Approved: 2005-03-31

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/The Instrumentation, Systems and Automation Society (ISA).

.1 ANSI/ISA 5.5, Graphic Symbols for Process Displays.

.2 American National Standards Institute (ANSI)/ Institute of Electrical and Electronics Engineers (IEEE).

.1 ANSI/IEEE 260.1, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).

.3 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

.1 ASHRAE STD 135, BACNET - Data Communication Protocol for Building Automation and Control Network.

.4 Canadian Standards Association (CSA International).

.1 CAN/CSA-Z234.1, Canadian Metric Practice Guide.

.5 Consumer Electronics Association (CEA).

.1 CEA-709.1, Control Network Protocol Specification.

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.7 Electrical and Electronic Manufacturers Association (EEMAC).

.1 EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.

.8 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.9 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.2 SYSTEM DESCRIPTION

.1 The BAS system in the Stanley Knowles Building is manufactured by Siemens Building Technologies. The system consists of a graphical Building Operators workstation located in the building operator's office, 9 remote DDC control panels, fancoil controllers and VAV controllers located throughout the building. The DDC control panels

operate the hot water and humidification boilers, chilled water system and air handling equipment to control the temperature, pressure, humidity and CO2 in the space. Various sensors connected to the controllers provide them with necessary information.

.2 Work covered by this section, includes, but not limited to, following:

.1 New roof mounted exhaust fan connection the BAS:

.1 The exhaust fans are to be controlled by the existing BAS system.

.2 The exhaust fans shall run base on an occupied/unoccupied schedule, which is adjustable by the building operator.

.2 New Equipment and Telecom Rooms:

.1 The air conditioners serving these spaces will have packaged controls with alarm output that shall be connected back to the existing BAS system. The BAS shall monitor alarms from the new air conditioners

.2 The space shall be provided with high temperature alarm. Controls contractor shall provide separate room temperature sensor for each space and wire back to existing BAS.

.3 The space shall be provided with leak detection alarm. Controls contractor shall provide separate leak sensor for each space and wire back to existing BAS.

.3 New Roof Top Unit, RTU-1.N:

.1 This unit shall come complete with packaged controls and shall be interfaced with the existing BAS.

.2 The BAS shall control unit operating schedule and monitor the following points:

.1 Discharge air temperature
.2 Outside air temperature
.3 Return air temperature
.4 Heating status and stages
.5 Cooling status and stages
.6 Economizer (free cooling) status
.7 All available unit alarms.

.4 New Humidifier HU-1.N:

.1 This new unit will have packaged controls with alarm output that shall be connected back to the existing BAS system. The BAS shall monitor alarms from the humidifier.

.5 Complete operating and maintenance manuals.

.6 Training of personnel.

.7 Acceptance tests, technical support during commissioning, full documentation.

.8 Wiring interface co-ordination of equipment supplied by others.

.9 Miscellaneous work as specified in these sections and as indicated.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control:

.1 Provide equipment and material from manufacturer's regular production, CSA certified, manufactured to standard quoted plus additional specified requirements.

.2 Where CSA certified equipment is not available submit such equipment to inspection authorities for special inspection and approval before delivery to site.

.3 Submit proof of compliance to specified standards with shop drawings and product data.

.4 In lieu of such evidence, submit certificate from testing organization, approved by Departmental Representative, certifying that item was tested in accordance with their test methods and that item conforms to their standard/code.

.5 For materials whose compliance with organizational standards/codes/specifications is not regulated by organization using its own listing or label as proof of compliance, furnish certificate stating that material complies with applicable referenced standard or specification.

.6 Permits and fees: in accordance with general conditions of contract.

.7 Submit certificate of acceptance from authority having jurisdiction to Departmental Representative.

.8 Existing devices intended for re-use: submit test report.

1.4 QUALITY ASSURANCE

.1 Have local office within 50km of project staffed by trained personnel capable of providing instruction, routine maintenance and emergency service on systems,

.2 Provide record of successful previous installations submitting tender showing experience with similar installations utilizing computer-based systems.

.3 Have access to local supplies of essential parts and provide 7 year guarantee of availability of spare parts after obsolescence.

.4 Ensure qualified supervisory personnel continuously direct and monitor Work and attend site meetings.

.5 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

1.6 EXISTING CONDITIONS - CONTROL COMPONENTS

.1 Re-use field control devices, where possible, that are usable in their original configuration provided that they conform to applicable codes, standards specifications.

.1 Do not modify original design of existing devices without written permission from Departmental Representative.

.2 Provide for new, properly designed device where re-usability of components is uncertain.

.2 Inspect and test existing devices intended for re-use within 30 days of award of contract, and prior to installation of new devices.

.1 Furnish test report within 40 days of award of contract listing each component to be re-used and indicating whether it is in good order or requires repair by Departmental Representative.

.2 Failure to produce test report will constitute acceptance of existing devices by contractor.

.3 Non-functioning items:

.1 Provide with report specification sheets or written functional requirements to support findings.

.2 Departmental Representative will repair or replace existing items judged defective yet deemed necessary for EMCS.

.4 Submit written request for permission to disconnect controls and to obtain equipment downtime before proceeding with Work.

.5 Assume responsibility for controls to be incorporated into EMCS after written receipt of approval from Departmental Representative.

.1 Be responsible for items repaired or replaced by Departmental Representative.

.2 Be responsible for repair costs due to negligence or abuse of equipment.

.6 Remove existing controls not re-used or not required. Place in approved storage for disposition as directed.

Part 2 Products

2.1 EQUIPMENT

.1 Complete list of equipment and materials to be used on project and forming part of bid documents by adding manufacturer's name, model number and details of materials, and submit for approval.

Part 3 Execution

3.1 MANUFACTURER'S RECOMMENDATIONS

.1 Installation: to manufacturer's recommendations.

3.2 PAINTING

.1 Painting: in accordance with Section 09 91 23 - Interior Painting, supplemented as follows:

.1 Clean and touch up marred or scratched surfaces of factory finished equipment to match original finish.

.2 Restore to new condition, finished surfaces too extensively damaged to be primed and touched up to make good.

.3 Clean and prime exposed hangers, racks, fastenings, and other support components.

.4 Paint unfinished equipment installed indoors.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Acronyms:

.1 Cx - Commissioning

.2 CxA - Commissioning Agent

1.2 INTENT

.1 Provide commissioning of integrated automation equipment and systems in accordance with this, Section 01 91 13 and related sections.

.2 All items noted in this document are the responsibility of the contractor supplying and installing the equipment, unless noted otherwise.

1.3 MANUFACTURER'S SERVICE ON SITE

.1 Arrange and pay for qualified Manufacturer's representatives to supervise starting and testing of following equipment and systems:

.1 Controls Components

.2 Use manufacturers factory trained personnel where required to maintain manufacturer's warranty.

.3 Maintain documentation of all equipment start-up and commissioning and provide to Commissioning Agent.

Part 2 Products

2.1 Not Used

Part 3 Execution

3.1 GENERAL

.1 Commission all equipment and systems installed as part of this contract. Typical required information or actions are listed below for each equipment or system.

.2 Provide check sheets for equipment not listed in this section.

.3 Document the commissioning process by completing the PI forms, Performance Verification (PV) Tests and System PV Tests.

3.2 INTEGRATED CONTROL SYSTEMS

.1 Check that installation is in accordance with drawings, specifications and Manufacturer's recommendations.

.2 Commissioning must be completed by qualified technical staff that have the capability to deliver a fully commissioned system in a timely manner as further described in this section.

.1 Submit control calibration check sheets prior to system acceptance. Check sheets to include unit identification, controller/transmitter tag numbers, device controlled, controller PID settings, interlock devices and wire tag numbers.

.2 Provide system control sequences and points list, along with controls drawings.

.3 Set damper linkages, static pressure/volume controls as required by the balancing trade.

.4 Adjust and calibrate all input/output devices prior to system acceptance. Include settings on As-Built control drawings.

.5 Test the operation of all monitored and controlled points as well as the operation and capabilities of all sequences, reports, specialized control programs and algorithms, diagnostics and all other software.

.6 Graphic displays must be installed and fully operational prior to the start of commissioning. Submit printout of graphics (pdf accepted) for approval as outlined in Specifications.

.7 Each control loop measured variable and calculated setpoint must be placed on a continuous trend. Submit trend reports for approval.

.8 Load/save of database must be demonstrated.

.9 All features of the system must have been demonstrated.

.10 All alarms shall be operational.

.3 In addition to general start-up and commissioning requirements, the Contractor shall provide on-site manpower for PI inspections, PV testing, and systems PV testing with the Departmental Representative and CxA:

.1 Provide verification of the graphical operator interface in accordance with Specifications.

.2 Provide verification of the sequences of operation, custom programming and loop tuning of systems.

.3 Provide a final performance verification acceptance test of 7 consecutive days. This test shall be

conducted on the complete and total installed and operational control system in order to demonstrate that it is functioning properly in accordance with the specifications. In addition, a second 7-day test will be required as part of seasonal testing.

.4 In addition to the 7-day test, the following shall be demonstrated:

.1 Fire alarm simulation.

.2 Power failure simulation, generator power operation, and recovery to normal power.

.3 Hardware and software limits.

.4 Remote system access (if specified).

.5 Spot checks of end-to-end integrity will be carried out.

.6 System communication and graphic update speeds.

.4 Complete alarm log shall be maintained for the duration of the 7-day test. The log will be submitted at the end of the test.

.5 The printer (if used for alarms) shall be left on for the complete 7-day test. Printouts are to be submitted for review at the end of the test.

.6 Results of all tests shall be documented and submitted to the CxA for review.

.7 Prior to acceptance of the work, submit the hard copy and two backup copies of the entire database and operating system software.

.8 During the test, in the event of equipment failure of any of the hardware components, software applications or routines, the test will recommence and run until 7 failure-free test days have occurred.

3.3 MECHANICAL EQUIPMENT AND SYSTEMS DEMONSTRATION AND INSTRUCTION

.1 Provide demonstrations and instruction in accordance with Section 01 91 13.

END OF SECTION