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1. Process Conditions

1.1 General

For design requirements and conditions, refer to the equipment datasheet:

Technical Data Sheet – Potable Water Treatment Plant (Doc. No. H337697-PX701-D460713)

Additional specific requirements are provided below.

Equipment and components shall be the Seller's standard design for the service specified, with readily available replacement parts. No new technology shall be applied to the design of the equipment without examples of operating equipment using the technology in similar design conditions.

1.2 Duty and Operational Requirements

The equipment shall be designed and constructed to operate continuously, 24 hours per day, 365 days per year.

All equipment will be of the Supplier's best quality and construction to ensure a minimum equipment design life of 25 years (exceptions to be noted).

The supplier shall supply a sufficient number of modular trains such that the system can produce 100% of the required flow during peak demand. The potable water system shall be equipped with installed redundant spares for all critical components, including pumps, blower and motors. Spares are to be provided such that in the event of equipment failure, barring any pressure vessel or tank failure, the faulty component can be replaced and the system put back into service within hours. During regular maintenance or servicing of the equipment the daily design flow shall still be met. During normal operation all trains are to be in service to treat the feed flow.

1.3 Material Characteristics

The Seller shall fabricate the equipment using only new materials of first grade quality, free from defects impairing strength, durability and appearance.

After the Purchase Order is issued, the Seller shall not substitute materials, without prior written approval from the Owner.

Materials of construction shall be suitable for the specified duty and operating conditions.

Use the lowest material density for volumetric capacity calculations. Use this volume and the highest material density for power calculations.

All materials of construction shall be identified by the Supplier by the current ASTM specification number(s) on the data sheets provided.

Design all equipment components such that corrosion and wear are minimized.

1.4 Site Conditions

Site conditions are identified in Site Conditions Data Sheet (Doc. No. H337696-0000-10-107-0001).

2. Design Conditions

2.1 Feed Water Characteristics

The feed water source for the potable system will be Ocean water. The main water quality parameters are listed in Design Basis - Potable Water Treatment Plant (Table 4-8), Document No. H337697-1000-10-109-0001.

2.2 Potable Water Quality

The potable water treatment plant shall comply with the Canadian Drinking Water Guidelines and the Ontario Drinking Water Quality Standards.

2.3 Potable Water Demand

The average flow requirements of the potable treatment plants shall be based upon the per capita consumption rate given in Section 4.5.2 of the Design Basis – Potable Water Treatment Plant, Doc. No. H337697-4000-10-109-0001).

3. Technical Requirements

3.1 Potable Water Storage Tank

The potable water storage tank shall be sized to provide a minimum of retention of 24 hours in order to ensure a potable water supply during equipment outages.

4. Performance Requirements

4.1 Guarantees

The supplied equipment shall be guaranteed as follows:

Table 4-1: Guarantees

Parameter	Guarantee Requirement
Flows	As per section 2
Potable Water Quality	As per section 2

4.2 Warranty

The Seller shall warrant the equipment's manufacture is free of defects or workmanship for the greater period of 18 months from delivery or 12 months from commissioning. All components deemed to be defective shall be replaced to the Owner at no cost (supply and delivery). Installation or consequential damages costs shall not be the responsibility of the Seller.

In case of assistance delay by the Seller, the Owner reserves the right to perform the necessary maintenance at Seller's full expense.

4.3 Test Methods and Procedures

All test method details, timing, sampling protocols and procedures and tolerances shall be developed by the Seller, submitted with the bid package and agreed upon with the Owner before issue of a purchase order.

5. Pumps, Valves and Piping Requirements

Refer to standard specifications for Piping Materials Specifications, document number to be confirmed, for materials of construction for piping and valves for details.

6. Mechanical Requirements

Standard Mechanical requirements are identified in the Mechanical Design Criteria, Document XXX-TBD (not published).

All equipment and all components shall be the Seller's standard heavy-duty design and fabrication and shall have been proven effective and reliable under similar operating conditions. No new or unproven design is acceptable.

Not all parts and materials are specified in this specification. For those that are not specified, the Seller shall use their standard parts and materials, which will be subject to the approval of the Owner.

The Seller shall notify the Owner if any specific requested component is unsuitable for the required service and present alternatives, along with the technical justifications.

7. Electrical Requirements

Electrical design shall comply with the following:

- H337967-S260050 – Electrical Requirements for Packaged Equipment.

All electrical panels, transformers, lighting panel, MCCs, including starters, circuit breakers, and VFDs shall be provided by the Supplier.

All lighting system, and power outlets, shall be included by the Supplier.

All wiring, cabling conduits, and cable trays to be included by the Supplier.

8. Instrumentation and Controls Requirements

Instrumentation and controls design shall comply with the following:

- Instrumentation Requirements for Packaged Equipment, H337967-S250050

The local control system for the water treatment plant shall be supplied by the seller.

The Owner shall approve all exceptions or deviations from these requirements.

9. Structural Requirements

Structural design shall comply with the following:

- Structural Design Criteria – Doc. No. H337697-0000-35-109-0001.

The container and water tanks shall be designed for seismic and wind conditions in accordance with local codes, API and IBC.

Container and water tanks shall be anchored.

All equipment, including piping and electrical equipment, shall be secured by base plates, supports, or other means.

The Seller shall supply certified design data showing dimensions, loadings, locations and sizes of all steel members which will allow others to design concrete foundations, inserts, and anchor bolts to receive Seller's equipment.

All stairs, ladders, platforms and walkways shall be supplied by the Supplier.

10. Painting Requirements

All exterior metallic surfaces shall be primed and painted / coated with a suitable polyurethane, or epoxy product capable of withstanding the noted site conditions, especially temperature variations without cracking chipping or peeling.

All interior carbon steel surfaces shall be primed and painted / coated or lined, with a suitable polyurethane, or epoxy product, and shall be in accordance with NSF61.

Painting shall not be required for parts of equipment that are manufactured of or coated with corrosion resistant materials, that are machine finished or normally left unpainted.

Machine finished parts that are not manufactured of corrosion resistant materials and are not painted, shall be given a heavy coat of rust-inhibiting compound that can be easily removed at installation by the use of solvents and hand wiping.

11. Regulations, Standards, and Codes

The International System (SI) will be used for all design calculations and on all drawings.

The equipment shall comply with the latest version of all appropriate regulations, standards and codes, including, but not limited to, those listed below:

Table 11-1: Applicable Regulations, Standards and Codes

Number / Acronym	Title
AWWA	American Water Works Association
IBC	International Building Codes
NSF	National Sanitation Foundation
GCWQ	Guidelines for Canadian Drinking Water Quality
NWT Reg 108-2009	Northwest Territories Water Supply System Regulations
Ontario Reg 170/03	Safe Drinking Water Act, 2002
Nunavut Waters and Nunavut Surface Rights Tribunal Act, SC 2002, c 10	
Northwest Territories Water Act	
Northwest Territories Water Regulations (SOR/93-303)	
Ontario Drinking Water Quality Standards	
NSF/ANSI Standard 61	Drinking Water System Components
AWWA Standard B100	Filtering Material
AWWA Standard B604	Granular Activated Carbon
OSHA	Occupational Safety and Health Administration

12. Health, Safety, Environment and Community Requirements

Protection designed for the valid codes and standards shall be installed in order to avoid operator injury. Minimum required protection as follows:

- Operation point protection.
- Moving parts protection.
- Power transmission and gyratory parts protection.
- Hot spots protection.
- Dust emission protection.
- Tools protection.
- Collision detection system (between machines).
- Fire protection and detection system.

13. Assembly and Testing

13.1 Critical Dimensions

All critical dimensions shall be checked prior to shipment. All ancillaries shall be assembled and all motions tested in accordance with manufacturers standard procedures. Prior to disassembly all components shall be match marked, where practical, for ease of field assembly. The Seller shall describe the extent of field assembly required.

13.2 Equipment Assembly

All equipment shall be shipped assembled to the maximum extent possible consistent with shipping limitations indicated below. The Owner shall be consulted prior to the shipment of large components.

13.3 Pre-Assembly

All pre-piped and pre-assembled lube oil and hydraulic oil systems shall be tested for their output pressures and motions to the maximum extent possible.

13.4 Specific Testing Requirements

Water tanks to be hydrostatically tested.

13.5 Control System Components

At the Owner's option, Seller-furnished control systems components shall be subject to Owner-witnessed Factory Acceptance Test (FAT) in accordance with test procedures that shall be

submitted by the Seller and reviewed by the Owner. All input / output signals and control functions shall be simulated. If required, the Seller-furnished components may be subject to integration testing with the main project PCS system.

The Seller shall submit a Site Acceptance Test procedure that will be subject to the Owner's review and permission to proceed. Items such as proper equipment grounding, powering up, checking for correct software installed, etc. shall be included in the procedure.

Wherever possible instruments shall be pre-wired and pre-installed to controller.

14. Shipping, Construction, Commissioning and Operator Training

14.1 Shipping

The equipment will be shipped to an assembly site in the largest feasible sections that allow transportation by road. Protective coatings and coverings shall be applied to ensure that the equipment is not damaged during shipment. The Seller shall provide match-marking of all parts to facilitate field assembly and shall provide shipping dimensions and weights of all components and assemblies.

14.2 Construction Supervision, Testing and Commissioning

The Seller shall make available qualified personnel to advise and assist with on-site supervision of construction and assist with testing and commissioning. The Seller's expense policy shall be outlined in the bid document. The Owner, and / or his representative and any Authorities having jurisdiction over the equipment shall witness all tests.

14.3 Operator Training

If requested, the Seller shall train operators and supervisors in the operation of the supplied equipment. Such training shall include:

- Training lectures and lecture notes.
- On-the-job training during commissioning and plant operation.

The Seller will supply rates and terms for such training.

15. Spare Parts

The Seller shall supply lists of recommended spare parts.

16. Quality Assurance

The Seller shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.

END OF SECTION