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The Regional Municipality of Durham Report

To: Works Committee
From: Commissioner of Works
Report: #2025-W-8
Date: April 2, 2025

Subject:

Sole Source Procurement of Engineering Services for the Duffin Creek Water Pollution Control Plant located in the City of Pickering

Recommendations:

That the Works Committee recommends to Regional Council:

- A) That staff be authorized to award a sole source contract to Veolia Water Technologies & Solutions for the provision of engineering field services for the Incineration Equipment Inspection, Process Monitoring and On-Site Support for the Duffin Creek Water Pollution Control Plant, located in the City of Pickering, in the amount of \$300,000*, to be financed from within the approved project budget;
 - B) That staff be authorized to award a sole source contract to Metro Connect International Inc. for the provision of engineering services for the Incineration Process Control Programming, Commissioning and Support for the Duffin Creek Water Pollution Control Plant, located in the City of Pickering, in the amount of \$430,000*, to be financed from within the approved project budget; and
 - C) That the Commissioner of Finance be authorized to execute the necessary agreements and associated amendments related to the sole source agreements.
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Report:**1. Purpose**

1.1 The purpose of this report is to seek Regional Municipality of Durham (Region) Council approval to award sole source contracts as follows:

- a. **Veolia Water Technologies & Solutions (Veolia)**, for engineering field services for the inspection of all Incineration Equipment, Process Monitoring and On-Site Support at the Duffin Creek Water Pollution Control Plant (WPCP), in the City of Pickering; and
- b. **Metro Connect International Inc. (Metro Connect)**, for engineering services for supporting the Incineration Process Control Programming, Commissioning and Support at Duffin Creek WPCP in the City of Pickering.

1.2 Dollar amounts followed by an asterisk (*) are before applicable taxes.

2. Background for Veolia

2.1 In 2010, Infilco Degremont (Formerly IDI, now known as Veolia), was the Original Equipment Manufacturer and Supplier (OEM) for the two High Temperature Fluidized Bed (HTFB) Incineration Trains (Units #3 and #4), Boiler and High-Pressure Steam and Condensate Systems in the North Incineration Facility. They were awarded the pre-purchased Equipment Contract under York/Durham Capital Project (P-06-95 Incineration Heat Recovery) through a competitive bidding process in 2007 with a final bid price of \$70 million dollars, excluding applicable tax. In early 2022, Veolia was also awarded another pre-purchased Equipment Contract under York/Durham Capital Project (P-20-12 Fluidized Bed Equipment Supply) through a sole source contract to design and supply two new HTFB Incineration Trains (Units #1 and #2) in the South Incineration Facility. The total contract bid price was \$85 million dollars, excluding applicable taxes. Veolia is the only equipment manufacturer and supplier who can design and supply a 105 dry tonne per day fluidized bed reactor, which is the largest size of reactor in the incineration market. Construction of P-20-12 is anticipated to commence in mid 2026.

2.2 In 2013, under York/Durham Capital Construction Project of the Stage 3 Solids Expansion Program (T-08-59 New Dewatering and Incineration Facilities), the installed incineration systems faced challenges in starting up the turbines with

the Fluidized Air Blowers (FABs) as part of the HTFB Incineration Trains. Due to the size of Low-Pressure Steam (LPS) piping and control valves, the amount of cooling water to the LPS Condensers was determined to be inadequate to condense the steam to condensate, resulting in a major delay of the capital construction project by more than 1.5 years. The issue was eventually detected by field staff from Veolia (Former IDI), and rectified.

- 2.3 In October 2021, while commissioning a new Enhanced Mercury Removal (EMR) system under York/Durham Capital Construction Project (T-13-50), a major corrosion problem arose unexpectedly. The EMR vessel housed five levels of nine Sorbent Polymer Composite (SPC) modules, which were used to remove mercury and a small fraction of Sulphur Dioxide (SO₂) from the flue gas. Since the modules had exceeded its performance in removing the SO₂, the by-product (i.e. extremely acidic sulphuric acid condensate) was causing the interior wall of the vessel to corrode at the welds during the operation. The system had to shut down for temporary repair and the Plant had a difficult time to process sludge during the high demand haulage season. Veolia field service representatives suggested several recommendations at the emergency moment, for example: (1) To remove all the modules immediately from the SPC vessel, preventing the SO₂ to react with water and form acidic solution; (2) To design and install an emergency bypass duct for repair work; (3) To apply coating on the interior vessel, protecting the stainless shell from corrosion due to the acidity of condensation; and (4) To monitor the shell thickness by Ultrasonic Thickness tester in the field regularly as a temporary measure until the vessel has been repaired completely. The prompt responses and assistances from Veolia on-site allowed the project teams and the Plant to resolve the unforeseen crisis quickly and to ensure the system reinstated its service without extended delay and operated safely.

- 2.4 Recently, several critical incineration equipment has shown significant signs of wears, corruptions, and leakages, resulting in long-term shutdown of the Incineration Trains for inspection and repair. Incineration Units #3 and #4 have been operating for 12 years since 2013 and have shown signs of mechanical and corrosion problems. The following is a list of major equipment and components that must be inspected immediately and conduct a detailed overhaul for repair work. This work is urgent and very critical to the current state at the Plant as Unit #1 is aging and has passed its end of service life whereas Unit #2 is under construction. Should Units #3 and #4 cease to operate due to the following equipment failure, the Region's ability to dispose of sludge will be compromised.

- 2.5 Since January 2024, FAB #4 has experienced high vibration issues due to alignment and heavy deposits on the impeller and casing. If this blower is out of service, both Incineration #3 and #4 process trains cannot be started up and operated to burn sludge which could result in compliance issues.
- 2.6 In September 2024, the turbine drive associated with this FAB #4 was found with an alignment issue with the clutch and blower. Failure to repair this turbine will cause the Plant to not be able to utilize the steam generated from the boiler and drive the FAB. The FAB must then be operated with electric motor, increasing electric cost of the Plant.
- 2.7 In November 2024, the Economizer #4 in the Waste Heat Boiler unit experienced a leak in the high-pressure boiler feed water tubes due to erosion and the abrasiveness of ash. Failure to repair the water tubes could lead to the entire train out of service for a long time (approximately six to eight months).
- 2.8 In December 2024, the ID Fan #3 discharge duct (36" Ø) and silencer had a leak due to corrosion, allowing Sulphur Dioxide (SO₂) from the flue gas emitted to the surrounding. Failure to repair/replace the duct and silencer would become a major health and safety issue in the workplace.
- 2.9 Extensive knowledge of the HTFB Incineration system installed under Projects P-06-95, T-08-59, and T-13-50 is required to provide a thorough inspection of work, to identify the root cause of equipment failure, and to resolve and mitigate the operational and mechanical problems of critical equipment. Veolia is the overall design and supply of the original equipment of the HTFB Incineration systems, in which they are subject matter experts in the Incineration Industry across North America and Europe.

3. Background for Metro Connect

- 3.1 In 2010, Metro Connect were the original Programmable Logic Controller (PLC) programmers, Supervisory Control and Data Acquisition (SCADA) developers and in-field commissioning representatives to start up and operate the two High Temperature Fluidized Bed (HTFB) Incineration Trains (#3 & #4). They were selected by IDI, the Original Equipment Manufacturer (OEM) who was awarded the Pre-purchased Equipment Contract under York/Durham Capital Project (P-06-97 Incineration Heat Recovery) through a competitive bidding process.

- 3.2 In 2013, under York/Durham Capital Construction Project of the Stage 3 Solids Expansion Program (T-08-59 New Dewatering and Incineration Facilities), the newly installed incineration systems had challenges in starting up the turbines with the Fluidized Air Blowers (FABs) as part of the HTFB Incineration Trains. Due to the size of Low-Pressure Steam (LPS) piping and control valves, the amount of cooling water to the LPS Condensers was determined to be inadequate to condense the steam to condensate, resulting in a major delay of the capital construction project by more than 1.5 years. The issue was eventually detected by the field staff from Metro Connect and IDI and it was rectified.
- 3.3 In 2021, the upgrade of a new Enhanced Mercury Removal (EMR) system began construction in York/Durham Capital Construction Project (T-13-50). The new system was retrofitted into the existing HTFB Incineration Trains #3 and #4 with two Sorbent Polymer Composite (SPC) units. During the commissioning period, the installed SPC experienced a very high differential pressure across the vessel, causing the entire incineration train being tripped every three to five days of operation. This operational interruption was very disruptive to the Plant as the sludge processing rate could not be maintained at the Plant's disposal rate target. With comprehensive knowledge of Incineration process control along with proficient troubleshooting skills, Metro Connect and Veolia (Former IDI) field staff were able to identify the issues in the field, in which the excessive water accumulated in the SPC Inlet duct causing the high differential pressure across the SPC vessel and tripped the operating train. Metro Connect then implemented a new automatic draining system to extract the water accumulating at the Inlet Duct to relieve the pressure.
- 3.4 In 2022, Metro Connect was awarded the Region's consulting services contract (RC00002765) for the Incineration Process Control Programming and Support for Duffin Creek WPCP as the lowest compliant bidder. They provided process control programming and remote support, in-field training, and process recommendations of the HTFB incineration systems and other common steam systems with high complexity in process control to the Incineration Team.
- 3.5 Extensive knowledge of the HTFB Incineration system at Duffin Creek WPCP is required to provide process control programming, commissioning, process support and in-field training at Duffin Creek WPCP to the Engineering Support Division, SCADA Division, and Incineration Team. Metro Connect is a subject matter expert in the Incineration industry in North America with an in-depth knowledge of HTFB incineration reactors and complex steam systems.

4. Justification for the Sole Source for Veolia

- 4.1 Veolia has extensive knowledge and understanding of the existing Incineration equipment in Trains #3 and #4, including the design and process operation at Duffin Creek WPCP. Veolia's senior field service representatives have been working with the Region's stationary engineers in the North Incineration Facility for approximately 15 years. They are familiar with the existing equipment configuration and the complexity of how each process equipment is interconnected. They also have an in-depth understanding of the process control and troubleshooting experience in the field, particularly during startup and commissioning of the Incineration equipment. This knowledge will benefit the diagnosis of the root causes of the equipment failures and the resolution of process operational and mechanical issues due to their familiarity with the design and existing process equipment and control.
- 4.2 For a new engineering field service representative to inspect the Incineration equipment, to investigate the underlying problems, and to generate practical recommendations and repair plans for the Incineration system at Duffin Creek WPCP, they would need to become familiar with the work area in the Incineration Facility, the existing equipment arrangement, the complexity of how each specialized process equipment is interconnected, and the local regulations such as Technical Standards and Safety Authority (TSSA) requirements. Wastewater incineration is a very small and niche industry, in which a senior field service representative requires exceptional engineering and in-field experience during operation and troubleshooting in large-scale HTFB incineration plants (comparable size as Duffin Creek WPCP). The Region would also be required to coordinate multiple inspection services assignments, resulting in considerable time and resources, which could lead to prolonged production downtime of burning sludge and unnecessary operational challenges in meeting health and safety and regulatory requirements.

5. Justification for the Sole Source for Metro Connect

- 5.1 Metro Connect has an enhanced comprehension of the existing Incineration Process Control Programming, including PLCs and Human Machine Interfaces (HMI) of Trains #3 and #4 and associated common steam systems at Duffin Creek WPCP. They are familiar with the existing equipment configuration and the complexity of how each process equipment is interconnected. They also have extensive commissioning and troubleshooting experience during construction

and startup of each incineration train. This knowledge will benefit the process upgrades and optimization, system startup and resolution of process operational issues due to their familiarity with the existing process control strategies, PLCs programs, HMI systems, and integration into the Plant PLCs.

- 5.2 For another consulting engineer to provide Incineration Process Control Programming, Commissioning and Support for the Duffin Creek WPCP, they would need to become intimately familiar with the existing process control narratives and programming logics of the overall incineration systems. Wastewater incineration is a very small and niche industry, in which an expert requires extensive experience designing and commissioning large projects to gain the knowledge from large-scale HTFB incineration plants (similar size as Duffin Creek WPCP). The Region would also be required to invest significant time and resources to provide all the background information, OEM documentation, and conduct many workshops and site plant tours to bring a different consultant up to speed prior to commencing any upgrade/modification work. Critical incineration equipment (such as fuel oil, high pressure boiler and steam systems) are regulated under TSSA authority. Without fully understanding the complexity of the incineration process, fuel and steam systems could lead to operational challenges in meeting health and safety and regulatory requirements.
- 5.3 In April 2022, the awarded consulting services contract (RC00002765) for the Incineration Process Control Programming and Support for the Incineration Staff commenced. Metro Connect has been providing 24/7 remote process control support and training sessions for the Incineration Staff to ensure reliable operation of Trains #3 and #4. During the support period, Regional staff, including Engineering Support Division, SCADA Division and the Incineration Team, continue to acquire valuable incineration process knowledge and skills from Metro Connect staff through formal knowledge transfer sessions and hands-on guidance. This invaluable knowledge will be leveraged to resolve operational process problems efficiently, allowing the HTFB reactors to reliably operate at its sludge disposal targets and to meet the MECP's emission requirements.
- 5.4 The Region does not have internal resources with the knowledge and skills in this niche area to perform the programming for the incineration process control systems, which include reactors, primary heat exchangers, waste heat boilers, scrubbers, quenchers, SPCs, FAB blowers, induced draft fans, de-aerators, steam and condensate systems, etc.

6. Proposed Consulting Services for Veolia

6.1 Staff have met with Veolia to determine the scope of work to provide engineering field services for the Incineration Equipment Inspection, Process Monitoring and On-Site Support at the Duffin Creek WPCP.

6.2 The proposed engineering field services scope of work will include:

- a. Development of inspection, maintenance and repair work plans and reports of each assignment;
- b. Investigation into each equipment failure and problem, including background review of original equipment design, site visits, and engaging with OEMs;
- c. Reporting to include background information, site observation and finding, comparison from previous conditions, photos with timestamp, recommendation, suggested mitigation and process modification.
- d. Process data analysis of the Incineration system of Unit #3 and #4 and common steam systems to proactively identify hidden operational problems and provide recommendations for rectification;
- e. On-site verification prior to startup and during operation of Units #3 & #4 and common steam systems to identify potential operational challenges, followed by submission of startup reports and suggested resolutions;
- f. Development of Standard Operating Procedures (SOPs) for the Incineration Systems as required by the Engineering Support Division and Incineration Team; and
- g. Support for Incineration startup, commissioning and troubleshooting activities as required by the Engineering Support Division.

6.3 The estimated engineering services fee of \$300,000* includes the following services:

- Project management;
- Meetings and workshops;
- On-Site Inspection, Diagnosis, & Repair Work;

- Documentation of Work Plans & Reports for each service & assignment;
- Process Monitoring and Process Data Analysis;
- On-Site Support During Startup, Operation, Commissioning & Troubleshooting;
- Development of SOPs; and
- Additional services as required by the Capital Projects.

7. Proposed Consulting Services for Metro Connect

7.1 Staff have met with Metro Connect to determine the scope of work to provide Incineration Process Control Programming, Commissioning, In-Field and Remote Support at the Duffin Creek WPCP.

7.2 The proposed engineering services scope of work will include:

- a. Review of existing PCNs and update of the existing PCN versions to reflect the latest and modified incineration systems;
- b. Development of SOPs for the Incineration Systems as required by the Engineering Support Division and Incineration Team.
- c. Classroom and hands-on training sessions for the Incineration Team and SCADA Division;
- d. Modification of existing Process Control Programming and Loop Diagram drawings to reflect the latest and modified incineration systems;
- e. Development of PLC Health Programming for the existing Incineration Allen Bradley and Emerson PLCs of the Stage 3 Incineration systems;
- f. Update on the existing HMI Programming to existing PLC Health Screens;
- g. Development of HMI PLC Overview Graphic and modification of miscellaneous HMI screens for process operational improvement;
- h. Integration of new equipment process control logics into the existing PLC programs; and

- i. Support for commissioning activities as required by the Engineering Support Division, and remote process control support during operation.
- 7.3 The estimated engineering services fee of \$430,000* includes the following services:
- Project management;
 - Meetings and workshops;
 - Updating of Existing Incineration PCNs and Loop Diagram drawings to reflect as-built conditions;
 - Development of SOPs;
 - PLC Health Programming;
 - PLC Health Screen HMI and Miscellaneous HMI Screen Modifications
 - Remote and In-Field Process Control and Commissioning Supports;
 - Additional services as required by the Capital Projects; and
 - Incineration and SCADA Operational Training.

8. Financial Implications

- 8.1 Section 7.2 of the Region's Purchasing By-law #16-2020 permits the sole sourcing of goods or services under specific circumstances, including where a change of supplier is not recommended due to compatibility/continuity concerns and cost impacts. The by-law requires Regional Council approval for any negotiated purchases of \$100,000 and greater in value.

- 8.2 Financing for the purchase of consulting services estimated at \$730,000* will be provided from within the following approved project budgets:

2025 Sanitary Sewage Capital Budget

Duffin Creek WPCP – Engineering Field Services for
Incineration Equipment Inspection, Process Monitoring
and On-Site Support

User Revenue (Project ID: Y1503)

Durham's Share (26.2%)	<u>\$191,260</u>
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York's Share (73.8%)	<u>\$538,740</u>
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Total Financing	<u>\$730,000</u>
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9. Relationship to Strategic Plan

- 9.1 This report aligns with the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Connected and Vibrant Communities

- C1: Align Regional infrastructure and asset management with projected growth, climate impacts, and community needs.

10. Conclusion

- 10.1 It is recommended that Regional Municipality of Durham Council authorize a sole source contract with Veolia Water Technologies & Solutions for engineering field services for the Incineration Equipment Inspection, Process Monitoring and On-Site Support at the Duffin Creek Water Pollution Control Plant.
- 10.2 It is also recommended that Regional Municipality of Durham Council authorize a sole source contract with Metro Connect International Inc. for engineering services for the Incineration Process Control Programming, Commissioning and Support at the Duffin Creek Water Pollution Control Plant.
- 10.3 This report has been reviewed by the Finance Department and the Commissioner of Finance concurs with the financial recommendations.

10.4 For additional information, contact Mike Hubble, Director, Environmental Services, at 905-668-4113 extension 3460.

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE
Commissioner of Works

Recommended for Presentation to Committee

Original signed by:

Elaine C. Baxter-Trahair
Chief Administrative Officer