

SUMMARY OF WORK

1. GENERAL

- .1 The Work to be performed under the Contract is generally described in Part D of the Supplemental Conditions, and as shown on the Specifications and Drawings.
- .2 The Contractor shall be deemed to have allowed for any increased costs in his bid for the staging of the Work required, any co-ordination, including any additional costs incurred because of scheduling constraints imposed by the City, as identified in the Specification Section and elsewhere in the Contract Document.
- .3 A set of drawings is attached to these Specifications to indicate approximately the general arrangement of the installations in the Deacon Booster Pumping Station and the proposed locations of the UV reactors and related equipment and installations.

2. SEQUENCE AND METHODS

- .1 The Contractor shall be responsible for determining the proper sequence to be followed, and the methods, plant and tools to be used in the execution of the Work, so as to fully and effectually carry out the intent and purpose of the Contract, subject however, to the paramount right and authority of the Contract Administrator to direct and control the sequence to be followed and the methods, plant and tools to be used so as to promote the safety, economy and proper scheduling of the Work, harmony and co-operation with other contractors, and to cause as little interference as possible with ordinary traffic and public business.
- .2 If any part of the Work depends, for its proper execution, upon work to be done by another contractor, the Contractor shall report promptly, in writing, to the Contract Administrator, any errors, omissions or defects in the Work of such other contractor which interfere with or are likely to interfere with or prevent the proper execution of the Contract. Should the Contractor fail to make such a report, the Contractor shall have no claim against the City by reason of such erroneous, omitted or defective work, except for latent defects therein not noticeable at the time the Contractor commenced work.

3. APPLICABLE STANDARD SPECIFICATIONS AND DETAILS

- .1 In addition to the Specifications included in this Tender Package, the Contractor is advised that all Specifications contained in the current Standard Construction Specifications of the City of Winnipeg shall apply to the Work.

4. CO-ORDINATION

- .1 The Deacon Ultraviolet (UV) Light Disinfection Project consists of five (5) separate Contracts. The Work of this Contract (Contract No. 5) comprises the installation of equipment including equipment supplied under four (4) other supply contracts. In addition, some programming work will be undertaken by the City so that the controls systems can be

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integrated into the existing system, refer to Systems Integration in this section of the specification.

Tender documents and some shop drawings for all four (4) of the Equipment Supply Contracts are available for viewing at the Contract Administrator's office.

The Deacon Ultraviolet (UV) Light Disinfection Project will include four (4) equipment supply contracts, in addition to this contract:

- .1 **Contract No. 1** - Supply, Delivery, Supervision of the Installation and Commissioning, and Validation Testing of UV Disinfection Equipment (Tender 264-2003).
 - .2 **Contract No. 2** – Supply of Pump Control Valves and Recirculation Valve (Tender 385-2003).
 - .3 **Contract No. 3** – Supply and Delivery of Isolation Valves and Modulating Valves (Tender 493-2003).
 - .4 **Contract No. 4** –Supply of Magnetic Flow Meters (Tender 384-2003).
- .2 The Contractor shall cooperate and liaise with the City of Winnipeg employees or their appointed representatives in order to make appropriate working arrangements to ensure satisfactory execution and timely completion of the work.
 - .3 The Contractor shall attend coordination meetings, as directed by the Contract Administrator, when the Contract Administrator considers that they are necessary for ensuring the sufficiency of the liaison coordination and co-operation with the City or their appointed representative and the Equipment Supplier's representative. The Contractor shall be deemed to have allowed in his Tender Price for any interference and coordination to his operations that may result from any of the above. The Contractor must also take all precautions necessary to ensure that he does not hinder or delay in any way the progress of these other parties or cause damage to their completed work.
 - .4 The proposed schedule for the entire upgrade project is generally as follows:

Contract No. 1 - UV Disinfection Equipment

Contractor: Calgon Carbon Corporation
Manufacturer: Calgon Carbon Corporation
P.D. No. 264-2003

- .1 UV Disinfection Equipment Supply Contract Award..... July 25 2003
- .2 Delivery of Equipment to Site March 24, 2004
- .3 Pick-up of UV Disinfection Equipment by Installation Contractor
under Contract No. 5:by March 25, 2004
.....(but not earlier than March 24, 2004)

Contract No. 2 – Pump Control Valves

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Contractor: Power and Mine Supply Co. Ltd.
Manufacturer: G.A. Industries
P.D. No. 385-2003

- .1 Pump Control Valves Supply Contract Award November 14, 2003
- .2 Delivery of Pump Control Valves and Related Equipment June 30, 2004
- .3 Pick-up of Pump Control Valves by Installation Contractor
under Contract No. 5: by July 1, 2004
..... (but not earlier than June 30, 2004)

Contract No. 3 – Isolation and Modulating Valves

Contractor: Mueller Flow Control
Manufacturer: Pratt
P.D. No. 493-2003

- .1 Isolation and Modulating Valves Supply Contract Award November 26, 2003
- .2 Delivery of Isolation and Modulating Valves and Related Equipment July 17, 2004
- .3 Pick-up of Isolation and Modulating Valves by Installation Contractor
under Contract No. 5: by July 18, 2004
..... (but not earlier than July 17, 2004)

Contract No. 4 – Magnetic Flow Meters

Contractor: Keywin Industries Ltd.
Manufacturer: ABB Automation (Bailer Fischer & Porter)
P.D. No. 384-2003

- .1 Magnetic Flow Meters Supply Contract Award November 24, 2003
- .2 Delivery of Magnetic Flow Meters and Related Equipment May 4, 2004
- .3 Pick-up of Magnetic Flow Meters by Installation Contractor
under Contract No. 5: by May 5, 2004
..... (but not earlier than May 4, 2004)

5. SYSTEMS INTEGRATION

- .1 The City of Winnipeg will assign a Systems Integrator under separate contract for this project. The Contractors will work in cooperation with the Contract Administrator and Systems Integrator, retained by the City of Winnipeg, to ensure all aspects of this project are coordinated.
- .2 The System Integrator scope of work does not relieve the Contractors of their specific responsibilities in testing, commissioning and training or for the satisfactory performance of any other aspect of their work under this Contract.

- .3 Services to be provided by the Systems Integrator, will include the following:
 - .1 Programming modifications for three existing pump PLCs;
 - .2 Programming modifications for existing station PLCs;
 - .3 Configuration and program modifications for existing SCADA workstations;
 - .4 Configuration and programming for communication networks, including Modbus Plus systems and radio communication system;
 - .5 Assist Contractor to test and commission control system;
 - .6 Assist Contractor to train City staff in control system operation;
 - .7 Prepare documentation for all PLC programs, workstation configurations, and network configurations.

6. MATERIALS DELIVERY

- .1 The Contractor will accept delivery of City supplied equipment as outlined in Section 01210 of the specification.
- .2 The Contractor will arrange delivery of Contractor supplied equipment as outlined in Section 01212 of the specification.
- .3 The Contractor will construct a storage facility for all equipment and materials as outlined in Section 01500 of the specification.

7. WORK STAGING

- .1 The existing installation consists of a common below-grade inlet supply header and two discharge headers, designated Branch I and Branch II. The inlet header has a number of connections to existing or future above-grade piping. There are two 900mm diameter connections, between column lines 2 and 4, that are currently capped, for the future Branch I piping, and five 1500mm diameter connections, between column lines 4 and 9, three of which are connected to feed Branch II. The other two connections are capped for future use.
- .2 There are no isolation valves on the inlet header itself, so any work on Branch I connections requires the shutdown of the whole header.
- .3 Each of the three existing feeds to Branch II includes a 1500mm x 900mm reducer, an upstream isolation valve, a two-speed pump, and downstream check and isolation valves before a flanged connection to the Branch II discharge header.
- .4 The demand pattern in the summer period dictates that supply must be maintained to the City reservoirs between May 14th, 2004 and September 7th, 2004, the May and September long

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- weekends. Consequently no work is possible on the Branch II piping work during this period and installation of the Branch II UV system must be scheduled around this period.
- .5 Before the new system can be installed, some demolition work will be required, as described in Section 02070 and the Drawings.
 - .6 The installation of the HVAC System and associated works, can be carried out at the same time that the process mechanical installation occurs.
 - .7 There is an existing DAF pilot plant facility installed in the area of the new Branch I UV piping. This will be removed by the City before the UV Installation Contract gets underway.
 - .8 The existing Branch II piping between the pump discharge flanges and the Branch II discharge header flanges must be removed under this contract to allow installation of the new UV piping and reactors.
 - .9 The installation sequence can be generally described as follows:
 - .10 Branch I:
 - .1 Isolate the inlet header. Isolation of the inlet header requires a full station shutdown. Drain the inlet header, remove blind flanges on the existing stubs, and install a new isolation valve and a temporary blind flange on each of the two stubs. Re-open the inlet header. Once these valves are installed, work on the Branch I piping and installation of UV reactors UVR-1100 and UVR-1200 can proceed.
 - .11 Branch II:
 2. When the work area becomes available in early September, existing piping from pumps P 2-2 and P 2-3 must be removed first to allow installation of piping and UV reactors UVR-2100 and UVR-1200.
 - .12 After installation of reactors UVR-2100 and UVR-2200, pumps P 2200 and P 2300 can be returned to service, and piping from pump P 2-1 removed. Piping and reactors UVR-2300 and UVR-2400 can then be installed.
 - .13 This sequence is suggested because a staging platform is required to be installed, above the piping for reactor UVR-2400, to allow future crane and maintenance access. Early installation and use of this staging platform would be required to bring piping and materials onto the pump station floor and work area if UVR-2300 and UVR-2400 are installed before UVR-2100 and UVR-2200.
 - .14 Validation of the UV reactors, in accordance with the approved validation protocol, will be undertaken using reactor UVR-2300 once installation is complete.
 - .15 Deacon Booster Pumping Station supplies water to the City of Winnipeg. This station has to supply the City with water continuously, 24 hours per day, 365 days per year. Therefore, it is imperative that any modification and installation work to be undertaken within the station must be properly staged so that it will not adversely affect the operation of the station and

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significantly reduce its output capability. This will obviously impose constraints on the planning and execution of this Work, and the Contractor must arrange his work schedule to accommodate the constraints.

- .16 During the work the Contractor will not be allowed to use new or existing valves to isolate in-service lines. If this is unavoidable, adequate measures are to be taken to ensure that the valves are not subject to movement and the work shall be subject to approval by the Contract Administrator.
- .17 If a full station shutdown is required, it can only be accommodated for a six hour period, between 11:00 p.m. and 5:00 a.m. The station must be in operation at all other times. Total station shutdown is a condition where none of the pumps in the pumping station are operating and water is not being pumped from the station. The Contractor shall not assume that the station can be completely shutdown each or any day at the above times. Dates of any proposed complete station shutdown shall be subject to the acceptance of the City. This acceptance will be based on the anticipated operational requirements of the City's water supply system to meet the water demands at the time. The Contractor shall submit a detailed plan and schedule for each total shutdown required 14 days in advance to the Contract Administrator for review and agreement.
- .18 All required labour, tools, and equipment shall be on site prior to commencing work.

8. VALIDATION

- .1 Validation testing will be conducted to demonstrate the performance of the UV Reactor in comparison to the guarantees for dose delivery, inactivation, power consumption, and additional elements of system performance.
- .2 The Validation Testing will be in accordance with the United States EPA Proposed Draft UV Disinfection Guidance Manual (UVDGM) (EPA 815-D-03-007, June 2003) requirements. One UV Reactor will be validated.
- .3 The Contractor is responsible to provide coordination and supervision to facilitate all validation testing. The validation work will be conducted after Substantial Completion, prior to Total Performance and is expected to last about one (1) month.
- .4 The Contractor is responsible for supplying all labour and materials to successfully carry out all of the requirements for validation.

END OF SECTION