PART 1 GENERAL

1.1 Scope

.1 Aboveground fuel oil storage tank.

1.2 Standards

.1 Comply with Territorial Government Regulations.

.2 Aboveground fuel storage tanks shall comply with CAN4-S602

PART 2 PRODUCTS

2.1 Above Ground Fuel Storage Tanks (Outside Building)

.1 Aboveground 10,000 L self contained.

.2 Construction: to CAN/ULC-S602 and S652-95.

.3 Primary tank to be enclosed in a leak tight reinforced steel containment casing having a capacity of 110% of the primary tank's capacity.

.4 Tank shall have interstitial monitoring port for leak detection of primary tank and be of sufficient size to enable product removal.

.5 Tank shall be equipped with a lockable truckfill spillbox with release device to drain accumulated spillage into tank.

.6 Tank shall be equipped with level indicator mounted directly on tank in plain view of fill point.

.7 100 diameter FILL complete with removable droptube, truckfill adaptor, and 95% fill limiting valve. Fill limiting valve: Ryanik Manufacturing OFV-2 Contact 1-800-697-5109.

.8 1-25 diameter bottom drawoff with ULC approved repad construction.

.9 2-50 diameter spare couplings.

.10 100 diameter primary tank vent c/w 3660 long 100 diameter vent pipe, vent cap, and whistle.

.11 100 diameter interstitial vent c/w vent pipe and cap.

.12 500 diameter lockable combination spillbox and manhole with 20 manual drain connection.

.13 50 diameter interstitial monitoring inspection port.

.14 50 diameter tank mounted level indicator port.

.15 Tank assembly to be complete with lifting lugs, grounding lug and formed plate skid.

.16 Exterior: 1-coat of red oxide primer painted to CAN/CGB-1.1401 coat of white marine enamel, corrosion resistant, polyeurethane 1.5 mil, factory applied.

.17 Provide 50mm black block lettering indicating tank contents.

.18 Tank gauging stick and chart to manufacturer's standard.

.19 Standard of Acceptance: Kingland Ford.

PART 3 EXECUTION

3.1 Installation

.1 Flush and clean fuel tank prior to delivery to site and keep sealed during construction.

.2 Provide fuel for testing of tanks.

.3 At turn over of job to Owner completely fill all tanks with intended fuel.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1.2 References

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

.1 ANSI/ASME-B16.3- 1985, Malleable-Iron Threaded Fittings, Classes 150 and 300.

.2 ANSI/ASME-B16.9- 1986, Factory-Made Wrought Steel Buttwelding Fittings.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA-B139- M91, Installation Code for Oil Burning Equipment.

.3 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)

.1 MSS-SP-80- 1987, Bronze Gate, Globe, Angle and Check Valves.

1.3 Product Data

.1 Submit product data in accordance with Section 01330 - Submittal Procedures.

PART 2 PRODUCTS

2.1 Fill Vent and Carrier Pipe

.1 Steel: to ASTM A 53, Schedule 40, continuous weld or electric resistance welded, screwed.

2.2 Steel Pipe Coating

.1 Bituminous paint: in accordance with manufacturer's recommendations.

2.3 Jointing Material

.1 Screwed fittings: pulverized lead paste .

2.4 Fittings

.1 Steel:

.1 Malleable iron: screwed, banded, Class 150 to ANSI/ASME-B16.3.

.2 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A 47M.

.3 Nipples: Schedule 40, to ASTM A 53.

2.5 Gate Valves

.1 NPS 2 and under, screwed bonnet:

.1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, solid wedge disc.

.2 Acceptable material: Red – White Fig. 293.

PART 3 EXECUTION

3.1 Piping

.1 Install oil piping system in accordance with CAN/CSA-B139 and CAN/CSA-B140.0.

.2 Assemble piping using fittings manufactured to ANSI standards.

.3 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.

.4 Slope piping down in direction of storage tank unless otherwise indicated.

.5 Use eccentric reducers at pipe size change installed to provide positive drainage.

.6 Provide clearance for access and maintenance of equipment, valves and fittings.

.7 Ream pipes, clean scale and dirt, inside and out.

.8 Fill, vent, and return outside building:

.1 Steel piping welded throughout except at tanks where use electrically isolating fittings.

.2 Grading: slope all piping at 1% minimum back to tanks.

.9 Piping at tanks:

.1 Suction: terminate 150 mm from bottom of tank.

.2 Vent: extend into tank and terminate less than 25 mm from top. Terminate open end [3600] mm above grade with return bend and removable 10 mesh copper screen.

.10 Interconnections between tanks:

.1 Interconnect fill, vent, to ensure equal level in tanks.

.2 Valve to permit isolation of any tank without interfering with use of any other tank.

3.2 Valves

.1 Install valves with stems upright or horizontal unless approved otherwise by Engineer.

.2 Install gate valves at all branch take-offs, to isolate each piece of equipment and as indicated.

3.3 Field Quality Control

.1 Test system in accordance with CAN/CSA-B139 and CAN/CSA-B140.0 and authorities having jurisdiction.

.2 Isolate tanks from piping pressure tests.

.3 Maintain test pressure during backfilling.

3.4 Flushing and Cleaning

.1 Flush after pressure test with number 1 or number 2 fuel oil for a minimum of 2 hours. Clean strainers and filters.

.2 Dispose of fuel oil used for flushing out in accordance with requirements of authority having jurisdiction.

END OF SECTION

PART 1 GENERAL

1.1 General

.1 This Section covers items common to Sections of Division 16. This section supplements requirements of Division 1.

1.2 Codes and Standards

.1 Do complete installation in accordance with CSA C22.1-1998 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1-M1987 except where specified otherwise.

1.3 Care, Operation and Start-up

.1 Instruct Engineer and operating personnel in the operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.4 Voltage Ratings

.1 Operating voltages: to CAN3-C235-83.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 Permits, Fees and Inspection

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Engineer will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.

.4 Notify Engineer of changes required by Electrical Inspection Department prior to making changes.

.5 Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to Engineer.

1.6 Materials and Equipment

.1 Provide materials and equipment in accordance with Section [01610 - Basic Product Requirements].

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.

.3 Factory assemble control panels and component assemblies.

1.7 Electric Motors, Equipment and Controls

.1 Supplier and installer responsibility is indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings.

.2 Control wiring and conduit is specified in Division 16 except for conduit, wiring and connections below 50 V that are related to control systems.

1.8 Finishes

1. Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
   .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.
2. Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
3. Clean and prime exposed non-galvanized hangers, racks and astenings to prevent rusting.

1.9 Equipment Identification

.1 Identify electrical equipment with nameplates as follows:

.2 Nameplates:

.1 Lamicoid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters

NAMEPLATE SIZES			
Size 7	25 x 100 mm	2 lines	6 mm high letters

.3 Labels:

.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.4 Wording on nameplates to be approved by Engineer prior to manufacture.

.5 Allow for average of twenty-five (25) letters per nameplate.

.6 Identification to be English.

.7 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.8 Identify equipment with Size 3 labels engraved "ASSET INVENTORY No. [___]". Number as and if directed by Engineer.

.9 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.10 Terminal cabinets and pull boxes: indicate system and voltage.

.11 Transformers: indicate capacity, primary and secondary voltages.

1.10 Wiring Identification

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

1.11 Conduit and Cable Identification

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at [15] m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue

	Prime	Auxiliary
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

1.12 Wiring Terminations

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.13 Manufacturers and CSA Labels

.1 Visible and legible, after equipment is installed.

1.14 Warning Signs

.1 As specified and to meet requirements of Electrical Inspection Department and Engineer.

.2 Porcelain enamel signs, minimum size 175 x 250 mm.

1.15 Single Line Electrical Diagrams

.1 Provide single line electrical diagrams [under plexiglass] [in glazed frames] as follows:

.1 Electrical distribution system: locate in main electrical room.

.2 Electrical power generation and distribution systems: locate in power plant rooms.

.2 Provide fire alarm riser diagram, plan and zoning of building [in glazed frame] [under plexiglass] at fire alarm control panel and annunciator.

.3 Drawings: [600 x 600] mm minimum size.

1.16 Mounting Heights

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Local switches: 1400 mm.

.2 Wall receptacles:

.1 General: 300 mm.

.2 Above top of continuous baseboard heater: 200 mm.

.3 Above top of counters or counter splash backs: 175 mm.

.4 In mechanical rooms: 1400 mm.

.3 Panelboards: as required by Code or as indicated.

.4 Telephone and interphone outlets: 300 mm.

.5 Wall mounted telephone and interphone outlets: 1500 mm.

1.17 Load Balance

.1 Measure phase current to panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.18 Conduit and Cable Installation

.1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.2 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.19 Field Quality Control

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Master Electrical contractor license as issued by the Province that the work is being contructed.

.3 Conduct and pay for following tests:

.1 Circuits originating from branch distribution panels.

.2 Lighting and its control.

Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

.4 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.5 Insulation resistance testing.

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.6 Carry out tests in presence of Engineer.

.7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.8 Submit test results for Engineer's review.

1.20 Co-ordination of Protective Devices

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

END OF SECTION

PART 1 GENERAL

1.1 Description

.1 Incoming telephone service facilities from property line to main terminal, wireless.

1.2 Coordination with Telephone and Telecommunication Authorities

.1 Co-ordinate with NWTel to ensure availability of service.

PART 2 PRODUCTS

2.1 Material

.1 Communication line hardware to CAN/CSA-C83.

.2 DDC Controller.

2.2 Manufacturer

.1 DDC Controller Standard of Acceptance – Siemens.

PART 3 EXECUTION

3.1 Installation

.1 Install telephone service facilities.

.2 Install telephone panel.

.3 Install grounding system and make connections.

.4 Install antenna on building as required by NWTel.

END OF SECTION

PART 1 GENERAL

1.1 Work Included

.1 Supply and install a complete monitoring system as shown on the drawings and as specified herein.

.2 Components shall include:

- Intake Pumphouse Building Temperature
- Intake Pumphouse Main Line Temperature
- Intake Pumphouse Main Line Pressure
- Boiler Shacks (2) – Mainline Temperature
- Boiler Shacks (2) – Mainline Pressure
- Boiler Shacks (2) – Building Temperature
- Water Storage Tank Level.

.3 Responsibility shall include supply and installation of all components as specified herein so to provide a functioning system, including start-up, testing, and documentation.

.4 Documentation shall include:

- Control panel shop drawings, face layouts, schematics and point to point wiring diagrams.
- Schematics, interconnecting wiring diagrams including conductor indentification and field terminals and motorschematics where applicable.
- As-built drawings of the completed systems.
- Five (5) sets of operating and maintenance materials, wiring diagrams for inclusion into the O&M manuals.

1.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 1330 – Submittal Preocedures.

.2 Include schematic, wiring, interconnection diagrams, specific product information of components used in the building of the above mentioned panels.

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1.3 Qualifications

.1 The DDC manufacturer shall be a firm normally engaged and fully competent in this type of work. The firm shall have been continuously engaged in this business for at least five (5) years.

.2 The firm shall show that it maintains a fully equipped and qualified organization in Canada, capable of performing the present work and of providing continuous service after the project is completed.

PART 2 PRODUCTS

2.1 General

.1 Products shall be selected based on the specification herein and on the arrangement and interconnection schematics in the drawings. Components shall be selected on the basis of system compatibility and overall operation.

2.2 Enclosures

.1 All enclosures for mounting indoors shall be EEMAC type 1A, gasketted.

.2 Wiring, ducting, instruments, and equipment shall be arranged for convenience of maintenance. All terminals and calibration adjustments must be accessible.

.3 All incoming and outgoing instrument and control wiring shall be terminated on terminal blocks. Field wiring shall match control wiring identification. Wiring numbers shall be installed on both ends of each wire.

.4 Insulation sleeves shall be used as connectors, sockets and terminals where the possibility of "shorts" exists.

.5 Terminal block spare terminals shall be provided with 20% spare.

.6 Control terminals shall be Weidmuller SAK6N type, Entrelec, or Allen Bradley. Control terminals shall be labeled identical to the wiring numbers, IE. wire no. 3021 connected to field terminal no. 3021, no exceptions.

2.3 Water Pressure Indicators

.1 Analog sensor with a 4 to 20 mA output signal. Sensor element to be stainless steel. Range 0 to 150 psi accuracy : /- 0.5 %.

.2 Standard of acceptance Sentra model 206

2.4 Water Temperature Indicator

.1 Analog sensor with a changing resistance output signal. Sensor element to be platinum wire resistance type. Range –40 degree C to 20 degree C accuracy : /- 0.5 %.

.2 Standard of acceptance Siemens liquid immersion model 544-577

2.5 Ultrasonic Level Indicators

.1 Non-contacting ultrasonic liquid level measurement. Polycarbonate CSA enclosure, Nema 4, Displays: high contrast 4 digit 18 mm LCD's, resolution: the greater of 0.1% of range or 2 mm accuracy: 0.25% of range or better, VAC input: 120, output 4-20 mA, 5-form C (SPDT) relays. Standard of Acceptance: Miltronics MultiRanger Plus with ST25C series transducer.

2.6 Building Temperature Indicators

.1 Flush mount Room Temperature Sensor changing resistance (4 to 20 mA) output signal. Sensor to be housed in standard electical surface mount box. Range 0 to 40 degrees C accuracy : /- 0.2 degrees C.

.2 Standard of acceptance Sentra model 206

2.7 Modular Equipment Controller

.1 Standard of acceptance Siemens Modular equipment Controller ; MEC Controller 100 series.. Supply with battery back up and autodialer system complete with NEMA 1 enclosure.

.2 Telecommunication Capability:

1. Auto-dial/auto-answer communications shall be provided to allow DDC Controllers to communicate with remote operator stations and/or remote terminals via telephone lines, as indicated in the sequence of operations.
2. Auto-dial DDC Controllers shall automatically place calls to workstations to report alarms or other significant events. The auto-dial program shall include provisions for handling busy signals, "no answers" and incomplete data transfers.
3. Operators at dial-up workstations shall be able to perform all control functions, all report functions and all database generation and modification functions as described for workstations connected via the network. Routines to automatically answer calls from remote DDC or Controllers shall be inherent in the Controller. The use of additional firmware or software is not acceptable. The fact that communications are taking place with remote DDC Controllers over telephone lines shall be completely transparent to an operator.

.3. DDC Controllers shall be a 16-bit stand-alone, multi-tasking, multi-user, real-time digital control processors consisting of modular hardware with plug-in enclosed processors, communication controllers, power supplies and input/output point modules. Controller size shall be sufficient to fully meet the requirements of this specification and the attached point I/O schedule. Each controller shall support a minimum of three (3) Floor Level Application Specific Controller Device Networks.

.4 Each DDC Controller shall have sufficient memory to support its own operating system and databases, including:

1. Control processes
2. Energy management applications
3. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
4. Historical/trend data for points specified.
5. Maintenance support applications
6. Custom processes
7. Operator I/O
8. Dial-up communications
9. Manual override monitoring

3.Each DDC Controller shall support firmware upgrades without the need to replace hardware.

4.Provide all processors, power supplies and communication controllers so that the implementation of a point only requires the addition of the appropriate point input/output termination module and wiring.

5. DDC Controllers shall provide a minimum two RS-232C serial data communication ports for operation of operator I/O devices such as industry standard printers, operator terminals, modems and portable laptop operator's terminals. DDC Controllers shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems, printers or terminals.

6.As indicated in the point I/O schedule, the operator shall have the ability to manually override automatic or centrally executed commands at the DDC Controller via local, point discrete, on-board hand/off/auto operator override switches for digital control type points and gradual switches for analog control type points.

1. Switches shall be mounted either within the DDC Controllers key-accessed enclosure, or externally mounted with each switch keyed to prevent unauthorized overrides.
2. DDC Controllers shall monitor the status of all overrides and inform the operator that automatic control has been inhibited. DDC Controllers shall also collect override activity information for reports.

7.DDC Controllers shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device. Graduated intensity LEDs or analog indication of value shall also be provided for each analog output. Status indication shall be visible without opening the panel door.

8.Each DDC Controller shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all panel components. The DDC Controller shall provide both local and remote annunciation of any detected component failures, low battery conditions or repeated failure to establish communication.

2.8 Intranet/Internet Access

1. Web Based Operator Interface; The BAS shall provide a web based graphical interface that allows users to access the BAS data via the Internet, extranet, or Intranet. The interface shall use HTML based ASP pages to send and receive data from the BAS to a web browser.
2. A web server computer will be supplied. The web server shall use Microsoft's IIS server 4.0 with Windows NT4, or IIS 5.0 with Windows 2000, and support browser access via Microsoft Internet Explorer 5.0 (or higher), or Navigator Netscape 6.0 (or higher).
3. All information exchanged over Internet shall be optionally encrypted and secure via SSL (provided by Owner).
4. Access to the web interface may be password protected. A users rights and privileges to points and graphics will be the same as those assigned at the BAS workstation. An option will exist to only allow users "read" access via the web browser, while maintaining "command" privileges via the BAS workstation.
5. Commissioning of the Web interface shall not require modification or creation of HTML or ASP pages. All graphics available at the BAS graphical workstation shall be available to users via a web browser.
6. The web-based interface shall provide the following functionality to users, based on their access and privilege rights:
    1) Logon Screen – allows the user to enter their user name, password and Domain name for logging into the web server.
    2) Alarm Display – a display of current BAS alarms to which the user has access will be displayed. Users will be able to acknowledge and erase active alarms, and link to additional alarm information including alarm messages, and informational and memo text. Any alarm acknowledgements initiated through the web interface will be written to the BAS central workstation activity log.
    3) Graphic Display – Display of system graphics available in the BAS workstation will be available for viewing over the web browser. Software that requires creation of "web" graphics in order to display them via the browser interface will not be acceptable. A graphic selector list will allow users to select any graphics to which they have access. Graphic displays will automatically refresh with the latest change of values. Users will have the ability to command and override points from the graphic display as determined by their user accounts rights.
    4) Point details – users will have access to point detail information including operational status, operational priority, physical address, and alarm limits, for point objects to which they have access rights.
    5) Point Commanding – users will be able to override and command points they have access to via the web browser

interface. Any commands or overrides initiated via the web browser interface will be written to the BAS central workstation activity log.

7. The web server licensing options will allow concurrent access by (5), (10), (25). (50), (100) browser connections
8. Internet connections, ISP services, as well as necessary firewalls or proxy servers shall be provided by the Owner as required to support the web access feature.
9. In the event of the loss of normal power, there shall be an orderly shutdown of all DDC Controllers to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 60 days.
10. Upon restoration of normal power, the DDC Controller shall automatically resume full operation without manual intervention.
11. Should DDC Controller memory be lost for any reason, the user shall have the capability of reloading the DDC Controller via the local RS-232C port, via telephone line dial-in or from a network workstation PC.
12. Provide a separate DDC Controller for each AHU or other HVAC system as indicated in Section 3.02. It is intended that each unique system be provided with its own point resident DDC Controller.

2.11 PERSONAL COMPUTER OPERATOR WORKSTATION HARDWARE

A. Personal computer operator workstations shall be provided for command entry, information management, system monitor, alarm management and database management functions. All real-time control functions shall be resident in the DDC Controllers to facilitate greater distribution, fault tolerance and reliability of the building automation control.

1. Provide workstation(s) of equal capability located as determined by the consultant or owner.

2. Workstation shall consist of a personal computer with minimum 256MB RAM, hard drive with 3.0 GB available space, video card capable of supporting 1024 × 768 resolution with a minimum of 65536 colors (Windows NT) or 16 Bit color (Windows 2000), CD-ROM, CD-R, CD-RW, or DVD-ROM Drive, mouse and 101-key enhanced keyboard. Personal computer shall be a Windows 2000 or NT4 Compatible PC and shall include a minimum 933MHz Pentium-III processor.

3. The PC monitor shall support a minimum display resolution of no less than 1024 X 768 pixels. Separate controls shall be provided for color, contrasts and brightness. The screen shall be non-reflective.

B. Provide an Epson FX-870 or equivalent printer at each workstation location or on the network (Ethernet) for recording alarms, operator transactions and systems reports.

(** Note: Include C. if color printer option is used)

.....

B. Provide a color printer as determined by the consultant or owner for printing of dynamic trend graph report, Excel reports, graphics and any other screen displays. Printer shall include as a minimum Okidata Microline 590 or equivalent.

C. Alarm Display shall list the alarms with highest priority at the top of the display. The alarm display shall provide selector buttons for display of the associated point graphic and message. The alarm display shall provide a mechanism for the operator to sort alarms.

D. Intranet/Internet Access

(Note: Option for web browser access via Intranet/internet**)**

1. Web Based Operator Interface

a. The BAS shall provide a web based graphical interface that allows users to access the BAS data via the Internet, extranet, or Intranet. The interface shall use HTML based ASP pages to send and receive data from the BAS to a web browser.

b. A web server computer will be supplied. The web server shall use Microsoft's IIS server 4.0 with Windows NT4, or IIS 5.0 with Windows 2000, and support browser access via Microsoft Internet Explorer 5.0 (or higher), or Navigator Netscape 6.0 (or higher).

c. All information exchanged over Internet shall be optionally encrypted and secure via SSL (provided by Owner).

d. Access to the web interface may be password protected. A users rights and privileges to points and graphics will be the same as those assigned at the BAS workstation. An option will exist to only allow users "read" access via the web browser, while maintaining "command" privileges via the BAS workstation.

e. Commissioning of the Web interface shall not require modification or creation of HTML or ASP pages. All graphics available at the BAS graphical workstation shall be available to users via a web browser.

f. The web-based interface shall provide the following functionality to users, based on their access and privilege rights:

1) Logon Screen – allows the user to enter their user name, password and Domain name for logging into the web server.

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5) Point Commanding – users will be able to override and command points they have access to via the web browser interface. Any commands or overrides initiated via the web browser interface will be written to the BAS central workstation activity log.

g. The web server licensing options will allow concurrent access by (5), (10), (25), (50), (100) browser connections.

h. Internet connections, ISP services, as well as necessary firewalls or proxy servers shall be provided by the Owner as required to support the web access feature.

2.12 WORKSTATION OPERATOR INTERFACE

A. Basic Interface Description

1. Operator workstation interface software shall minimize operator training through the use of user-friendly and interactive graphical applications, 30-character English language point identification, on-line help, and industry standard Windows application software. Interface software shall simultaneously communicate with and share data between any combination of dedicated, modem autodial, and Ethernet-connected building level networks. The software shall provide, as a minimum, the following functionality:

a. Real-time graphical viewing and control of the BAS environment

b. Reporting

c. Scheduling and override of building operations

d. Collection and analysis of historical data

e. Point database editing, storage and downloading of controller databases.

f. Alarm reporting, routing, messaging, and acknowledgment