Specifications
for the
Potable Water Treatment System Modifications

U.S. Coast Guard Station Alexandria Bay
Wellesley Island, New York

Department of Homeland Security
United States Coast Guard
Civil Engineering Unit Cleveland
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Specifications for the Potable Water Treatment System Modifications for the United States Coast Guard Station Alexandria Bay, Wellesley Island, New York

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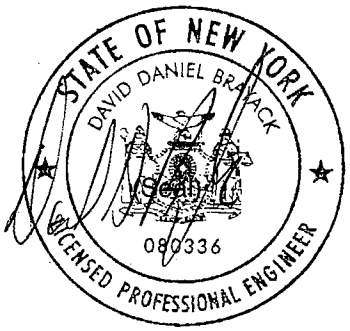
Date



Electrical Specifications for the Potable Water Treatment System Modifications for the United States Coast Guard Station Alexandria Bay, Wellesley Island, New York

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050251

3/27/08
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DEPARTMENT OF HOMELAND SECURITY
UNITED STATES COAST GUARD
MAINTENANCE AND LOGISTICS COMMAND

SPECIFICATIONS
FOR
POTABLE WATER TREATMENT SYSTEM MODIFICATIONS
U.S. COAST GUARD STATION ALEXANDRIA BAY
WELLESLEY ISLAND, NEW YORK

MARCH 2008

COMMANDING OFFICER
UNITED STATES COAST GUARD
CIVIL ENGINEERING UNIT, RM 2179
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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

DIVISION 1
(January 2002 Version)

SECTION 01010
SCOPE OF WORK

1. WORK INCLUDED: Major items of work shall include the following:

1.1. The Contractor shall provide all services and materials necessary for the installation and startup of the potable water treatment system modifications of the United States Coast Guard (USCG) Alexandria Bay Station located in Wellesley Island, New York.

1.2 The scope of work includes, but is not limited to, installation of a river water intake structure and jet pump jet assembly, replacement of existing river water pumps, installation of a water flow meter and cartridge filter housings, replacement of supply pumps, and modification to storage tank piping. The water system provides approximately 860 gallons of water per day.

1.3 The work shall be complete and includes furnishing, as applicable or may be required, all Contractor's plant, equipment, rigging, safety devices, labor, tool, materials, supplies, and services; and performing all operations necessary for or incidental to a complete project in conformance with the attached Contract Drawings and Technical Specifications.

1.4 The Contractor shall furnish all necessary labor, equipment, and materials to furnish and install the river water intake structure. Details of the existing underwater intake jet assembly and existing piping are uncertain and the Contractor shall inspect and evaluate the existing underwater intake and piping prior to installing the new intake structure and jet assembly.

1.5 The Contractor shall furnish all labor, materials, equipment and incidentals to install and field test the components and auxiliary equipment.

1.6 The Contractor shall furnish all necessary labor, equipment, and materials to furnish and install the piping, wiring, and instrumentation interconnections between the above listed treatment components and auxiliary equipment.

1.7. The anticipated order of the project is described below, although the Contractor can propose an alternative sequence.

1. Inspect existing intake equipment and piping, confirm existing conditions, and propose connection of new intake structure and new jet assembly to existing piping.
2. Fabricate new intake structure and piping.
3. Arrange for alternative potable water source.
4. Demolish existing river water pumps, river water pump controls, sand filters, and coagulation tank.
5. Install new river water pumps, control panel, remote alarm, filters, UV disinfection unit, flow meter, injection nozzle, and associated piping. Disinfect new equipment.
6. Install piping modifications on water storage tanks. Disinfect new piping.

7. Install new intake structure and jet assembly.
8. Startup and test new river water pumps and filter system.
9. Install new pressure tanks.
10. Switch existing BFP and existing Y-strainer.
11. Install new supply pumps, controls, and piping. Disinfect new equipment.
12. Startup new supply pumps.
13. Complete startup of new system.

1.8 Work associated with these items are described in the following specification sections and/or are shown on the contract drawings. Incidental work items not listed above and necessary for completing the project shall be included.

2. DRAWINGS: Drawings and the accompanying specifications are the property of the Government and comprise legal documentation that pertains exclusively to this project. Drawings can only be obtained electronically by downloading the files identified with this solicitation at **http://www.fbo.gov**. CEU Cleveland will not provide hard copies of drawings.

2.1 Construction Drawings: CG DWG. 7503-D, Sheets 1 – 12 of 12

2.2 Reference Drawings

SECTION 01015
CONTRACTOR WORK HOURS

1. WORK HOURS: Accomplish work during normal unit operational hours of 7:30 a.m. to 4:30 p.m., Monday through Friday unless otherwise approved by the Coast Guard. Note any departures from these work hours on the Daily Reports.

2. SATURDAY, SUNDAY AND HOLIDAYS: The contractor shall provide the Contracting Officer's Technical Representative at least forty-eight hours advance notice prior to working on weekends or Federal holidays. The Government may reject any such request without impacting the completion time of the contract.

3. CONTRACT COMPLETION: The contractor shall complete work within the time frame indicated upon issuance of the Notice to Proceed. Limitations imposed by these work hours will not entitle the Contractor additional time to complete the project. Refer to FAR Clause 52.211-10 "Commencement, Prosecution and Completion of Work".

SECTION 01028
PRE-BID SITE VISITS

1. GENERAL: Bidders are responsible for visiting the site to field verify existing conditions and determine actual dimensions and the nature of the work required. Failure to visit the site does not relinquish the bidder from determining the extent and scope of the work required and estimating the difficulty and cost to complete the project. Requests for equitable adjustments, in either time or money, arising from failing to field verify site conditions may be denied. Provisions regarding the site visit requirements are outlined in FAR Clause 52.236-3 "Site Investigation and Conditions Affecting the Work"

2. SITE VISIT: Arrange pre-bid site visits to verify existing conditions with the Officer in Charge, U.S. Coast Guard Station Alexandria Bay at (315) 482-2574.

SECTION 01030
PRE-CONSTRUCTION SITE CONDITIONS

1. SITE CONDITION VERIFICATION: The Contractor shall verify the conditions of the existing site, equipment and facilities potentially affected by the work under this contract and photograph and/or videotape the conditions in order to document their pre-construction condition. Copies of the photos and videos shall be submitted to the Contracting Officer prior to starting work.

2. UTILITIES: The contractor shall use proactive measures such as digging, metering, testing, underground utility location devices, and utility company location services to locate all underground utilities identified in the area of work at no additional expense to the Government. Additional cost of unplanned outages and repair of damaged utilities, including emergency repairs by others, not properly identified by the Contractor shall be the Contractor's responsibility.

SECTION 01040
COORDINATION

1. INTERFERENCE WITH COAST GUARD OPERATIONS: Accomplish work in a manner that causes minimal impact on normal operations. The Contractor shall notify the Contracting Officer's Technical Representative at least five working days in advance of any planned outages of water, electrical, telephone, or sanitary facilities. Notify the Contracting Officer's Technical Representative at least one week prior to beginning construction.

2. MILITARY STATION REGULATIONS:

2.1 The Contractor, his employees, and subcontractors shall become familiar with and obey all station regulations. All personnel employed on the project shall keep within the limits of the work and avenues of ingress and egress, and shall not enter any other areas outside of the site of

the work unless required to do so in the performance of their duties. The Contractor's equipment shall be conspicuously marked for identification.

2.2 There shall be NO SMOKING in any Coast Guard building.

2.3 Storage Areas: The Contracting Officer's Technical Representative will determine exact location and boundaries of staging areas. Under no circumstances shall materials be stored in areas that will interfere with aircraft operations.

2.4 Storm Protection: If a gale force wind warning or higher is issued, take precautions to minimize any danger to persons and protect the work and nearby Government property. Precautions shall include, but not be limited to, closings, removing loose materials, tools and equipment, from exposed locations. Remove and secure scaffolding and temporary work. Close openings in the work area if storms of lessor intensity are imminent.

SECTION 01041
FIELD ADJUSTMENTS

1. The Contracting Officer's Technical Representative may authorize field adjustments. Field adjustments are those alterations that do not affect time, price, or intent of the contract documents. All field adjustments shall be documented in the Daily Reports and on the As-Built Drawings.

SECTION 01063
BUILDING PERMITS

1. NO BUILDING PERMITS from state or local governments are required for work performed on federal property. Courtesy permits may be obtained at the Contractor's option. No payment will be made to the Contractor for any permit cost. Design changes to obtain courtesy permits, even at no cost, will not be allowed without written approval of the Contracting Officer.

SECTION 01067
ENVIRONMENTAL PERMITS

1. Unless directed by other sections of this specification, the Contractor will not be responsible for obtaining environmental permits.

SECTION 01200
PROJECT MEETINGS

1. LOCATION: Project meetings will be conducted either on-site or with a conference call. The following meetings may be held:

1.1 Pre-Construction Conference: After award of a contract, the Coast Guard will arrange a conference with the contractor, and necessary Coast Guard personnel. The purpose of this conference is to orient the Contractor to Government procedures for wage rates, contractual and administrative matters, and to discuss specific issues regarding actual construction.

1.2 Progress and Technical Review Meetings: These meetings generally take place at the project site. Either party may request a meeting to review the progress of the project and/or review or clarify the technical requirements of the specifications.

SECTION 01300
SUBMITTALS

1. GENERAL: The Contractor shall submit to the Contracting Officer (4) copies of submittals required by this specification and/or itemized on the **"List of Submittals"** found at the end of this division.

2. REQUEST: A **"CONTRACT ITEM ACCEPTANCE REQUEST"** shall accompany all submittals. All items shall be individually listed and clearly identified, referencing the applicable Section and Paragraph. A copy of this form is located at the end of this division and may be reproduced as needed.

2.1 Up to eight (8) items may be listed on an individual acceptance request. Number each Contract Item Acceptance Request consecutively *(Submittals # 1, 2, etc.)* and re-submittals with letters *(Submittal #1A is the first re-submittal of Submittal #1)*.

2.2 Submittals shall be forwarded to the Contracting Officer. The contractor **shall allow 14 calendar days**, excluding mailing time, for the review process in the Construction Schedule and all project planning. In instances where submittal review must be expedited, the Contractor may annotate the Contract Item Acceptance Request as "Urgent" and provide a FAX number for prompt return. The Coast Guard will make every effort to accelerate the review of each urgent submittal; however, the Contractor should not anticipate a reduced time schedule and shall plan project progress accordingly.

3. ACCEPTANCE: Submittals will be stamped "Accepted," "Accepted with Comments," or "Resubmit". Acceptance, Acceptance with comments or Resubmit for each item will be indicated on the Contract Item Acceptance Request form and one copy returned to the Contractor.

3.1 **Prompt re-submittal of items is required.** The Contractor shall furnish a new Contract Item Acceptance Request numbered in accordance with the requirements of paragraph 2.1.

4. DEFECTIVE WORK: Acceptance of Submittals **does not** restrict the Government's right to reject departures from contract requirements, use of damaged or improperly installed items/materials, or latent defects, nor does it prejudice the Government's rights of rejecting any work found defective at Final Inspection and Acceptance.

4.1 Work started or completed prior to submittal acceptance is **solely** at Contractor's risk and may jeopardize contract performance.

SECTION 01310
CONSTRUCTION SCHEDULE, SCHEDULE OF VALUES,
AND PROGRESS SCHEDULE

1. In accordance with the Notice to Proceed letter, the Contractor shall submit the following:

a. Construction Schedule-This schedule shall be prepared using a horizontal bar graph with time scale. It shall be in an industry accepted Project Management format and shall accurately display:

1. All major categories of work to be performed within the required contract completion date broken out in sufficient detail to track progress throughout the life of the contract. Major work categories should include but are not limited to mobilization, carpentry, plumbing, mechanical, electrical, roofing, concrete, site work, and demobilization. In addition to construction activities, procurement times for critical items, submittal turnaround time, mobilization, final inspection, punchlist work, and demobilization shall be shown on the schedule.
2. The duration of each work category.
3. Any concurrent work categories.

b. Schedule of Values-This schedule shall be prepared as a **detailed** cost breakdown of the contract price and be submitted with the Construction Schedule. This schedule shall include but not be limited to costs of materials, equipment, and labor for all major work categories shown on the Construction Schedule. The Contractor shall adhere to the following guidelines when developing the Schedule of Values.

1. Format - The line items in the Schedule of Values **shall** be the same as that of the Construction Schedule.
2. Bonds - Bonding costs will only be paid in a lump sum if they are broken out separately and included with the schedule of values. The Contractor shall provide evidence that he has furnished full payment to the surety.
3. Materials - To request progress payments for materials delivered to the construction or fabrication site, the particular category of work associated with the materials must be broken down into separate material and labor costs.

2. UPDATES: **Each month and /or with each progress payment request,** the Contractor **shall** submit the following:

a. **Progress Schedule**-This schedule shall be an update of the Construction Schedule. It shall show the current schedule of all work.

1. Modifications - If modifications are made to the contract, the work added shall be tracked separately from the original Construction Schedule and shall maintain its individuality on the Progress Schedule throughout the life of the contract. Progress Payment requests shall not lump modification costs into the original contract price.

SECTION 01370
CONSTRUCTION DAILY REPORTS

1. GENERAL: **The Contractor shall complete a Daily Report for each and every day after mobilization.** The importance of an accurate, fully detailed Daily Report, promptly delivered to the designated On-Site Representative can not be overemphasized. The report shall provide an accurate cumulative summary of the history and performance of the work. The Daily Report shall document weather; work hours; work in-place; inspections and tests conducted, and their results; dimensional checks; equipment and material checks; data on workers by classification; the mobilization and demobilization of construction equipment; materials delivered to the site; and any other pertinent noteworthy event; e.g., personnel injury, site visit by Coast Guard personnel, etc.

2. RESPONSIBILITY: The Daily Reports play an important role in settling disputes and claims for both parties. For this reason the On-Site Representative and the Contractor's Superintendent, together, should review the report to ensure its completeness and accuracy. Each day's report shall be submitted to the On-Site Representative no later than 10:00 a.m. the following morning. The maximum allowable retainage will be enforced for late, sporadic or non-submission of Daily Reports. In the absence of an On-Site Representative the Contractor shall mail the Daily Reports directly to the Contracting Officer every Friday. Should the Daily Report indicate an accident, environmental issue, OSHA violation or any crisis the On-Site Representative deems important, the Report should be faxed to the Contracting Officer at (216) 902-6278 immediately.

3. **DESIGNATED ON-SITE REPRESENTATIVE RESPONSIBILITY**: After a Notice to Proceed for site work has been issued the On-Site Representative shall complete a Daily Report for each day until the Contractor mobilizes. After the Contractor is at the site, the On-Site Representative shall ensure that the Contractor completes the Daily Report in accordance with Paragraphs 1 and 2 above. Any items of dispute or other notes the On-Site Representative feels appropriate shall be added to the Daily Report. The On-Site Representative is also responsible for informing the COTR when the contractor fails to submit daily reports.

SECTION 01510
TEMPORARY UTILITIES

1. GENERAL: All temporary utility connections shall be compatible with existing materials and equipment to provide safe and efficient installation, operation and removal.

2. ELECTRICITY AND WATER: Electrical power and water are available on the site. The Contractor will be permitted to utilize these utilities in performing the work, provided that the existing systems are not overloaded. The Contractor is responsible for installing and removing all connections to existing systems and shall ensure work and materials are in accordance with local codes. The use of the electricity shall be limited to tools that can be operated on 60 Hertz, single phase, 20 ampere, 120 volt circuits.

3. TELEPHONE: Telephone services will not be available for use by the Contractor.

4. WATER HOOKUP: All connections to the water system shall be equipped with back flow protection. Temporary potable water pipes and hoses shall be sterilized before being placed in operation and every time the system is opened to the atmosphere for repair or relocation.

5. SANITARY FACILITIES: It shall be the Contractor's responsibility to furnish and maintain approved portable toilet facilities for all Contractor personnel. The On-Site Representative will designate the physical location for the facility and the Contractor shall maintain the toilet facility to the satisfaction of the Government. Contractor personnel are forbidden to use toilet facilities within existing buildings.

SECTION 01520
PROTECTION FROM WEATHER AND CONSTRUCTION OPERATIONS

1. TEMPORARY ENCLOSURES: Protect existing facilities/equipment and new construction, whether in progress or newly completed, from the adverse effects of the weather and construction operations. Provide temporary enclosures, coverings and barriers as required to afford protection against exposure, weather and wind damage and from construction operations which could degrade, stain, age, or reduce the finished quality of new work or damage existing facilities and equipment.

2. REAPPLICATION: All temporary closures or enclosures shall be made ready for immediate re-application in the event of sudden storms or man-made conditions requiring protection of existing facilities or completed construction.

3. CLIMATE CONTROL: Where temporary heat is required during construction to protect work completed or to heat facilities in operation by the Coast Guard, all openings shall be made weather tight to allow the maintenance of 68 degrees F heat minimum with the existing or temporary heating equipment or 78 degrees F. maximum with existing or temporary cooling. NOTE TO OFFEROR: CLIMATE CONTROL SPECIFICALLY REQUIRED BY THIS CONTRACT WILL BE SPECIFIED IN THE STATEMENT OF WORK AND/OR

ASSOCIATED DRAWINGS.

3. PIPING: Prevent water-filled pipes or tanks from freezing for both interior and exterior systems installed or in storage.

SECTION 01540
SAFETY PROGRAM

1. GENERAL: The Contractor is wholly responsible for work site safety. The Contractor shall implement a safety program that protects the lives and health of personnel in the construction area, prevents damage to property, and avoids work interruptions. The Contractor shall provide appropriate safety barricades, signs, signal lights, etc. (see SECTION 01570) as well as complying with the requirements of all applicable Federal, State and Local safety laws, rules and regulations.

2. COMPLIANCE: The Contractor is specifically required to comply with the requirements of the U. S. Army Corps of Engineers "Safety and Health Requirements Manual" (EM 385-1-1, *latest version available*) and the "Accident Prevention" clause (FAR 52.236-13). Once accepted, this safety plan shall become part of the contract requirements. ***Note: This review/acceptance does not in any way relinquish the Contractor from responsibility for work site safety nor the obligation to comply with the OSHA regulations found in 29 CFR 1910 & 1926 or any other State or Local safety law, rule or regulation applicable to the contract work.*** *The Coast Guard will cooperate fully with the Department of Labor (Occupational Safety and Health Administration) in their enforcement of OSHA regulations.*

3. SAFETY PLAN: The Contractor **shall submit a written safety plan.** At a minimum, this plan shall describe the Contractor's general safety program and identify specific safety provisions for hazards incidental to the contract work; e.g., elevated working surfaces, working over water, working from floating work platforms, overhead crane operations, etc.

SECTION 01541
EQUIPMENT/UTILITY LOCKOUT AND TAGOUT REQUIREMENTS

1. GENERAL: The Contractor shall comply with OSHA 29 CFR 1910.147, "The Control of Hazardous Energy " (Lockout/Tagout). The Contractor shall provide a Lockout/Tagout Plan to the Contracting Officer prior to starting any work affected by the energy in the equipment/utility system.

2. APPLICATION: The Contractor shall be responsible for locking out and tagging out of service, all equipment/utility systems involved in the work under this contract. After the Contracting Officer's Technical Representative has approved an outage, Government personnel and the Contractor shall independently secure the equipment/utility system and tag the respective system out of service. The Contractor shall provide their own locks and chains that are required to secure the equipment/utility systems; e.g., steam, water, air, and/or electricity.

SECTION 01542
MATERIAL SAFETY DATA SHEETS AND MATERIAL HANDLING PROCEDURES

1. DATA SHEETS: Submit a Material Safety Data Sheet (MSDS) for all materials containing hazardous substances required for contract execution. Information provided in MSDS's shall meet the requirements of 29 CFR 1910.1200. MSDS's require Contracting Officer review and acceptance prior to bringing these materials on site.

2. MATERIAL STORAGE: Limit the quantity of these materials stored on site to the amount needed for execution of work. Storage of excess materials will not be permitted. Assure that the storage of these materials comply with all applicable federal, state, and local laws and regulations and provide additional storage facilities (paint lockers, etc.) as required for the storage of such materials. Coordinate the physical location of storage areas with the On-site Representative prior to bringing these materials on site.

3. PROTECTIVE MEASURES: The contractor shall take all protective measures outlined on the MSDS's and as required by federal, state, and local regulations to protect all personnel in the vicinity of the work area from exposure to these materials. The Contractor shall submit a separate plan outlining the measures required. The Contracting Officer's Technical Representative shall review protective measures prior to allowing use of these materials.

4. DISPOSAL OF EXCESS MATERIAL: The Contractor shall dispose of all excess hazardous materials as required by the MSDS and all applicable federal, state, and local laws and regulations.

SECTION 01544
TEMPORARY FIRE PROTECTION

1. TEMPORARY FIRE PROTECTION: Install and maintain temporary fire-protection facilities to protect against predictable and controllable fire loss. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

1.1 Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher at each floor stairwell and one at each building construction opening for personnel egress.

1.2 Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways and other access routes for fighting fires.

1.3 Provide independent supervision of welding, flame cutting and other open flame work. Provide each fire supervisor with an appropriate fire extinguisher.

1.4 Provide training for all personnel on-site in the proper operation of each type of fire extinguisher provided. Provide all personnel with the proper notification procedure to summon the local fire department or emergency medical service.

1.5 There shall be NO SMOKING or unsupervised open flame permitted inside any structure, temporary or permanent; nor within 25 feet of combustible material or within 50 feet of flammable liquids or compressed gasses.

SECTION 01550
ACCESS ROADS AND PARKING

1. ACCESS: Access to the site is available from public roads. Any damage to these roads by the Contractor's vehicles shall be repaired without cost to the Government.

2. PARKING: Vehicular operations and parking shall comply with all applicable government orders and regulations. All driveways and entrances serving the Government shall be kept clear and available to emergency vehicles at all times.

3. VEHICLE AND VEHICLE OPERATION: All vehicles, owned by the Contractor or employees of the Contractor, and operators of these vehicles, shall meet all state regulations for safety, noise, loading and minimum liability insurance. All vehicle operators demonstrating reckless or careless operation in the opinion of the Government shall not be allowed to operate vehicles on government property for the duration of the contract.

4. VISITORS: No visiting vehicles will be permitted on government property unless the operator is employed by a subcontractor or supplier.

SECTION 01566
GENERAL CLEANUP & SITE RESTORATION OF WORK AREAS

1. GENERAL: The Contractor shall remove and properly dispose of all trash and debris incidental to the contract work from the limits of government property, as well as all adjacent affected areas. The Contracting Officer shall determine the extent and interval of these cleanups.

2. WORK AREA CLEANUP: At the end of each day the entire work area and all adjacent affected areas shall be thoroughly cleaned by removing all trash, debris, dust, etc. caused by the contract work. Any floor, wall or ceiling surfaces that may have been stained or soiled by the contract work shall be restored to pre-construction condition.

3. SITE RESTORATION: If at any time while performing the contract the Contractor causes damage or destruction to any portion of any Government facility or grounds; e.g., bulkheads, pavement, lawns, shrubbery, etc., it shall be the Contractor's responsibility to replace and/or restore the damage as approved by the Contracting Officer’s Technical Representative at no additional cost to the Government.

4. POST CONSTRUCTION CLEANUP: Upon completion of the job, the Contractor shall clean up the job site, returning it to a state of cleanliness equal to or exceeding that in which it was found. The Contractor shall properly dispose of any trash, extra materials, dirt, debris, or other litter that remains. If the job site appearance is not to the satisfaction of the Contracting Officer's Technical Representative, final acceptance will not be approved.

SECTION 01567
POLLUTION CONTROL

1. VOLATILE ORGANIC COMPOUND (VOC) REGULATIONS: Contractors are required to comply with local, state and federal VOC compliance laws and regulations in the foregoing order of precedence. In order to comply with the provisions of the Clean Air Act, each state must have a State Implementation Plan. Some contractors may be required to abide by the provisions of a Title V Permit. Some contractors may be required by state or local law to operate under the terms of a Compliance Plan to reduce VOC Emissions.

1.1 In accordance with the Notice To Proceed Letter, the contractor will submit copies of any local, state or federal implementation plans, permits or compliance plans required/applicable to the use/application of VOCs at contractor's facility or offsite work places.

1.2 If no local, state or federal implementation plans, permits or compliance plans are required/applicable to the use/application of VOCs, then the contractor shall submit to the designated Contracting Officer a letter, notarized under oath, that such documents are not required.

1.3 If the use of paint is required the contractor shall submit to the Contracting Officer and in accordance with the Notice to Proceed Letter, certificates, specifications or manufacturing data verifying the VOC rating.

2. SPILL RESPONSE PLAN: The Contractor shall submit a Spill Response Plan covering all regulated materials brought to the site for execution of work and all wastes generated as a result of the work to the Contracting Officer. The plan shall include, at a minimum, the following: types and quantity of all substances covered under this plan; the reportable quantity (RQ) for each substance; the on site storage location of each substance; the Contractor's spill response equipment, if applicable; procedures to be followed for responding to a spill, including initial responses to be taken; procedures to be followed in reporting a spill, including the names and telephone numbers for all federal, state, and local agencies/authorities to be notified; and the name, address, and telephone number (work, home, cell and pager) of all Contractor response and media relations personnel.

2.1 In the event of a spill or release, the Contractor shall be responsible for immediate implementation of the spill response plan and restoration of the site to pre-spill condition at no cost to the Government. The Contractor shall also immediately notify the Contracting Officer to coordinate further notifications.

SECTION 01568
EROSION AND SEDIMENT CONTROL

1. GENERAL: The Contractor shall plan and execute all earthwork to minimize the duration of exposure of unprotected soils. Temporary protection shall be provided on side and back slopes as soon as rough grading is completed or when sufficient soil is exposed to require protection to prevent erosion. All earthwork brought to final grade shall be finished immediately.

2. METHODS: The Contractor shall prevent erosion, control sedimentation, and prevent waterborne soil from entering surface waters, ditches, and storm drain inlets by use of any or all of the following methods.

2.1 Mechanical Control: Divert runoff by constructing ditches or berms. Filter runoff using straw bale dikes, filter fabric dams or other methods.

2.2 Sediment Basins: Trap sediment in temporary basins sized to accommodate the runoff of a local 25-year storm. Pump basins dry and remove accumulated sediment after each storm. Use a paved weir or vertical overflow pipe for overflow. Institute effluent quality monitoring programs as required by federal, state, and local regulations.

2.3 Vegetation and Mulch: Protect slopes by accelerated growth of vegetation, mulching, or netting. Stabilize slopes by hydroseeding, sodding, anchoring mulch or netting in place.

2.4 Geotextiles: Protect and stabilize slopes by anchoring geotextile fabric or matting. The Contractor shall use a geotextile designed and sized for the particular application.

3. OTHER METHODS: Other erosion and sediment control methods may be used, as authorized by the Contracting Officer.

SECTION 01569
HAZARDOUS WASTE

1. GENERAL: The Contractor shall comply with all federal, state, and local environmental regulations dealing with the generation, management, storage, and disposal of solid, toxic, and hazardous wastes. The Contractor shall ensure that all wastes are properly containerized, labeled and placarded, managed, tested, stored, transported and disposed of in accordance with all applicable regulations.

2. USED ELECTRIC LAMPS: 40 CFR 273 requires that electric lamps, including incandescent, fluorescent, neon and high intensity discharge (mercury vapor, high/low pressure sodium, metal halide) lamps that are no longer of use be recycled or treated as hazardous waste. The Contractor shall not dispose of any used electric lamps as solid waste. The Contractor shall recycle all waste electric lamps generated as a result of this work only at a licensed recycling

facility

3. METALS: Unless noted otherwise, scrap metal shall not be landfilled or treated as hazardous waste. Recycle all scrap metal by smelting or any other acceptable recycling process. Scrap metal includes ductwork, light fixture housings, pipe, mechanical and electrical equipment, doors and frames, etc.

4. SUBMITTALS: The Contractor shall provide the Contracting Officer with signed and fully executed originals of all hazardous waste profiles, test results, hazardous waste manifests and/or other shipping papers, electric lamp disposal documents and all other required documentation. Maximum payment retention shall be withheld until this documentation is received.

SECTION 01570
LIGHTS, SIGNS AND BARRICADES

1. GENERAL: The contractor shall provide and maintain all warning lights, sign, and barriers to insure the safety of pedestrians or vehicles traveling near or through any hazardous area caused by the execution of the Contract work.

2. LIGHTING: All lighting requirements shall meet table 7-1 in the US Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1).

3. BARRICADES: Hard barricades or flexible barriers shall completely encompass all exterior work areas. Flexible barriers shall consist of 1/2 inch steel bars or 2" X 2" wood stakes driven 12 inches minimum into hard packed soil. Space stakes on a maximum 10 feet interval and with two rows of yellow or orange 1/4 inch diameter rope (wire and plastic tape are not acceptable) at 24 inches and 36 inches each above ground.

4. HAZARD FENCING: Special fencing 4 foot high shall be installed to prevent small children or pets from entering the work area when within 300 feet of family housing or for special hazards as shown on the drawings.

SECTION 01571
MARINE LIGHTS AND SIGNALS

1. GENERAL: The Contractor's Marine equipment shall display such lights and day signals as may be required under applicable Navigation Rules. The Contractor shall inquire at the nearest Coast Guard Marine Safety Office for specific information on these rules. The Contractor to the satisfaction of the Contracting Officer shall mark offshore structures during all phases of construction and removal. Contractor shall provide any lights, daymarkers or buoys required. Contractor shall contact Commander, Ninth Coast Guard District (dpw) at (216) 902-6061 for issuance of "Notice to Mariners" a minimum of 10 (ten) days in advance of commencing any work.

SECTION 01620
STAGING AREAS AND ACCESS

1. LOCATION: The Contractor shall store materials and operate equipment within the confines of the staging area identified by the Government. Storage of materials outside of the staging area will not be permitted.

2. COORDINATION: Two weeks prior to construction, the Contractor shall contact the Officer in Charge U.S. Coast Guard Station Alexandria Bay at (315) 482-2574 to verify the condition of the staging area.

3. ADJACENT AREAS: The Contractor shall ensure that all land and vegetation adjacent to the staging area and access drive remain undisturbed and undamaged; all damages shall be repaired at no cost to the Government.

SECTION 01650
RECOVERED MATERIALS NOTICE

1. GENERAL: It is the intent of CEU Cleveland to comply with the requirements of Section 6002 of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA or the Act) as amended, 42 U.S.C. 6962 and Executive Order 12873 as they apply to the procurement of the materials designated in paragraph 2.

2. DESIGNATED RECOVERED MATERIALS It is the purpose of this section to designate items that are or can be made with recovered materials. These designated items can be found at http://www.epa.gov/epaoswer/non-hw/procure/products.htm .

3. CONTRACTOR RESPONSBILITY: The contractor should provide recycled materials to the extent practical, provided the materials meet all other requirements of the applicable specification section.

SECTION 01720
AS BUILT DRAWINGS

1. GENERAL: Maintain one full size set of contract drawings to record variations from the original design. **All deviations shall be neatly and clearly marked in RED** on these drawings to show work and/or materials actually provided. As Built drawings shall be **updated** as work progresses and kept at the work site for the duration of the contract. These drawings shall be available for Contracting Officer Technical Representative review upon request.

2. DISCOVERED UTILITIES: Indicate the exact location of any **underground utility lines discovered in the course of the work** on the As-Built drawings.

3. PERMITTED VARIATIONS: As Built drawings shall reflect the actual construction and materials provided when alternative materials or work methods are allowed in the specifications and/or drawings or if the scope is altered by award of bid items, subsequent changes or modifications.

4. STANDARDS: Variations shown on As Built drawings shall be neat, clear and conform with standard drafting practices. Mark-ups shall include supplementary notes, legends, and details necessary to convey the exact representation of construction actually provided**. To comply with Computer Assisted Design (CAD) practices, only full size AS BUILT drawings are acceptable.**

5. SUBMITTAL: Submit As Built drawings for Contracting Officer's Technical Representative acceptance upon completion of the contract. **Final payment will not be until all required As Built drawings are accepted.** Maximum retention shall be withheld for late or incomplete As Built drawings.

SECTION 01730
OPERATING INSTRUCTIONS AND TRAINING

1. MANUALS: Upon completion of the work, but before the work is accepted by the Government, the Contractor must forward two complete bound sets of instructions, tabbed and identified for reference, for all equipment and/or systems provided under this contract. The instructions shall include component parts, manufacturer's certificates, warranty slips, parts lists, descriptive brochures, and manufacturer's maintenance and operating instructions.

2. TRAINING: The Contractor shall provide two hours of training, which shall explain to the Government's personnel all procedures necessary to operate and maintain all equipment and systems on a continuing basis. A verification of training shall be provided

LIST OF SUBMITTALS

SECT	PARA	ITEM	KEY	GENERAL USE COLUMN
01030	1	Pre-Con Site Conditions		
01310	1.a	Construction Schedule		
	1.b	Schedule of Values		
	2	Progress Schedule		
01540	3.1	Safety Plan		
01541	1	Lockout/Tagout Plan		
01542	1	MSDS		
	3	Protective Measures		
01567	1.1	State Implementation Documentation		
	1.2	Notarized Letter		
	1.3	VOC rating documentation		
	2	Spill Response Plan		
01569	4	Hazardous Waste Documents		
01720	5.1	As-Built Drawings		
01730	1	Operating Instructions		
	2	Verification of Training		
10440	2.1.1	Shop Drawings (signs)		
11602	2.1	Turbidimeter Manufacturer's product data Shop drawings O&M Manual		
11602	2.2	pH meter Manufacturer's product data Shop drawings O&M Manual		
11602	2.3	Thermometer Manufacturer's product data Shop drawings O&M Manual		
15401	2.1a	Steel pipe and fittings Manufacturer's product data		
15401	2.1b	Copper pipe and fittings Manufacturer's product data		
15401	2.1c	Polyethylene pipe and fittings Manufacturer's product data		

15401	2.1d	Polyethylene Tubing Manufacturer's product data		
15401	2.3	Ball Valves Manufacturer's product data Shop drawings O&M Manual		
15401	2.3	Check valves Manufacturer's product data Shop drawings O&M Manual		
15401	2.3	Globe valves Manufacturer's product data Shop drawings O&M Manual		
15401	2.3.1	Intake check valve Manufacturer's product data Shop drawings O&M Manual		
15401	2.4.1	River Water Pumps Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.2	Supply Pumps Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.4	Pressure Tanks Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.5	Flow meter Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.6.1	Filter Cartridges Manufacturer's product data Shop drawings Design Data 1-micron giardia removal efficiency data		

15401	2.4.6.2	Filter Housings Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.7	UV Disinfection Unit Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.8	Pressure Gauges Manufacturer's product data Shop drawings O&M Manual		
15401	2.4.9	Injection Nozzle Manufacturer's product data Shop drawings Design Data O&M Manual		
15401	2.4.10	Intake Screen Manufacturer's product data Shop drawings		
15401	2.4.11	Vent Manufacturer's product data Shop drawings		
15401	3.4.5	Disinfection test results		
16051	1.0	Control panel Manufacturer's product data Shop drawings Design Data O&M Manual		

CONTRACT ITEM ACCEPTANCE REQUEST

Contract Number: HSCG83- **DO/TO: HSCG83-**

Contract Specialist: **Project Number:**

Contractor Name:

URGENT YES NO **(if yes) CONTRACTOR FAX #: _____**

Submittal #_____ **Job Location: _____**

NOTE: **Contractor must mark Deviation column if submittal deviates from contract requirements**

Item No.	Spec Section and Paragraph	Description of Material Include Type, Model #, Manufacturer, Etc.	Deviation	Status

STATUS ABBREVIATION GUIDE:
AC - Accepted
AC w/ CMT - Accepted with Comment
R-Resubmit
Comments:

Typed Name & Title	Signature	Date

NOTE: Review and acceptance of submittals by the Government is intended to verify general conformance with the design intent as shown on the contract drawings and in the specifications. Acceptance by the Contracting Officer Technical Representative does not relieve the Contractor of responsibility for any errors and/or omissions in the submittals, nor from the responsibility for complying with the requirements of the contract, except with respect to variations described and approved in accordance with FAR 52.243-4 CHANGES.

SECTION 10440
INTERIOR SIGNAGE

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01300:

A. Manufacturer’s Product Data

Submit product data describing materials of fabrication and general dimensions.

B. Shop Drawings

Submit shop drawings including dimensions and materials of construction.

1.2 GENERAL

Interior signage shall be of the design, detail, sizes, types, and message content shown on the drawings/attachments/signage placement schedule (as applicable), shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Signage shall be obtained from a single manufacturer with edges and corners of finished letterforms and graphics true and clean.

1.3 QUALIFICATIONS

Signs shall be the standard product of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate signs that have been in satisfactory use at least 2 years prior to bid opening.

1.4 DELIVERY AND STORAGE

Materials shall be packaged to prevent damage and deterioration during shipment, handling, storage and installation. Product shall be delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SAFETY SIGNS

2.1.1 Signs

Signs shall consist of 0.040 aluminum, sized 10 inches by 14 inches and lettered in accordance

with OSHA and ANSI standards. Provide sign lettered as follows:

a. One ”DANGER SODIUM HYPOCHLORITE”. Standard danger sign format: white background, white “DANGER” in red oval on black field. SODIUM HYPOCHLORITE in black.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Factory Workmanship

Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practicable.

PART 3 EXECUTION

3.1 INSTALLATION

Signs shall be installed plumb and true at locations provided below. Mounting height shall be 60 inch above the finish floor to the centerline of the sign. Place sign as indicated on the Drawings.

3.1.1 Anchorage

Anchorage shall be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or shown shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood. Exposed anchor and fastener materials shall be compatible with metal to which applied and shall have matching color and finish.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction.

END OF SECTION

SECTION 11602
LABORATORY EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Method 180.1 Determination of Turbidity

1.2 SUBMITTALS

Submit the following in accordance with Section 01300:

A. Manufacturer's Product Data

Submit product data describing equipment features, materials of fabrication, general dimensions, and operating parameters.

B. Shop Drawings

Submit shop drawings for equipment including dimensions, materials of construction, bills of materials, and parts lists.

C. Operation and Maintenance Manuals

Submit operation and maintenance data for equipment.

PART 2 PRODUCTS

Turbidimeter, pH meter, and thermometer shall be supplied by one vendor.

2.1 TURBIDIMETER

Provide a portable turbidimeter that meets criteria specified by USEPA Method 180.1. Meter shall be microprocessor-based with a range of 0-1000 NTU that can be adjusted by the operator to 0-9.99, 0-99.9 and 1-1000 NTU. Accuracy shall be +/- 2% of reading or +/- 1 least significant digit from 0-500 NTU. Resolution shall be 0.01 on lowest range. Light source shall be a tungsten lamp. Accessories shall include nine sample cells, calibration standards (<0.1, 20, 100, and 800 NTU), secondary standards, silicone oil and sample cell cleaning cloth, O&M manual,

reference card, batteries, and carrying case.

2.2 PH METER

Provide a portable pH meter. Meter shall have a range of -2.00 to 19.99. Accuracy shall be +/- 0.002. Resolution shall be 0.1, 0.01, and 0.001 (selectable). Accessories shall include platinum pH electrode, calibration standards, O&M manual, reference card, batteries, and carrying case.

2.3 THERMOMETER

Provide a portable field-grade non-mercury thermometer. Thermometer shall have a range of -30 to 120 °F. Accessories shall include protective nylon case.

2.4 LABWARE

Provide the following labware for sample collection and calibration:

a. Four 50-ml graduated pyrex glass beakers

b. Four 500-ml graduated pyrex glass beakers

c. One 1,000-ml graduated pyrex glass beaker

PART 3 EXECUTION

3.1 INSTALLATION

Provide products to Owner.

END OF SECTION

SECTION 15050
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (2005) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1 (2006) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2005; TIA 2005) National Electrical Code

1.2 QUALITY ASSURANCE

1.2.1 Material and Equipment Qualifications

Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.2.2 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.2.3 Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their

addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.2.4 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.2.5 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1.2.5.1 Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions shall be considered mandatory, the word "should" shall be interpreted as "shall." Reference to the "code official" shall be interpreted to mean the "Contracting Officer." References to the "permit holder" shall be interpreted to mean the "Contractor."

1.2.5.2 Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. These administrative requirements are covered by the applicable Federal Acquisition Regulations (FAR) included in this contract and by the authority granted to the Officer in Charge of Construction to administer the construction of this project. References in the ICC Codes to sections of Chapter 1, shall be applied appropriately by the Contracting Officer as authorized by his administrative cognizance and the FAR.

1.3 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.4 ELECTRICAL REQUIREMENTS

Furnish motors, controllers, disconnects and contactors with their respective pieces of equipment. Motors, controllers, disconnects and contactors shall conform to and have electrical connections provided under other sections in this specification. Furnish internal wiring for components of packaged equipment as an integral part of the equipment. Extended voltage range motors will not be permitted. Controllers and contactors shall have a maximum of 120 volt

control circuits, and shall have auxiliary contacts for use with the controls furnished. When motors and equipment furnished are larger than sizes indicated, the cost of additional electrical service and related work shall be included under the section that specified that motor or equipment. Power wiring and conduit for field installed equipment shall be provided under and conform to the requirements of other sections in this specification.

1.5 ACCESSIBILITY

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible.

PART 2 PRODUCTS

2.1 PAINT

New equipment shall be painted with the manufacturer's standard coating for the intended service.

PART 3 EXECUTION

3.1 PAINTING OF NEW EQUIPMENT

New equipment painting shall be factory applied or shop applied, and shall be as specified herein, and provided under each individual section.

3.1.1 Factory Painting Systems

Manufacturer's standard factory painting systems shall be provided.

3.1.2 Shop Painting Systems for Metal Surfaces

Clean, pretreat, prime and paint metal surfaces; except aluminum surfaces need not be painted. Apply coatings to clean dry surfaces. Clean the surfaces to remove dust, dirt, rust, oil and grease by wire brushing and solvent degreasing prior to application of paint, except metal surfaces subject to temperatures in excess of 120 degrees F shall be cleaned to bare metal.

Where more than one coat of paint is specified, apply the second coat after the preceding coat is thoroughly dry. Lightly sand damaged painting and retouch before applying the succeeding coat.

a. Temperatures Less Than 120 Degrees F: Immediately after cleaning, the metal surfaces subject to temperatures less than 120 degrees F shall receive one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, one coat of primer applied to a minimum dry film thickness of one mil; and two coats of enamel applied to a minimum dry film thickness of one mil per coat.

b. Temperatures Between 120 and 400 Degrees F: Metal surfaces subject to temperatures between 120 and 400 degrees F shall receive two coats of 400 degrees F heat-resisting enamel applied to a total minimum thickness of 2 mils.

c. Temperatures Greater Than 400 Degrees F: Metal surfaces subject to temperatures greater than 400 degrees F shall receive two coats of 600 degrees F heat-resisting paint applied to a total minimum dry film thickness of 2 mils.

END OF SECTION

SECTION 15401
PIPING, VALVES, AND EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA 10084 (2005) Standard Methods for the Examination of Water and Wastewater

AWWA B300 (2004) Hypochlorites

AWWA C651 (2005) Disinfecting Water Mains

AWWA C652 (2002) Disinfection of Water-Storage Facilities

AWWA C700 (2002) Cold-Water Meters - Displacement Type, Bronze Main Case

AMERICAN WELDING SOCIETY (AWS)

AWS B2.2 (1991) Brazing Procedure and Performance Qualification

ASME INTERNATIONAL (ASME)

ASME B1.20.1 (1983; R 2001) Pipe Threads, General Purpose (Inch)

ASME B16.15(1985; R 2004) Cast Bronze Threaded Fittings Classes 125 and 250

ASME B16.18(2001; R 2005) Cast Copper Alloy Solder Joint Pressure Fittings

ASME B16.22(2001; R 2005) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

ASME B16.3 (1998) Malleable Iron Threaded Fittings, Classes 150 and 300

ASME B31.5 (2001; Addenda 2004) Refrigeration Piping and Heat Transfer Components

ASME B40.100 (2006) Pressure Gauges and Gauge Attachments

ASTM INTERNATIONAL (ASTM)

ASTM A 53/A 53M (2006a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and

Seamless

ASTM A 733 (2003) Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples

ASTM B 42 (2002e1) Seamless Copper Pipe, Standard Sizes

ASTM B 813 (2000e1) Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube

ASTM B 88 (2003) Seamless Copper Water Tube

ASTM D 2737 (2003) Polyethylene (PE) Plastic Tubing

ASTM D 3035 (2003a) Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter

ASTM D 3261 (2003) Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

COPPER DEVELOPMENT ASSOCIATION (CDA)

CDA A4015 (1994; R 1995) Copper Tube Handbook

INTERNATIONAL CODE COUNCIL (ICC)

ICC IPC (2003; Errata 2003; Errata 2004; Errata 2004; Errata 2005) International Plumbing Code

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-110 (1996) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

MSS SP-58 (2002) Pipe Hangers and Supports - Materials, Design and Manufacture

MSS SP-69 (2003) Pipe Hangers and Supports - Selection and Application

MSS SP-73 (2003) Brazing Joints for Copper and Copper Alloy Pressure Fittings

MSS SP-80 (2003) Bronze Gate, Globe, Angle and Check Valves

NSF INTERNATIONAL (NSF)

NSF 14 (2006) Plastics Piping System Components and Related Materials

NSF 55 (2007) Ultraviolet Microbiological Water Treatment Systems

NSF 61 (2005; Addendum 2005) Drinking Water System Components - Health Effects

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

PL 93-523 (1974; A 1999) Safe Drinking Water Act

1.2 SUBMITTALS

Submit the following in accordance with Section 01300:

A. Manufacturer's Product Data

Submit product data describing equipment features, materials of fabrication, general dimensions, and operating parameters.

B. Shop Drawings

Submit shop drawings for equipment including dimensions, materials of construction, bills of materials, motor data, performance curves or charts, parts lists, mounting arrangements, and tie-in connections. For filters, indicate nozzle sizes and locations, dimensions, and installation details.

C. Design Data

Submit certified head versus capacity and efficiency curves or tables for pumps. Submit temperature and pressure ratings from filter housings, valves, and tanks. Submit giardia cyst removal efficiency for 1-micron absolute filter cartridges.

D. Operation and Maintenance Manuals

Submit operation and maintenance data for equipment and valves.

1.3 STANDARD PRODUCTS

Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.3.1 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.3.2 Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.3.3 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.3.4 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1.4 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.5 REGULATORY REQUIREMENTS

Unless otherwise required herein, plumbing work shall be in accordance with ICC IPC.

1.6 PROJECT/SITE CONDITIONS

The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.7 INSTRUCTION TO GOVERNMENT PERSONNEL

When specified in other sections, furnish the services of competent instructors to give full instruction to the designated Government personnel in the adjustment, operation, and

maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. Provide one man-day (8 hours per day) of instruction furnished.

1.8 ACCESSIBILITY OF EQUIPMENT

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible.

PART 2 PRODUCTS

2.1 MATERIALS

Materials for various services shall be as follows:

a. Steel:
Pipe: Seamless, galvanized, ASTM A 53, Type S, Grade B; or Seamless, black, ASTM A 53, Type S, Grade B, as indicated.

Malleable-iron threaded fittings, galvanized, ASME B16.3.

Nipples, pipe threaded, ASTM A 733.

b. Copper:
Seamless copper water tube, Type L – Hard, ASTM B 88.

Seamless copper pipe, ASTM B 42, Cast bronze threaded fittings, ASME B16.15.

Wrought copper and bronze solder-joint pressure fittings, ASME B16.22.

Cast copper alloy solder-joint pressure fittings, ASME B16.18

c. Polyethylene Pipe:
Polyethylene (PE) plastic pipe(SDR-PR), SDR 11, based on controlled outside diameter, ASTM D 3035.

Butt fusion polyethylene (PE) plastic pipe fittings, ASTM D 3261.

d. Polyethylene Tubing:
Polyethylene (PE) plastic tubing, ASTM D 2737.

Pipe schedules shall be selected as indicated. Pipe fittings shall be compatible with the

applicable pipe materials. Pipe threads (except dry seal) shall conform to ASME B1.20.1. Material or equipment containing lead shall not be used in any potable water system. In line devices such as water meters, check valves, valves, and fittings shall comply with PL 93-523 and NSF 61, Section 8.

2.1.1 Pipe Joint Materials

Solder containing lead shall not be used with copper pipe. Joints and gasket materials shall conform to the following:

a. Solder Material: Solder metal shall conform to ASTM B 32.

b. Solder Flux: Flux shall be liquid form, non-corrosive, and conform to ASTM B 813, Standard Test 1.

c. PTFE Tape: PTFE Tape, for use with Threaded Metal or Plastic Pipe.

2.1.2 Miscellaneous Materials

Miscellaneous materials shall conform to the following:

a. Hypochlorites: AWWA B300.

b. Gauges - Pressure and Vacuum Indicating Dial Type - Elastic Element: ASME B40.100.

2.2 PIPE HANGERS, INSERTS, AND SUPPORTS

Pipe hangers, inserts, and supports shall conform to MSS SP-58 and MSS SP-69.

2.3 VALVES AND APPURTENANCES

Valves 2-1/2 inches and smaller shall be bronze with threaded bodies for pipe and solder-type connections for tubing. Pressure ratings shall be based upon the application. Valves shall conform to the following standards, except as noted below:

Description	Standard
Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends	MSS SP-110
Bronze Gate, Globe, Angle, and Check Valves	MSS SP-80

2.3.1 Intake Structure Check Valve

Intake structure check valve shall be 2-inch diameter, disk-type check valve with silicon bronze body and poppet and NPT threads. Buna-N o-ring and stainless steel spring. Silicon bronze

shall contain less than 0.05% lead.

2.4 EQUIPMENT

2.4.1 River Water Pumps

Pumps shall be horizontal, end-suction single-stage jet pumps in twin pipe configuration. Pump capacity shall be 9 gpm at 40 feet depth to jet assembly and 30 to 50 psig discharge pressure. Shop painted cast iron case with glass-filled Noryl impeller. Lexan diffuser with stainless steel wear ring. Mechanical seals. Suction: 1¼-inch NPT. Discharge: 1-inch NPT. Drive: 1-inch NPT.

Motor: 1/2 hp, 208-230 V, 60 Hz, 3-phase, 3500 rpm with built-in overload protection.

Jet assembly includes jet body, nozzle, and venture.

Include pressure valve and pressure gauge.

Pressure switch shall not be included.

2.4.2 Supply Pumps

Pumps shall be horizontal, end-suction single-stage jet pumps in twin pipe configuration. Pump capacity shall be 25 gpm at 5 feet suction lift and 50 psig discharge pressure. Shop painted cast iron case with glass-filled Noryl impeller. Lexan diffuser with stainless steel wear ring. Mechanical seals. Suction: 1 ¼-inch NPT. Discharge: 1-inch NPT. Drive: 1-inch NPT.

Motor: 1-1/2 hp, 208-230 V, 60 Hz, 3-phase, 3500 rpm with built-in overload protection.

Shallow well adapter, nozzle, venture, gasket, bolts, and pipe plugs.

Pressure switch with cut in pressure of 40 psig and cut out pressure of 60 psig shall be included.

2.4.3 Pump Control

The river water pumps and supply pumps will be controlled from a single panel. The panel will include the following:

- HOA switch for each pump (4)
- Hourmeter for each pump (4)
- Pump operating light for each pump (4)
- Selector switch for each pair of pumps (2)
- Pump “trip” light (common) with reset
- Tank level alarm low light
- HOA switch for UV unit
- Delay timer for River Water Pump Start

- Delay timer for UV Unit Shut-off
- River Water Pump shut off by low UV intensity

See the Electrical sections of the Specifications for details. River water pumps are controlled by existing level switches; river water pump is deactivated at 34 inches from the bottom of the tank and activated at 6 inches from the bottom of the tank. The low level alarm is at 3 inches from the bottom of the tank.

2.4.4 Hydro-Pneumatic Water Pressure Tanks

Tank shall be of carbon steel construction with 125 psig water working pressure. Nominal tank volume shall be 119 gallons with dimensions of 26 inches in diameter and 59.75 inches high. The tank shall have a flexible high grade butyl diaphragm conforming to FDA requirements for use with potable water and shall be factory precharged to meet required system pressure. Water connection (1.25-inch NPT) and diffuser port shall be stainless steel. Air stem shall be brass. Outer coating shall be two part urethane finish over epoxy primer coat.

2.4.5 Flow Meter

Flow meter shall be positive displacement nutating disk-type conforming to AWWA C700. Meter housing shall be low-lead alloy cast bronze. Disk shall be thermoplastic. Trim shall be stainless steel or bronze. Inlet and outlet shall be ¾-inch NPT coupling. Operating range shall be 0.75 to 35 gpm. Pressure drop at 10 gpm shall be 2 psi or less. Flow meter shall be NSF-61 approved. Flow rate in gpm and totalized flow in gallons shall be displayed by an LED readout mounted on the flow meter. The operator shall be able to toggle through the readouts using a magnet supplied with the flow meter. Transmitter output shall be open collector. Device shall be battery powered and supplied with replaceable battery for long-term service.

2.4.6 Filters

Provide 3 filtration units, as indicated on the Drawings. Filter cartridges and housing shall be provided by the same vendor.

2.4.6.1 Filter Cartridges

Each cartridge shall be double open end with PVC end caps. There are 3 filter pore size: 20 micron, 5 micron, and 1 micron absolute. The 20- and 5-micron filter material shall be polyester and the 1-micron absolute filter material shall be polypropylene. Each filter cartridge shall be the standard length of 9.75 inch. The cartridge inside diameter shall be 1 1/16 inch. The cartridge outside diameter shall be 2.75 inches. Cartridge core material shall be PVC.

2.4.6.2 Filter Housing

The filter housing head, shell, and associated internal and external connections and internal and external hardware shall be constructed of stainless steel with wingnut lid closures. The filter housing shell O-ring material shall be Buna-N. Each housing holds seven filter cartridges. The

housing shall conform to NSF-61. The housing shall be prefabricated and delivered to the site in such a condition that the unit can be fastened in the location designated on the design drawings. The filter housing shall have the following dimensions and inlet, outlet, and system control connections:

Diameter:	13 inches
Overall Height:	19.5 inches
Pressure rating:	150 psig
Inlet/Outlet:	1.5 inch NPT
Drain:	1 inch NPT

2.4.7 UV Disinfection Unit

The UV system shall be complete and operational with all control equipment, monitoring and accessories to meet the requirements as shown and specified herein.

The system shall be an NSF/ANSI 55 Class A Certified system.

The system performance shall be rated to deliver a minimum of 40 mJ/cm2, at the end of lamp life, at a design flow rate of 14.6 gpm. The nominal flow through each unit shall be 13.2 gpm on a continuous flow operation with a maximum pressure drop of 34 psi. The normal flow rate through the system during operation shall be 8 gpm and the pressure drop at this flow rate shall be 6 psi or less.

The system shall be warranted to treat water with a hardness of 110 to 140 mg/L as CaCO3. The system must treat water with a temperature of 1 °C with a loss of UV intensity of less than 5 percent.

The unit shall be configured with water flow through a quartz tube with two parallel UV lamps mounted outside the quartz tube.

2.4.7.1 Influent Water Requirements and Design Parameters

Water Temperature Range:	1-40 °C (34-104 °F)
Ultraviolet Transmittance @ 253.7 nm:	> 75 % (minimum)
Hardness:	< 855 ppm as $CaCO_3$
Iron Content:	<3.0 ppm
Manganese:	<0.5 ppm
Turbidity:	<1 NTU
Operating Pressure Range (System):	100 psi (tested to 240 psi)
Electrical Requirements:	115 Vac , 60Hz, 1.5A (175W)

2.4.7.2 Effluent Water Quality

Water Quality after UV shall be 0 Bacterial Counts (NSF/ANSI 55 Class A Standards).

2.4.7.3 General Systems Specifications

The UV unit shall include:

- An automatic quartz cleaning system.
- Built in Flow restrictor valve limiting flow to 14.6 gpm.
- Audible and visual alarms for low UV Lamp output and Water Quality.
- Local displays of UV Intensity and Net Water UV Transmittance in percentage values.

2.4.7.4 Construction and Materials

A. General
1. All metal components in contact with the feed water and UV light shall be Type 316L stainless steel.
2. Flexible 1" Stainless Steel hoses shall be provided to simplify installation. Hoses mate to a 1" male NPT fitting.
3. The wiper mechanism and quartz tube can be examined without draining.
4. Unit designed to be installed indoors in a dry location.

B. UV Lamps
1. UV lamps shall be low pressure, high intensity lamps.
2. The filaments shall be rugged to withstand shock and vibration.
3. Lamp bases shall resistant to UV light.
4. All electrical connections to the UV lamp shall be terminated at one end.
5. UV lamps shall have a monochromatic spectral output with the emissions peaking at 254 nanometers.

C. Quartz Tube
1. Quartz tubes shall be clear fused quartz with a minimum UV transmissibility of 89 percent.

D. Electronic Power Supplies
1. Two UV lamps shall be operated by a single electronic power supply.
2. Electronic power supply shall have a high power factor and high efficiency.

E. Electrical
1. A power cord shall be provided for the unit to be plugged into a grounded receptacle.
2. Electrical supply shall be 115Vac, 1.5A max, 60Hz, single phase, 3 wire (including ground).
3. Normally open or normally closed Dry Contact shall be provided for external alarm 24Vdc max.

F. Automatic Cleaning System
1. The unit shall be provided with an automatic quartz sleeve wiping system. The wiping system shall be automatically initiated by the UV unit Control Panel or power on, and will operate while the UV system is in operation.
2. The automatic wiping system shall be driven by an externally mounted electric motor.

3. The wiper elements shall be fabricated of stainless steel.
4. The automatic wiping system shall operate on a timed cycle.

G. UV Sensors
1. The UV unit shall have two UV Sensors: one for lamp output and one for water quality.
2. Sensors shall be mounted outside the water flow (dry).
3. Sensors shall be monitored for accuracy and drift on a regular basis by substitution with a factory calibrated spare.

2.4.7.5 Controls and Instrumentation

A. Controls

The UV unit shall be installed in a system without a pressure tank or similar water storage device. The unit shall be turned on and off by an external control. The UV unit shall have an automatic temperature control to turn off the lamps to limit excessive temperatures.

A fully integrated programmable microcontroller shall be provided along with two UV sensors to monitor unit's performance in real-time. In addition in system monitoring, the microprocessor shall control the operation of the automatic quartz cleaning device.

The operator interface shall include a two line LCD display. The LCD shall provide system status information including lamp life remaining, Net UV Transmittance values, UV Intensity values, message history and setup options. The default language shall be English but French or Spanish may be selected in the Setup menu.

The operator interface shall include a key pad with four arrows allowing the operator to navigate menus and setup options. The operator can use the keypad to temporarily override the operation of the quartz cleaning device.

The operator interface shall include 3 colored LEDs providing quick system status of unit from several feet away. A green LED shall indicate unit treating when illuminated. An amber LED shall indicate a unit warning when illuminated. A red LED shall indicate a unit alarm when illuminated.

The audible alarm shall be capable of emitting a tone of ~ 85 dba and be capable of being silenced for 24 hours, 48 hours, or 1 week.

B. External Dry Contact

The UV unit shall include an external "dry" contact for remote alarms and pump shutoff via a relay – the word "dry" indicates no voltage present at the contact. The contact can be wired normally open or normally closed. The status of the contact shall change when the UV unit changes from a normal condition (energized relay) to alarm condition (de-energized relay). The maximum rating of the contact shall be 24 Vdc.

The dry contact shall be continuously operational by default, with no software setup required.

When the unit is awaiting a remote start, the relay shall be energized. Terminals shall be provided at base of circuit board for hookup.

C. Remote Start / Stop

The UV unit shall include remote start/stop capability, which allows it to remain idle without operating the UV lamps. When a signal is given (voltage applied), UV lamps shall be energized. The recommended limit of starts and stops of the UV lamps shall be two per day. The maximum rating of the contact shall be 22-36 Vdc, 0.5W max or 16-28 Vac, 0.5W max.

The remote start/stop shall be disabled by default and can be enabled in the Setup section of the menu. Terminals shall be provided at base of circuit board for hookup.

2.4.8 Pressure Gauges

Pressure shall be stem mounted, with phenolic or stainless steel cases and dry dials. The gauge sensors shall be Bourdon tube actuated and constructed of phosphor bronze, stainless steel, or Monel. The gauges shall be equipped with brass threaded 0.25-inch male connections. The dials of the gauges shall be 4.5 inch in diameter with scale readings in psig ranging from zero to 100 psig. A slotted adjustable pointer shall be provided with accuracy to conform to ASME B40.100.

2.4.8 Sodium Hypochlorite Solution Injection Nozzle Assembly

The injection nozzle shall be constructed of polypropylene and with a bronze corporation stop. The assembly shall have a 1-inch NPT fitting to attach to the piping at a “T” fitting.

2.4.10 Well Screen (for Intake Assembly)

Well Screens shall be 2 inches nominal diameter, 5 feet long, and slot size of 60 mesh. The screen and all accessories required for satisfactory operation shall be essentially standard products of manufacturers regularly engaged in the production of such equipment. Field constructed screen is not acceptable. Each end shall be F-NPT.

Metal screen shall be of an approved wire-wound type and shall be stainless steel, conforming to the applicable requirements of AWWA A100. A wire-wound screen manufactured with supporting bars or core of material different from the wire will not be acceptable. Joints shall be made of threaded couplings of the same material as the screens or by brazing or welding in accordance with AWWA C206.

2.4.11 Vent

Mushroom-type vent cap shall be galvanized cast iron with 30-mesh stainless steel screen and F-NPT end.

2.5 PIPE HANGERS (SUPPORTS)

Provide MSS SP-58 and MSS SP-69, Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Ferrous supports in contact with copper shall be copper plated. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

2.6 LABELS

Pipe labels shall be provided to indicate the direction of water flow. Pipelines discharging to the sanitary sewer shall also be labeled “To Sewer” at the valve.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

3.1.1 Water Pipe, Fittings, and Connections

3.1.1.2 Cutting and Repairing

The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to building, piping, wiring, or equipment as a result of cutting shall be repaired by mechanics skilled in the trade involved.

3.1.1.3 Protection of Fixtures, Materials, and Equipment

Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury. Upon completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Safety guards shall be provided for exposed rotating equipment.

3.1.1.4 Mains, Branches, and Runouts

Piping shall be installed as indicated. Pipe shall be accurately cut and worked into place without springing or forcing. Structural portions of the building shall not be weakened. Aboveground piping shall run parallel with the lines of the building, unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or side of main, using crossover fittings required by structural or installation conditions. Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering on the different services. Bare and insulated water lines shall not bear directly

against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted except for use in situations in which standard factory fabricated components are furnished to accommodate specific accepted installation practice. Change in direction shall be made with fittings.

3.1.1.5 Expansion and Contraction of Piping

Allowance shall be made throughout for expansion and contraction of water pipe. Horizontal runs of pipe over 50 feet in length shall be anchored to the wall or the supporting construction about midway on the run to force expansion, evenly divided, toward the ends. Sufficient flexibility shall be provided on branch runouts from mains and risers to provide for expansion and contraction of piping. Flexibility shall be provided by installing one or more turns in the line so that piping will spring enough to allow for expansion without straining.

3.1.2 Joints

Installation of pipe and fittings shall be made in accordance with the manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints shall be made up with fittings of compatible material and made for the specific purpose intended.

3.1.2.1 Threaded

Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1. Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene tape applied.

3.1.2.2 Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes 2-1/2 inches and smaller.

3.1.2.3 Copper Tube and Pipe

a. Brazed. Brazed joints shall be made in conformance with AWS B2.2, MSS SP-73, and CDA A4015 with flux and are acceptable for all pipe sizes. Copper to copper joints shall include the use of copper-phosphorus or copper-phosphorus-silver brazing metal without flux. Brazing of dissimilar metals (copper to bronze or brass) shall include the use of flux with either a copper-phosphorus, copper-phosphorus-silver or a silver brazing filler metal.

b. Soldered. Soldered joints shall be made with flux and are only acceptable for piping 2 inches and smaller. Soldered joints shall conform to ASME B31.5 and CDA A4015.

3.1.3 Dissimilar Pipe Materials

Connections between ferrous and non-ferrous copper water pipe shall be made with dielectric unions or flange waterways. Dielectric waterways shall have temperature and pressure rating equal to or greater than that specified for the connecting piping. Waterways shall have metal connections on both ends suited to match connecting piping. Dielectric waterways shall be internally lined with an insulator specifically designed to prevent current flow between dissimilar metals. Dielectric flanges shall meet the performance requirements described herein for dielectric waterways. Connecting joints between plastic and metallic pipe shall be made with transition fitting for the specific purpose.

3.1.4 Supports

3.1.4.1 General

Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for an individual pipe in the multiple pipe run. Threaded sections of rods shall not be formed or bent.

3.1.4.2 Pipe Hangers, Inserts, and Supports

Installation of pipe hangers, inserts and supports shall conform to MSS SP-58 and MSS SP-69, except as modified herein.

a. Types 5, 12, and 26 shall not be used.

b. Type 19 and 23 C-clamps shall be torqued per MSS SP-69 and shall have both locknuts and retaining devices furnished by the manufacturer. Field-fabricated C-clamp bodies or retaining devices are not acceptable.

c. Type 20 attachments used on angles and channels shall be furnished with an added malleable-iron heel plate or adapter.

d. Type 24 may be used only on trapeze hanger systems or on fabricated frames.

e. Horizontal pipe supports shall be spaced as specified in MSS SP-69 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves. Horizontal pipe runs shall include allowances for expansion and contraction.

3.1.8.4 Structural Attachments

Attachment to building structure concrete and masonry shall be by epoxy adhesive or masonry

anchor devices. Inserts and anchors shall be applied with a safety factor not less than 5. Supports shall not be attached to the underside of concrete filled floor or concrete roof decks unless approved by the Contracting Officer. Masonry anchors for overhead applications shall be constructed of ferrous materials only.

3.2 IDENTIFICATION SYSTEMS

3.2.1 Pipe Labels

Install direction arrows pump discharges, wall penetrations, and “T” fittings.

3.3 PAINTING

Painting of ferrous pipes, hangers, supports, and other ferrous metal work shall be:

a. Surface preparation in accordance to SSPC-SP3 power tool cleaning prior to priming.
b. one coat of alkyd-phenolic primer.
c. one (spray)or two coats (brush or roller)epoxy-polyamide final coat (black).

Copper, brass, and bronze surfaces do not need painting.

3.3.1 PAINTING OF NEW EQUIPMENT

New equipment painting shall be factory applied or shop applied, and shall be as specified under each individual section.

3.4 TESTS, FLUSHING AND DISINFECTION

3.4.1 Piping

The water supply system shall be tested in accordance with ICC IPC.

3.4.2 Defective Work

If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.

3.4.3 System Flushing

3.4.3.1 During Flushing

Before operational tests or disinfection, potable water piping system shall be flushed with potable water. Sufficient water shall be used to produce a water velocity that is capable of entraining and removing debris in all portions of the piping system. This requires simultaneous operation of all fixtures on a common branch or main in order to produce a flushing velocity of

approximately 4 fps through all portions of the piping system. In the event that this is impossible due to size of system, the Contracting Officer (or the designated representative) shall specify the number of fixtures to be operated during flushing. Contractor shall provide adequate personnel to monitor the flushing operation and to ensure that drain lines are unobstructed in order to prevent flooding of the facility. Contractor shall be responsible for any flood damage resulting from flushing of the system. Flushing shall be continued until entrained dirt and other foreign materials have been removed and until discharge water shows no discoloration.

3.4.3.2 After Flushing

System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced. After flushing and cleaning, systems shall be prepared for testing by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor.

3.4.4 Operational Test

Upon completion of flushing and prior to disinfection procedures, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory installation, connections, adjustments, and functional and operational efficiency. Coordinate operational test and equipment installation with commissioning. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

a. Time, date, and duration of test.

b. Water pressures.

c. Operation of each valve.

d. Pump suction and discharge pressures.

3.4.5 Disinfection

After operational tests are complete, the new water system components shall be disinfected. System shall be flushed as specified, before introducing chlorinating material. The chlorinating material shall be hypochlorites or liquid chlorine. Except as herein specified, water chlorination procedure shall be in accordance with AWWA C651 and AWWA C652. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million (ppm). If after the 24 hour and 6 hour holding periods, the residual solution contains less than 25 ppm and 50 ppm chlorine respectively, flush the piping and tank with potable water, and repeat the above procedures until the required residual chlorine levels are satisfied. The system including the tanks shall then be flushed with clean water until the residual chlorine level is reduced to less than one part per million. During the flushing period each valve shall be opened and closed several times. Samples of water in disinfected containers shall be

obtained from several locations selected by the Contracting Officer. The samples of water shall be tested for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with AWWA 10084. The testing method used shall be either the multiple-tube fermentation technique or the membrane-filter technique. Disinfection shall be repeated until tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

3.5 WASTE MANAGEMENT

Place materials defined as hazardous or toxic waste in designated containers. Close and seal tightly partly used sealant and adhesive containers and store in protected, well-ventilated, fire-safe area at moderate temperature. Place used sealant and adhesive tubes and containers in areas designated for hazardous waste.

3.6 INTAKE LOCATION

The location of the new intake structure shall be surveyed by GPS (+/- 3 feet). The coordinates shall be provided to the USCG.

END OF SECTION

SECTION 16051
PANEL FABRICATION AND ELECTRICAL INSTALLATION

1.0 IDENTIFICATION

Panel that shall be fabricated by the successful vendor under this Specification and the associated Contract Drawings are as follows:

Panels and Control Stations		
Panel Tag	***Description***	Contract Drawings
Control Panel	Water Treatment Systems Modification – USCG	E-1 to E-5

2.0 GENERAL

2.1 SCOPE OF VENDOR SUPPLY

1. Panel vendor shall fabricate the panel in accordance with this Specification and any applicable Contract Drawings, standards, codes, or attachments listed or referenced herein.

2. The panel vendor shall furnish all necessary labor, material, and equipment to construct, paint, assemble, wire, and test panel so that the panel shall be ready for installation in the field without further work by the installation contractor.

3. The panel furnished under this Specification, Contract Drawings, and attachments shall conform exactly to the requirements herein set forth. In the event of conflict between this specification and attachments or Contract Drawings, Tetra Tech or their designated representative shall be consulted and a determination obtained before work is done.

2.2 CODES AND STANDARDS

1. All fabrication work, selected equipment, and assembly described herein or shown on any of the Contract Drawings shall meet applicable requirements of any governmental bodies having jurisdiction. This shall include but not be limited to local, state, and federal authorities, their inspection agencies, as well as requirements found in the latest edition of the following codes and standards, where applicable and pertinent:

(1) NFPA 70 (NEC) National Electrical Code
(2) OSHA Occupational Safety and Health Act
(3) ANSI C2 (NESC) National Electrical Safety Code
(4) IEEE Institute of Electrical and Electronic Engineers
(5) ISA International Society for Measurement and Control
(6) NEMA National Electrical Manufacturers Association
(7) ASTM American Society for Testing Material
(8) NFPA National Fire Protection Association

2. All equipment utilized in the construction of panels specified herein or shown on the referenced drawings shall be listed for use by a National Recognized Testing Laboratory (NRTL) for the application. Acceptable NRTL listings or approvals are as follows:

(1) FM Factory Mutual
(2) UL Underwriters Laboratories

3.0 CONSTRUCTION

3.1 MATERIAL

1. Panel vendor shall furnish all instruments, materials, and equipment necessary to provide a complete working panel in accordance with the referenced or supplied Contract Drawings.

3.2 FABRICATION

1. Panels shall utilize catalog stock type enclosure as shown on the referenced project drawings. The panel shall be provided with internal bracing and framing adequate to insure rigidity and suitable for mounting the devices shown on the drawings. Welded construction shall be used throughout unless specified otherwise herein or shown differently on the drawings.

2. If required, panel fabricator shall furnish sufficient welded stiffeners to prevent deformation due to weight of mounted instruments. Welded construction shall be box type of 2" x 2" x 1/4" angle iron. Unistrut may be used for reinforcement and to facilitate mounting of internal equipment. Construction shall form a rigid assembly of sufficient strength to prevent buckling or distortion during shipment, handling, or erection.

3. All enclosure doors, hinges, latches, and hardware shall be manufacturer's standard supply.

4. Panel, including angles, shall be free from dents, gouges, and weld marks. The panels shall present a clean and smooth appearance. The edges and bottom of the panel shall be true and level. All welds that have been made shall be ground smooth and flush.

5. Panels shall have manufacturer's standard supply as far as provisions for mounting in the field.

3.3 PAINT (NON-STAINLESS TYPE ENCLOSURES)

1. All cutting, drilling, and welding necessary to the construction of the panels or to the panelboard assembly shall be completed in a workmanlike manner.

2. The entire panel surface and structure shall be primed, smooth, and finished with the vendor or enclosure manufacturer's standard paint or finish. Panel vendor shall furnish with the panels two (2) cans of touch-up paint for field touch-up use.

3. Vendor or enclosure manufacturer's standard finish shall be acceptable for work specified herein. For standard catalog stock enclosures, vendor standard, light gray ANSI finish is acceptable.

3.4 MOUNTING

1. Vendor shall be responsible for all instrument, equipment, or device cutouts in accordance with dimensions and tolerances specified by the respective manufacturer. If structural drawings illustrating cutouts are furnished, the panel vendor shall verify all cutout dimensions.

2. Panel cut-outs and holes shall be made smooth by any standard method provided that all cut edges are smooth, burrs removed, and that the panel is not bent or buckled during the process.

3. Care shall be taken so that all internal panel components will be easily accessible for maintenance. Empty space on panel front shall be clear in rear for future additions, if applicable.

4. The panel vendor shall route all wireways so as to maintain suitable and proper separation and to not interfere with the servicing of instruments or equipment.

3.5 WORKMANSHIP

1. Installation shall be laid out in a neat and workmanlike manner and shall be executed by mechanics skilled in their respective trades.

2. All work shall be performed in accordance with this specification and the applicable Contract Drawings. In the absence of specific instruction, pertinent industry standards (previously mentioned herein under section 2.2), as well as general good wiring practices shall be followed.

3. All work must comply with applicable local, state, and federal laws and ordinances as well as with the latest edition of all applicable codes and standards.

3.6 NAMEPLATES

1. All panel and panel mounted equipment, sub-panel, instruments, devices, or components shall be identified with permanent nameplates. All nameplates shall be symmetrically placed with respect to the items that they identify.

2. Nameplates shall be constructed of 1/8" thick white lamacoid (plastic), beveled with a black core, and engraved per the respective panel nameplate schedule shown on the project drawings. All inscriptions shall be per the respective nameplate schedule.

3. Nameplates shall be secured by a method that does not alter the strength or environmental integrity of the equipment or enclosure.

3.7 ELECTRICAL - GENERAL

1. All wiring shall conform to this section and with all applicable industry codes and standards (previously mentioned herein under section 2.2). Wiring shall also conform to section 3.8 of this Specification.

2. All panel wiring for 120V, 1 Phase, 60 Hertz control circuits shall be a minimum of #14 AWG, stranded copper, 600V rated, Type PVC MTW, THW, THWN, or THHN unless specified otherwise herein or shown otherwise on the Contract Drawings. Manufacturer's name shall be printed on insulation.

3. All panel wiring for 120V, 1 phase, 60 Hertz power distribution shall be a minimum of #12 AWG, stranded copper, 600V rated, Type PVC MTW, THW, THWN, or THHN unless specified otherwise herein or shown otherwise on the referenced drawings. Manufacturer's name shall be printed on insulation.

4. All wiring shall be installed in accordance with the respective instrument, device, or equipment manufacturer's recommendations. This shall include but not be limited to suitable separation of different levels of electronic signals.

5. All wire runs shall be either vertical or horizontal and suitably supported. Wire shall not be spliced but shall be one continuous unbroken run from origin to termination.

6. Wire identification (cable and conductors) shall be by sleeve type labels or approved equivalent applied where they can be easily read without disturbing other conductors or removing components.

7. Wire and cable connecting equipment shall terminate in terminal blocks separate from and in addition to any terminals that are a part of an instrument device or panel mounted component.

8. Terminal blocks used shall be as specified on the referenced Contract Drawings. All 120V, 1 phase, 60 Hz circuit terminals shall be "finger safe". Blocks shall be installed on mounting channel designed for quick addition of future terminals. All terminal blocks shall be marked in accordance with the Contract Drawings. No more than two (2) wires shall be used in any terminal.

9. Compression or mechanical connection lugs shall be used for panel cabling terminations and shall be sized to match the conductor. Connectors for stranded wire up to #10 AWG shall be Thomas & Betts or equivalent nylon insulated locking space or flanged fork, sized to match the screw diameter. Lugs shall be installed on conductors with T&B installing tool # WT2000 or equivalent. No more than two conductors shall be connected to a screw type terminal.

10. The cases of all instruments, components, relays, and the frames of all equipment, control devices, and regulating devices shall be grounded effectively through the steel structure. Vendor shall furnish a solderless copper ground lug in each cabinet sized for two (2) #2/0 wires. The lug shall be appropriately attached to a non-painted surface.

11. Shakeproof (star) washers shall be used on bolted, tapped and bolted, and stud and contact nut connections.

12. Mechanical grounding connectors, bolts, flat washers, shakeproof (star) washers, contact nuts, and compounds shall be high copper alloy, everdur, durium, or silicone bronze.

13. Unless specified otherwise herein or shown as otherwise on referenced drawings, the electrical power supply to the panels or cabinets shall be via an external 120V, 1 phase, 60 Hertz, 20A source. All overcurrent protection shall be in accordance with requirements found in NFPA 70 (NEC).

14. Panel vendor shall provide a minimum of one (1) 120V, 20A rated, ground fault protected convenience receptacle within each cabinet for maintenance use. Locations and quantities shall be as per the referenced drawings.

15. Panel vendor shall furnish an internally mounted fluorescent light fixture, which shall be controlled via an internally mounted, suitably rated switch. The fluorescent fixture shall be provided with an OSHA tube guard or shall be suitably mounted or located such that accidental tube breakage via inadvertent physical contact shall not produce a falling glass hazard.

3.8 ELECTRICAL - NON HAZARDOUS

1. All wiring within the control panel shall be enclosed in plastic wiring ducts. Wiring duct manufacturer shall be Panduit or approved equivalent. Where wiring from door to subpanel is necessary, the wire or cabling length shall be sufficient to permit full door opening to 180^{o}. All wire or cabling from door to panel shall be properly sleeved so as to prevent damage to cable insulation when the door is operated.

2. Where applicable in panels, wire or cabling shall be bundled with cable ties. Ties and accessories shall be Thomas & Betts or suitable equivalent. All "ty-raps" shall be installed with the use of a tool that cuts the "ty-rap" flush with the locking device.

3. Fluorescent fixture (previously mentioned in section 3.7) shall be the panel vendor's standard stock type fixture provided that the fixture can accommodate an OSHA tube guard or can be located to eliminate the type hazard previously described. Location of the fixture shall also take into consideration tube replacement or removal.

4. The panel vendor shall provide a 1/4" x 1" copper bus throughout the respective cabinet or panel in such a way so as to easily facilitate grounding of panel mounted components, equipment, or instruments. Bus bar shall be mounted on insulators and shall be provided by the vendor even if not explicitly shown on the referenced panel drawing. Instrument connections to signal common shall be individually connected to this bus.

5. All panel mounted equipment requiring 120V power shall be permanently wired for such where possible. Use of cord and plug connected equipment must comply with requirements specified herein as well as with NFPA 70 (NEC) and OSHA 29 CFR 1910 electrical sub-parts.

4.0 QUALITY ASSURANCE REQUIREMENTS, SUBMITTALS, & DOCUMENTS

4.1 FABRICATOR Q.A. REQUIREMENTS

1. Panel fabricator shall have their own "in house" quality procedure which provides for proper, systematic checkout and testing of all work prior to shipment of panels to the customer. This system shall document via report all fabricator "in house" checking and testing of panels and equipment. All vendor QA checkout and testing reports shall be available for the customer or their designated representative to review, if requested.

4.2 GUARANTEE

1. Panels and equipment furnished by the vendor shall be guaranteed against defective material, poor workmanship, poor finish, or failure in normal usage for a period of one (1) year from date of initiation of regular operation, but not exceeding 18 months from date of shipments.

2. Vendor shall also guarantee that the panel and equipment furnished by the vendor will not deteriorate unduly prior to being placed in regular operation, provided reasonable care is exercised by the Owner for a reasonable storage period.

4.3 TESTING AND INSPECTION

1. The following tests or points of inspection shall be performed or reviewed by the panel vendor. Any deficiencies found shall be corrected prior to the arrival of Owner's QA inspection personnel.

(1) All electrical circuits checked for continuity and operability.
(2) Nameplates checked for spelling and size of letters.
(3) Instruments, panel mounted devices, and alarm circuits tested by signal simulation to determine operability.
(4) Any other test required to establish that all instruments, equipment, devices and wiring have been correctly installed and is in satisfactory working condition.

2. Upon completion, Owner or their designated representative shall inspect the panel for operability and conformity to Contract Drawings. Panel vendor shall supply the necessary power, testing devices and manpower required by the Owner's inspector. Owner's inspection shall not relieve panel vendor of responsibility for deficiencies that may be discovered or that may develop subsequent to the inspection.

4.4 CRATING AND SHIPPING

1. The panel shall be secured and protected against damage from handling and adverse weather.

2. Remove and pack separately any instruments that the manufacturer recommends not be shipped with the panel.

3. Install shipping stops. Protect all gauge glasses, instrument fronts, and face mounted equipment with heavy cardboard and masking tape.

4. Add desiccant to panel to prevent accumulation of moisture.

5. Panel shall be wrapped in plastic, crated, and securely fastened to a skid adding further cushioning, as necessary.

6. Shipping address and hours for accepting deliveries at the respective plant site shall be indicated on the purchase order for fabrication services to the vendor. Should the appropriate information not be shown or inadvertently left off the purchase order, the vendor shall contact the following to obtain the appropriate information:

TBD

4.5 SUBMITTALS, DRAWINGS, AND ATTACHMENTS

1. Panel vendor may supplement Tetra Tech's Contract Drawings with drawings of his own to enable panel construction and route wiring.

2. Tetra Tech's approval of drawings shall not constitute permission to deviate from the purchase order where Specifications have not changed, unless modifications are specifically approved in writing. This does not relieve the vendor of responsibility for correctness of design, details, and dimensions.

3. All applicable project panel Contract Drawings have been listed under section 1.0 along with the respective panel tag number or equipment identification number, if applicable or available. Those drawings shall be considered as attachments to this specification.

4. The Contract Drawings provide a listing of panel nameplates with engraving legends.

END OF SECTION