions of the modified WPPI agreement and be compliant with air emissions requirements. Over the past four years the AWTF generators have averaged 46 hours per year runtime. Up to 91% of those hours were precautionary operation in anticipation of potential weather related emergency operations. The Utility believes it can greatly curb by establishing defined criteria for how and when the generators are operated but yet ensuring primacy for water treatment operations and plant security. Additionally, this type of generator operation is expected to greatly decrease in the near future with the facility migrating from ultra filtration to conventional treatment processes and technology that are less energy intensive and more robust in the face of short duration power losses.

#### **RECOMMENDATION:**

Two viable alternatives were examined by S.E.H. as part of the cost-benefit analysis. The analysis identified Alternative 2 with a slightly higher net present value than Alternative 1 suggesting that it is the financially preferable alternative. The Utility recommends selection of Alternative 2 after careful consideration of non-quantifiable benefits, costs, and risks.

If you have any questions or require additional information regarding this project please contact Chris Stempa at 920-832-5945.