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PROCUREMENT OF PROGRAMMABLE LOGIC CONTROLLER HARDWARE FOR YORK REGION WATER AND WASTEWATER FACILITIES

The Environmental Services Committee recommends the adoption of the recommendations contained in the following report dated September 30, 2009, from the Commissioner of Environmental Services.

1. RECOMMENDATIONS

It is recommended that:

1. The Region enter into an agreement with Rockwell Automation Inc. for the future ongoing procurement of all required Programmable Logic Controller hardware and ancillary equipment for York Region water and wastewater facilities, for a term of five years, with an option to extend for an additional five years and shall not exceed a total amount of $2,500,000.00, excluding GST.

2. The Regional Chair and Regional Clerk be authorized to execute the necessary agreement, subject to review by Legal Services.

2. PURPOSE

The purpose of this report is to obtain Council authorization to procure Programmable Logic Controller (PLC) hardware and ancillary equipment from a single specified manufacturer for Regional water and wastewater facilities for a term of five years with an option to extend for an additional five years.

The Purchasing By-law requires Council authorization for the sole source purchase of any goods or services if the total cost exceeds $100,000 or where the term of a contract is longer than three years. In this instance, the estimated total aggregate value of purchases that will be made under this proposed agreement is $2,500,000 and the term of the proposed agreement is in excess of the three-year limit.

3. BACKGROUND

SCADA is used to monitor and control the Region's water and wastewater system and collects data to optimize the system and meet regulatory requirements

The Region's overall water and wastewater system consists of 144 discrete facilities including water treatment plants, water pollution control plants, water reservoirs, and pumping stations. The integrated operation of this entire system is controlled using a computerized Supervisory Control and Data Acquisition (SCADA) system.

The SCADA system allows real-time automatic and remote manual control of individual components such as valves, pumps, motors, generators etc. within these facilities from one central location. The SCADA system also collects and stores data from each facility used to provide information for regulatory compliance reporting and to allow the Region to optimize the operation of the system. The data is further used to determine water and wastewater usage by the local municipalities for billing purposes as well as forecasting future infrastructure needs and demands.

The existing SCADA system includes PLCs at each facility from two different manufacturers

A key component of the overall SCADA system includes a series of PLCs situated at each and every one of the Region's water and wastewater facilities. Each PLC is uniquely programmed to operate the specific equipment at the individual facility. Currently, of our 144 facilities, 120 are equipped with PLCs manufactured by Bristol Babcock Canada, and 24 by Rockwell Automation Inc.

Bristol Babcock PLC hardware is at the end of its product life and needs to be replaced with current technology

Approximately 95 of the Region's 120 Bristol Babcock PLCs noted above were installed over 15 years ago and have reached the end of their product life cycle with the announcement of the planned retirement of the product line effective January 2009. This announcement from Bristol Babcock identifies that the processing units for these PLCs will no longer be supported after 2011. As such, those facilities currently serviced with obsolete Bristol Babcock PLC hardware need to be upgraded in the near future as replacement of this aging infrastructure is crucial to ensure that the Region's facilities continue to operate in compliance with provincial regulations. The remaining 25 of the Region's Bristol Babcock PLCs will not be affected by this announcement as they currently use the newer Bristol Babcock hardware.

4. ANALYSIS AND OPTIONS

Region's overall SCADA system would function more efficiently and cost effectively if all PLCs were from one single manufacturer

Historically, the Region's water and wastewater facilities operated as a series of stand-alone systems that were controlled by isolated SCADA systems. As such, the SCADA design standards listed more than one approved PLC manufacturer. This resulted in the SCADA system that we have today which, as noted above, is comprised of 120 PLCs manufactured by Bristol Babcock and 24 PLCs manufactured by Rockwell Automation.

Over time as the Region grew and more and more facilities came on line, the SCADA system needed to evolve into the integrated and centralized system that we now use. Accordingly, in moving forward, the most efficient and cost-effective means of operating the overall SCADA system is to maintain a product line from a single manufacturer for the PLC hardware. This will ensure product compatibility for seamless integration of new and existing facilities into the Region-wide system. Also, utilizing a single manufacturer will bring significant cost savings to the Region based on the ability to stock one set of spare components and develop increasing expertise on the system over time, thus reducing the overall cost of maintaining the system.

Furthermore, operating a system composed of two manufacturers introduces elements of risk in the reporting and monitoring which is mandated by the Ministry of the Environment. Risks such as inaccurate reports and lack of monitoring may lead to potential charges, penalties, and/or fines against the Region.

PLC hardware replacement project approved for Stimulus Funding and is being completed by Eramosa Engineering Inc.

Driven by the need to replace the obsolete Bristol Babcock PLC hardware, and in recognition of the opportunity to commence the move towards a single product line for the PLC hardware, the Region initiated the Water and Wastewater – Instrumentation and Control Replacement project. This project was recently approved for federal and provincial government funding under the Stimulus Program. Eramosa Engineering Inc., a recognized SCADA expert consultant, has been engaged by the Region to complete this project. Their scope of work includes the development of SCADA standards, manufacture of PLC hardware based on these new standards as well as subsequent installation of PLCs at selected facilities. This project will be among the first procurements made for PLC hardware under this proposed agreement with Rockwell Automation.

Rockwell Automation Inc. is the recommended supplier of PLCs towards establishing a single product line

Given the primary goal of moving towards a single product line for PLC hardware, Eramosa Engineering Inc. developed and analyzed options to achieve this goal in the least amount of time possible. In analysing these options, it is important to note that initial purchase of PLC hardware from the manufacturer is not the major component in the total cost to the Region. Subsequent installation and programming of PLCs at each facility makes up the majority of the projects costs. Furthermore, while PLC hardware costs are relatively similar from facility to facility, the subsequent installation and programming costs increase substantially relative to the size and complexity of the facility.

The findings of Eramosa's analysis are summarized in Table 1 and discussed in detail below.

Table 1
PLC Purchase Options

Option	Description	No. of PLCs	Estimated Cost
1	Replace all PLCs by 3rd party	144	$12,200,000
2	Sole source purchase of PLCs from Bristol Babcock Canada	119	$10,400,000
3	Sole source purchase of PLCs from Rockwell Automation Inc.	120	$ 7,600,000

Option One: Replace all PLCs by 3rd party

Even though the price obtained by the Region under this option would be on a competitive basis, the Region would not be in control over which manufacturer ultimately becomes the single supplier of PLC hardware going forward. As such, if Bristol Babcock or Rockwell Automation is not the successful bidder, all of the Region's existing PLCs will need to be replaced within a relatively short time frame.

The cost for the purchase of PLC hardware and the necessary design, construction, and programming for all of the 144 facilities is estimated to be $12,200,000.

Option Two: Sole source purchase of PLCs from Bristol Babcock Canada

As outlined above, 120 of the Region's facilities are equipped with PLCs manufactured by Bristol Babcock. Of these, 25 PLCs are newer models that will not be rendered

obsolete by Bristol Babcock's recent announcement. As such, similar to option one, all but these 25 newer Bristol Babcock PLCs must be replaced within a relatively short time frame. The cost for the purchase of PLC hardware and the necessary design, construction, and programming for all of the facilities not already equipped with newer Bristol Babcock PLCs is estimated to be $10,400,000.

Option Three: Sole source purchase of PLCs from Rockwell Automation Inc.

As outlined above, 24 of the Region's facilities are equipped with PLCs manufactured by Rockwell Automation Inc. As such, similar to option one, all but these 24 existing Rockwell Automation PLCs must be replaced within a relatively short time frame. The cost for the purchase of PLC hardware and the necessary design, construction, and programming for all of the facilities not already equipped with Rockwell Automation PLCs is estimated to be $7,600,000.

The number of PLCs that would be replaced under this option is virtually equal to the number of PLCs to be replaced under option two. The reason that option three is significantly less expensive is due to the fact that the existing Rockwell Automation PLCs are located in some of the Region's more complex facilities such as the Aurora Sewage Pumping Station, Schomberg Water Treatment Plant, and Kleinburg and Nobleton Water Pollution Control Plants. As such, the overall replacement costs for the design, construction, and programming phases at these more complex facilities is significantly more expensive.

Independent market survey identifies Rockwell Automation Inc. as the leading PLC supplier in North America

An independent market survey completed by the ARC Advisory Group identified Rockwell Automation as the leading PLC supplier in North America with a market share of approximately 59%. Worldwide, Rockwell Automation holds a market share of approximately 21%. The survey indicates wide acceptance of the Rockwell Automation PLC hardware platform across various industries. In Ontario, a number of large municipalities such as Halton Region, Peel Region, and the City of Guelph have standardized on the Rockwell Automation PLC hardware platform. This standardization allows the Region to leverage the services of local consultants and contractors who are intimately familiar with the Rockwell Automation product line to assist the Region as required.

5. FINANCIAL IMPLICATIONS

The Region will enter an agreement with Rockwell Automation, which will determine the price of its PLC hardware and ancillary equipment. The agreement will stipulate a discounted percentage over the manufacturer's listed prices published on its website.

Once negotiated and included in the executed agreement, this discounted rate will be in effect for the full term of the agreement, with annual increases capped at a set amount. As noted above, other regional municipalities are currently using Rockwell Automation PLC hardware. This will provide an excellent benchmark to ensure that the negotiated pricing agreement is reasonable in today's market.

In addition to direct purchases by the Region, the price structure within the agreement with Rockwell Automation will also extend to all third party contractors purchasing PLC hardware under Regional contracts.

It should be noted that the estimated cost of $2,500,000 relates only to the procurement of PLC hardware and ancillary equipment from Rockwell Automation Inc. These, as well as the additional estimated costs related to design, construction, and programming as outlined under option three in this report totalling $7,600,000, will be funded from Project No. 73980: SCADA Master Plan and Upgrades - Water, and under Project No. 73740: SCADA Infrastructure Assets - Wastewater. There are sufficient funds identified in the 2009 Capital Program to cover all anticipated expenditures in 2009. Sufficient budget will be allocated in subsequent capital programs to fund additional expenditures going forward. In addition, federal and provincial funding from the Stimulus Program has been approved to fund the Water and Wastewater – Instrumentation and Control Replacement project currently in progress by Eramosa Engineering Inc.

6. LOCAL MUNICIPAL IMPACT

SCADA ensures the integrity of the system to service the municipalities

The Region's water and wastewater system is constantly monitored by SCADA. These checks and balances are in place to monitor that water supply to local municipalities meets current drinking water standards and that the environment is protected through real-time monitoring and alarming of our wastewater discharges.

7. CONCLUSION

The Region's overall water and wastewater system incorporates 144 discrete facilities including water treatment plants, water pollution control plants, water reservoirs, and pumping stations. The integrated operation of this entire system is controlled by a computerized Supervisory Control and Data Acquisition (SCADA) system. Key components of this system include Programmable Logic Controller (PLC) hardware located at each of these facilities. The Region's existing SCADA system consists of PLC hardware manufactured by two different suppliers. Going forward, the most efficient and cost-effective means of operating the overall SCADA system would be to maintain a product line from a single PLC manufacturer.

In recognition of the above, it is recommended that the Region enter into an agreement with Rockwell Automation, Inc. for future ongoing procurement of all required Programmable Logic Controller (PLC) hardware and ancillary equipment for York Region water and wastewater facilities, for a term of five years, with an option to extend for an additional five years.

For more information on this report, please contact Brett Bloxam, Director of Operations, Maintenance and Monitoring, Environmental Services at extension 5320.

The Senior Management Group has reviewed this report.