1.0 General

1.1 REQUIREMENTS AND PROCEDURES

.1 This section specifies general requirements and procedures for contractors submissions of shop drawings, product data, samples and mock-ups to Engineer for review. Additional specific requirements for submissions are specified in individual sections of Divisions 2 to 16.

.2 Do not proceed with work until relevant submissions are reviewed by Engineer.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submissions.

.6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer.

1.2 SUBMISSION REQUIREMENTS

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow 5 working days for Engineer's review of each submission.

.3 Accompany submissions with transmittal letter, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address, and subcontractor (if applicable)

.4 Identification and quantity of each shop drawing, product data and sample.

.5 Name, address and telephone numbers of supplier and manufacturer.

.6 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

1.3 SHOP DRAWINGS

.1 The term "Shop Drawings" shall mean any of the following:

.1 Original drawings or modified standard drawing prepared by the Contractor, or any of his subcontractors or equipment suppliers.

.2 Manufacturer's catalogue sheets, brochures, literature, performance charts and diagrams and similar documentation used to illustrate manufactured products.

.2 Shop drawings shall clearly indicate details of construction of the work, including:

.1 Layout, showing dimensions, including identified field dimensions and clearances

.2 Setting or erection details

.3 Capacities

.4 Performance characteristics

.3 Submit a minimum of eight (8) copies of all shop drawings.

.1 One (1) copy to Engineer's files.

.2 Seven (7) copies are to be retained by Engineer for future inclusion into Chapter 9 of Operations and Maintenance Manual. These copies are to be original manufacturer's brochures, etc., as specified in Section 01730 Operations and Maintenance Manual Section 2.4.6.

END OF SECTION

1.0 General

1.1 CONSTRUCTION SAFETY MEASURES

.1 Observe construction safety measures of the National Building Code Part 8, Territorial Government, Workers'/Workmen's Compensation Board and Municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

.2 Comply with the requirements of the Safety Act of Nunavut.

1.2 OVERLOADING

.1 Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation.

1.3 WHMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, and storage, of hazardous materials: and regarding labelling of containers and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada and Health and Welfare Canada.

.2 Deliver copies of MSDS sheets to Engineer on delivery of materials.

1.4 SHEETING AND SHORING

.1 Provide sheeting and shoring as required for installation of underground works to provide construction safety for workmen in accordance with National and Territorial regulations.

1.5 PROPANE CYLINDERS

.1 Propane cylinders shipped to site must be provided with a locked, tamper proof, closure cap for the operating valve.

.2 Propane to be stored in accordance with Territorial regulations.

2.0 Products (not applicable)

3.0 Execution (not applicable)

END OF SECTION

1.0 General

1.1 FIRES

.1 Fires and burning of rubbish on site is only allowed with proper permits.

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.

.3. All waste material is to be disposed of at the community landfill site. The Contractor is responsible to obtain all permits.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways, unless authorized under permits obtained from the regulatory authority.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways, except as authorized.

.4 Do not use equipment in existing water reservoir.

1.5 POLLUTION CONTROL

.1 Control emissions from equipment and plant to local authorities emission requirements.

.2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

2.0 Products (not applicable)

3.0 Execution (not applicable)

END OF SECTION

1.0 General

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.3 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

1.2 MANUFACTURERS INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify Engineer in writing of any conflict between these specifications and manufacturers instructions. Engineer will designate which document is to be followed.

1.3 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.

.3 Conceal fasteners where indicated. Space evenly and lay out neatly.

.4 Fastenings which cause spalling or cracking are not acceptable.

1.4 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.5 DELIVERY AND STORAGE

.1 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.

.2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.

.3 Store material and equipment in accordance with suppliers instructions.

.4 Touch-up damaged factory finished surfaces to Engineer's satisfaction. Use primer or enamel to match original. Do not paint over name plates.

2.0 Products

2.1 MATERIALS

.1 Quality:

.1 Refer to GC 22.

.2 Unless otherwise stipulated elsewhere in the Contract Documents, the Contractor shall provide and pay for labour, products, tools, construction machinery and equipment, water, heat, light, power, transportation and other facilities and services necessary for the performance of the work in accordance with the Contract.

.3 Products, materials, equipment and articles (referred to as Products throughout the specifications) incorporated in the work shall be new, not damaged or defective, and of the best quality (compatible with specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.4 Defective products, whenever identified prior to the completion of work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.5 Should any dispute arise as to the quality or fitness of products, the decision rests strictly with the Engineer based upon the requirements of the Contract Documents.

.6 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item.

.2 Availability:

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify the Engineer of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.

.2 In the event of failure to notify the Engineer at commencement of work and should it subsequently appear that work may be delayed for such reason, the Engineer reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

.3 Transportation:

.1 Pay costs of transportation and handling of products required in the performance of work.

2.2 SUBSTITUTION

.1 Further to Clause 8 of the Intructions to Tenderers:

.1 No substitutions will be permitted without prior written approval of Engineer.

.2 Proposals for substitution may only be submitted after award of contract. Such request must include statements of respective costs of items originally specified and the proposed substitution.

.3 Proposals will be considered by Engineer if:

.1 materials selected by tenderer from those specified, are not available;

.2 delivery date of materials selected from those materials specified would unduly delay completion of contract, or

.3 alternative material to those specified, which are brought to the attention of and considered by Engineer as equivalent to the material specified and will result in a credit to the Contract amount.

.4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.

.5 Amounts of all credits arising from approval of substitutions will be determined by Engineer and Contract Price will be reduced accordingly.

3.0 Execution (not applicable)

END OF SECTION

1.0 General

1.1 RECORD DRAWINGS

.1 Engineer will provide two (2) sets of white prints for record drawing purposes.

.2 Maintain project record drawings and record accurately deviations from Contract documents.

.3 Record changes in red. Mark on one set of prints and at completion and prior to final inspection, neatly transfer notations to second set and submit both sets to Engineer.

.4 Record following information:

.1 Depths of various elements of buried piping, etc. in relation to project benchmark.

.2 Horizontal and vertical location of underground utilities and appurtenances referenced to project benchmark.

.3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

.4 Field changes of dimension and detail.

.5 Changes made by Change Order or Field Instruction.

.5 Redlined drawings:

.1 Redlined drawings must be completed by the Contractor and submitted to Engineer for review. Provide final redlined copies including all necessary changes.

.2 Provide reduced copies of as-built drawings for inclusion in final Operation and Maintenance Manual.

.3 Substantial Completion WILL NOT be awarded without completed as-built drawings.

2.0 Products (not applicable)

3.0 Execution (not applicable)

END OF SECTION

PART 1 GENERAL

1.1 Operations and Maintenance Manual

.1 Operations and Maintenance Manuals for the project will be produced by the Contractor, as outlined in Section 2.1.2.

.2 Manuals are to cover all installed items requiring or likely to require operating, maintenance, or repairs.

.3 The Contractor's work includes: the complete authoring, organization, and supply of O&M manual material as detailed in this section.

.4 All work described in this section is the Contractor's work except where specifically indicated otherwise.

.5 The number of copies required is five (5).

.6 The draft Operation and Maintenance manual is to be submitted for review by the Engineer a minimum of six weeks prior to substantial completion.

.7 The final approved and completed Operation and Maintenance Manuals are to be delivered to the Engineer at least 14 days before the Substantial Completion inspection. Deliver any outstanding information prior to requesting final inspection. The data is to be separated into individual manual sets, organized into applicable categories of work parallel to the specification sections and each chapter in order and identified.

.8 Substantial Completion WILL NOT be awarded without completed Operation and Maintenance Manuals.

1.2 Reference Standards

.1 The Contractor's Operation and Maintenance manual submissions are to conform to the current edition of "Specifications for Operations and Maintenance Manuals", Department of Public Works and Services, Government of Nunavut.

PART 2 FORMAT

2.1 Organization

.1 The provision of Binders and Dividers are the responsibility of the Contractor.

.2 The completed manual will contain 10 chapters. The responsibility for production of each chapter is indicated below:

.1 Introduction (by Engineer)

.2 Index (by Contractor)

.3 Background, Design Data (by Engineer)

.4 Schematic, Functional Data (by Engineer)

.5 Components Details (by Contractor)

.6 Operating Procedures (by Engineer)

.7 Maintenance Procedures (by Engineer)

.8 Testing and Certification Data (part by Contractor)

.9 Manufacturer Data and Service Information (by Contractor)

.10 Appendices (by Contractor)

.3 Group information logically by system within chapters to the greatest possible extent. Organize the information on each system in the most logical fashion, for example, from supply point through to point of use.

2.2 Language

.1 English for all information.

2.3 Testing and Certification Data (Chapter 8)

.1 Provide data sheets that provide actual operating conditions after the systems have been balanced or adjusted to design conditions. Data required includes balancing of air and water systems, final control settings, field check data on all motors including rpm, voltage, phase, and actual current under normal loads, alignment certificates from millwrights, electrical load balancing, etc.

.2 Include all data sheets recording concrete test results, data tests for leakage, drain operation, ground test, pump capacity tests, etc.

.3 List all items that require periodic inspection by independent inspectors. List the frequency of inspection, the inspection agency to contact, including address and current phone number.

.4 Include a photocopy of each certificate issued by the independent inspectors who make inspections pursuant to health, safety, and other regulations of a similar nature. Indicate where the original of each such certificate is filed and where it is to remain displayed.

.5 Include the originals of manufacturer's warranties in Copy 1 of the manual.

.6 Include clear, legible photocopies in copies 2 through 5.

.7 Group warranties together to form a section in Chapter 8.

2.4 Manufacturer's Information (Chapter 9)

.1 This chapter of the Operation and Maintenance manual provides a collection of all manufacturer's service manuals, parts lists, operating and maintenance instructions, performance curves, and other applicable data that may be required in future years.

.2 Include information needed for operation, maintenance and repair of every component of mechanical and electrical systems, and any other system requiring or likely to require operation or routine maintenance.

.3 Preface this section with an index. List in order each item by the manufacturer's name and the pieces of equipment to which it refers. Include supplier's name, address, and phone number.

.4 Include:

.1 Maintenance instructions for finished surface and materials.

.2 Copy of hardware and paint schedules.

.5 Include all service manuals, data sheets, and other manufacturer's information for each component.

.6 Manufacturer's information is to be original in all copies of the manual. Photocopies are not acceptable.

.7 On the first page of each inclusion, identify the piece of equipment to which it refers. Include nameplate information such as model, size, capacity, serial number, etc.

.8 Remove pages from manufacturer's information that are irrelevant to the equipment provided to this project.

.9 Where tables and curves are given for the full range of sizes, underline in red in all copies the data that refers to the installed equipment. If more than one size or type in the same table was used, add the identification for each in the margin to assist positive identification. Draw a thick diagonal black line across all data not applicable to equipment provided.

.10 If any warning instructions are included which, if ignored, could significantly affect the equipment, mark these with red arrows in all copies, to draw to the operator's attention.

.11 Service manuals must be the operating and maintenance type, which gives parts lists, preferably including an exposed or sectioned drawing for guidance in assembling, installation details, lubrication, and operations details. Sales types of brochures, which give only a very general description and few details, are not acceptable.

.12 Mount any items that are smaller than 8½"x 11", on a full page, for inclusion in the manual.

.13 Include all wiring diagrams complete with wire coding.

PART 3 EXECUTION

3.1 Not Used

.1 Not Used

END OF SECTION

1.0 General

.1 Operating personnel shall be contacted at the beginning of the project and encouraged to come on site at least once a week for the duration of the project. During these periods, they shall be given a full explanation of the various systems as the project progresses.

.2 Maintain a log of all site visits. Maintenance personnel that login/out are to be witnessed by the Contractor. Provide the log record to the Engineer at the Substantial Completion inspection.

1.1 RELATED WORK

.1 Commission the various process, mechanical, electrical, and control systems for the work performed under this project, and any changes to the rest of the system as a result of the completed work.

.2 See specific specification sections for additional and/or detailed procedures for commissioning.

1.2 SUBMISSIONS

.1 The Contractor shall furnish, to the Engineer, his detailed methodology and schedule for the commissioning of each plant process at least twenty (20) working days prior to planned start of commissioning for the process. The plan shall include the following:

.1 Detailed schedule of events.

.2 Methods for introducing flow, disposing of partially treated water, and disposing of any waste generated during commissioning.

.3 Planned attendance of manufacturer's representatives.

.4 Contingency plans in the event of a process malfunction.

.5 Drawings and sketches as required to illustrate the planned sequence of events.

.2 The Contractor and Engineer shall discuss and mutually agree to the provisions of the commissioning plan.

1.3 CO-ORDINATION

.1 The Contractor shall co-ordinate with Subcontractors to ensure their attendance as necessary to make any adjustments or to facilitate any minor repairs during commissioning.

1.4 INSPECTION/TAKEOVER PROCEDURES

.1 Two weeks prior to the Substantial Completion inspection, operating personnel shall be given instruction for a period of two weeks with a minimum of six hours per day. Instruction is to be provided during regular work hours. Language of instruction to be in English. Instruction to include:

- .1 Intake pump extraction, replacement, and installation.
- .2 Intake pump selection.
- .3 Heat trace removal and replacement.
- .4 Fuse locations and replacement.
- .5 Water Treatment System operation and maintenance, including all automatic and manual operations.
- .6 Water storage tank operation.
- .7 Truckfill system operation in botic and manual settings.
- .8 Stand-by power generator operation and maintenance.
- .9 Boiler and heat exchanger operation and maintenance.
- .10 Monitoring and controls function and procedures.

.2 The Contractor shall operate the new system for one week prior to calling for substantial completion inspection.

.3 Prior to application for Substantial or Final Certificate of Completion, carefully inspect the work and ensure it is complete, that major and minor construction deficiencies are complete and/or corrected and the building is clean and in condition for occupancy. Notify the Engineer in writing, of satisfactory completion of the work and request an inspection.

.4 During the substantial completion inspection, the Engineer will prepare a list of deficiencies and defects. Correct all deficiencies identified.

.5 When the deficiencies and defects have been corrected and requirements of the Contract have been performed, make application for Certificate of Final Completion. Refer to General Conditions Article GC43, Engineer's Certificates for specifics to application.

.6 When the above requirements have been met, set date for Final Completion Inspection.

.7 In the event the facility is not ready for commissioning or cannot be successfully commissioned on the date set for commissioning and the Contractor has not notified the Engineer in sufficient time to prevent unnecessary travel, the Contractor shall pay for travel and accommodation costs for subsequent trips by the Engineer and Owner and all of their agents and representatives.

.8 The Certificate of Final Completion will not be issued until all requirements of the Contract have been met.

2.0 Products

2.1 EQUIPMENT

.1 All process equipment shall be satisfactorily installed and tested as per the requirements of the specifications and drawings. The electrical and the control systems and any related services pertaining to each piece of equipment shall be completed and shall be operational.

2.2 POWER

.1 Be responsible for all electrical power and fuels used during commissioning.

2.3 CHEMICALS

.1 Supply all chemicals required to satisfactorily complete commissioning.

2.4 MANPOWER

.1 Supply all staff required during commissioning necessary to operate the plant processes.

2.5 SYSTEMS

.1 The systems which must be commissioned include; but are not limited to:

.1 Intake and heat trace.
.2 Intake pump removal and installation.
.3 Alarms, monitoring and metering.
.4 Motor controls and pump operations.
.5 Water Treatment System.
.6 Water Storage.
.7 Truckfill System.
.8 Stand-by Power Facilities.
.9 Boiler and Heat Exchangers.
.10 Monitoring and Controls.

3.0 Execution

3.1 PREPARATION

.1 Each item of process equipment included in the process system to be commissioned shall be satisfactorily tested under all conditions.

.2 Piping systems shall be finished and tested.

.3 All services shall be operational.

.4 Electrical connections shall be complete and inspected if required by the permit to the satisfaction of the governing authorities.

.5 Control systems shall be fully operational.

.6 In the process areas, architectural finishes, painting, and heating, etc., shall be substantially complete.

3.2 SEQUENCE

.1 The process systems shall be commissioned from upstream to downstream.

3.3 COMMISSIONING

.1 Raw water will be introduced in a manner which precludes the damage of any equipment or structures.

.2 For a period of twenty-four (24) hours, twice during commissioning, each process system shall be subjected to flows and loads as close to design conditions as possible. Where necessary to achieve this, augment flows from other sources or operate a part of the system at any time to exaggerate the naturally occurring flows and loads.

.3 Operate all systems in automatic, manual-remote and manual-local modes as applicable.

.4 Ensure all bypasses and backup provisions function satisfactorily.

.5 Induce all minor and major process alarm conditions. Ensure the process reacts as designed, and the applicable alarms are annunciated.

3.4 TESTING

.1 Acquire all samples as directed by the Engineer to provide a basis for process evaluation.

.2 Arrange and be responsible for the transportation to a qualified laboratory of all the samples to be tested at an outside facility. Be responsible for the analyses and communication of results to the Engineer.

.3 Co-operate with the Engineer in undertaking all analyses of samples to be tested at the plant.

3.5 ACCEPTANCE

.1 The commissioning of a continuously operating process, mechanical or electrical system shall be considered acceptable when the system has operated in a stable manner, satisfying the specified basic design criteria for a period of fourteen (14) consecutive days.

.2 Where a system operates intermittently, commissioning shall be considered acceptable when the system has been operated in a stable manner, satisfying the specified basic design criteria, as often as required during a period of fourteen (14) consecutive days but in no case less than four (4) days.

END OF SECTION

Contents

PART 1 GENERAL

1.1 Related Sections

.1 Section 16010 - Electrical General Requirements .

.2 Section 16062 - Grounding - Secondary.

.3 Section 16122 - Wire and Cables 0-1000V.

.4 Section 16133 - Conduits, Conduit Fastenings and Conduit Fittings .

1.2 References

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-C83- 87, Communication and Power Line Hardware.

1.3 Regulatory Requirements

.1 Co-ordinate and meet requirements of power supply authority. Ensure availability of power when required.

PART 2 PRODUCTS

2.1 Material

.1 Service mast: rigid heavy duty, galvanized steel , suitable for attachment of support clamps. insulator rack, weatherhead, service drop fittings.

.2 Insulator rack: to CAN/CSA-C83, four wire, heavy duty.

.3 Weatherhead: to approval of supply authority .

.4 Rigid steel galvanized conduit, fittings: to Section 16133 - Conduits, Conduit Fastenings and Conduit Fittings .

.5 Service drop conductors and supporting cable: to Section 16122 - Wires and Cables 0-1000 V . copper, size and number of conductors as indicated .

.6 Weatherproof meter socket: to approval of supply authority.

PART 3 EXECUTION

3.1 Installation

.1 Install service mast. insulator rack, weatherhead.

.2 Install meter socket and conduit.

.3 Install service drop conductors allowing sufficient conductor length for connection to service equipment.

.4 Allow sufficient conductor length for connection to supply by power supply authority.

.5 Allow sufficient conductor length for drip loops.

.6 Make grounding connections in accordance with Section 16062 - Grounding - Secondary.

3.2 Field Quality Control

.1 Perform tests in accordance with Section 16010 - Electrical General Requirements.

.2 Perform additional tests if required by authority having jurisdiction.

END OF SECTION