Greater New Haven Water Pollution Control Authority

New Haven, Connecticut

BIDDING REQUIREMENTS
AND
CONTRACT DOCUMENTS

for purchase of

Process Air Compressor Equipment

Process Air Compressor System for Low Level Nitrogen Removal
East Shore Water Pollution Abatement Facility

Project No. CWF 2019-04

JACOBS

Wethersfield, CT

December 2021

Project No. E2X90000 Copy No._____

Pages

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PROCUREMENT REQUIREMENTS

GREATER NEW HAVEN
WATER POLLUTION CONTROL AUTHORITY

NOTICE OF REQUEST FOR PROPOSAL (RFP)
PROCESS AIR COMPRESSOR EQUIPMENT

PROJECT NO. CWF 2019-04
PROCESS AIR COMPRESSOR SYSTEM
FOR LOW LEVEL NITROGEN REMOVAL
EAST SHORE WATER POLLUTION ABATEMENT FACILITY

The Greater New Haven Water Pollution Control Authority intends to pre-select a single supplier to furnish process air compressor equipment and ancillary equipment, including all materials, equipment, or work required including commissioning, training, and performance testing to be incorporated into the Process Air Compressor System for Low Level Nitrogen Removal project at the East Shore Water Pollution Abatement Facility.

Proposals shall be received at the Office of Director of Finance and Administration of the Greater New Haven Water Pollution Control Authority located at 260 East Street, New Haven, Connecticut 06511, until 10:00 a.m., prevailing local time January 20, 2022. Proposals received after that time will not be accepted.

The bidders may be required to attend a virtual interview regarding the technical proposal.

The selected Proposer will be named as the preselected supplier of Process Air Compressor Equipment in the project specifications for the general construction of the Process Air Compressor System for Low Level Nitrogen Removal project. The Contractor shall be responsible for the purchase of the Process Air Compressor Equipment package from the Process Air Compressor Equipment Manufacturer as described herein and in the Proposal. In return, the Proposer must agree to enter into an agreement with the General Contractor who is selected by the Greater New Haven Water Pollution Control Authority to construct the Process Air Compressor System for Low Level Nitrogen Removal, and to provide the equipment and services as established in the Proposal.

The information for Bidders, Proposal, Form of Contract, Plans and Specifications may be examined at the web address https://gnhwpca.com/doing-business-with-gnhwpca/vendor-portal/. All Bidders must obtain the full "RFP" by contacting engineering@gnhwpca.com and referencing the project number CWF 2019-04.

All questions concerning this RFP must be submitted to the Authority via email in writing before 4:00 p.m. on January 7, 2022 (Email: engineering@gnhwpca.com and Karina.massey@jacobs.com). To be given consideration, questions must be received prior to the due date for questions indicated above. This office is the only point where information shall be disseminated. The Authority reserves the right to reject any and all proposals, and to waive informalities and irregularities in the preselection procedure.

All bidders are to note that this project is subject to the following requirements:

1. Any contract awarded under this RFP is expected to be funded in part by the State of Connecticut, Department of Energy and Environmental Protection. Neither the State of Connecticut nor any of

its departments, agencies, or employees is or will be party to this RFP or any resulting contract. This procurement will be subject to the requirements contained in Title 22a, Section 22a-482-4, subsections (h), (j), and (o).

2. Bidders are subject to affirmative action to ensure equal opportunity for employment, as noted in Governor's Executive Orders Three and Seventeen.

3. American Iron and Steel (AIS) requirements of Section 436 of Public Law (P.L.) 113-76, Consolidated Appropriations Acts, 2014.

4. State of Connecticut Wage Rates and Federal Minimum Wage Rates, as determined by the United States Department of Labor under the Davis-Bacon Act.

5. United States Environmental Protection Agency's Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment implementing Section 889 of Public Law 115-232, effective August 13, 2020.

A certified check or bid bond in the amount of ten percent (10%) of the total bid amount must accompany the bid. Said checks or bid bonds will be returned to the unsuccessful bidders upon execution of a contract between the selected firm and the selected Contractor. If any bid is not accompanied by a bid bond or certified check at the specified time for receipt of proposals, the incomplete proposal will not be read and this action will constitute automatic rejection of the bid.

The successful bidder will be required to furnish a performance bond and a labor and materials payment bond to the Greater New Haven Water Pollution Control Authority and the selected Contractor for the amount of the total bid. A certified check cannot be substituted for either bond.

The Greater New Haven Water Pollution Control Authority reserves the right to alter quantities and accept or reject any or all bids or portions of any bids, for any or no reason, including unavailability of appropriated funds as it may deem to be in its best interests.

All bidders are to note that the award of this proposal is subject to the following conditions and contingencies:

1. The approval of such government agencies as may be required by law.

2. The appropriation of adequate funds by the proper agencies.

3. The Proposal Form as provided in these documents, submitted with all applicable certifications and documentation in accordance with the bid documents.

Greater New Haven Water Pollution Control Authority

BY: Gabriel Varca
Director of Finance and Administration

DATED: December 16, 2021

END OF SECTION

REQUEST FOR PROPOSAL

1. DEFINITIONS

1.1. Bidder: Synonymous with Proposer, shall refer to any manufacturer's authorized representative submitting a proposal in response to this Request for Proposal.

1.2. Owner: Greater New Haven Water Pollution Control Authority.

1.3. Engineer: Jacobs

1.4. Contractor: General Contractor to be selected by Owner to perform the work to provide the ESWPAF Process Air Compressor System for Low Level Nitrogen Removal.

1.5. Equipment Manufacturer: The selected Proposer to this request for proposal that will be furnishing the Process Air Compressor Equipment for the ESWPAF Process Air Compressor System for Low Level Nitrogen Removal project.

1.6. Project: The ESWPAF Process Air Compressor System for Low Level Nitrogen Removal Project performed by the Contractor.

2. PROPOSAL

2.1. Proposals for the process air compressor equipment, mailed or delivered in person, shall be one package shall be sealed and be marked “Project CWF 2019-04 Process Air Compressor PROPOSAL DOCUMENTS ENCLOSED.”

2.2. Prepare and submit five (5) hard copies and one (1) electronic (PDF) copy on USB drives.

2.3. The Proposal consists of the following:

2.3.1. Proposal Form: Completed Section 00 41 65-01, Request for Proposal, Proposal Form.

2.3.2. Proposal Submittal Information: Information as shown in Section 44 42 19.05, High Speed Turbo Air Compressors, Part 1, Article 1.05 Submittals, paragraph B Action Submittals.

2.3.3. Proposal Security:

2.3.3.1. Each Proposal shall be accompanied by Proposal Security made payable without condition to Director of Finance and Administration, Greater New Haven Water Pollution Control Authority, in the amount of 10 percent of the Equipment

Manufacturer's Total Bid. Security may be in the form of either a bond or a certified check.

2.3.3.2. Each Bidder's proposal Security will be retained until the selected Equipment Manufacturer has a signed agreement with the Contractor for installation of the Equipment Manufacturer's equipment at the East Shore Water Pollution Abatement Facility.

2.4. The proposal is exempt from Connecticut State sales and use taxes on permanently installed materials and equipment supplied under this proposal.

2.5. All pricing in the proposal shall be free on board the project site, located at 345 East Shore Parkway, New Haven, CT 06405

3. PROPOSAL EVALUATION

3.1. The Engineer will evaluate Proposals as submitted by Equipment Manufacturers according to monetary and non-monetary criteria and review with the Owner. The evaluation process may include an interview held via electronic means. The local representative and the service technician that will support the Owner during service calls must attend the interview.

3.2. Receipt of the submittal by the Owner does not constitute either a direct or implied guarantee to the pre-selected Equipment Manufacturer that prequalification or purchase will be granted. Proposals may be rejected at anytime at the Owners discretion.

3.3. Engineer and Owner may request additional information from the Equipment Manufacturer after submission of the Proposal if any item is unclear or incomplete; or Owner may determine insufficient information was originally submitted and refuse to further consider the manufacturer and/or equipment. The Equipment Manufacturer shall have 7 calendar days from receipt of a written request to submit any requestion additional information to the Owner and Engineer.

4. PROJECT

4.1. The selected Equipment Manufacturer will be named as the preselected supplier of the process air compressors and ancillary equipment in the project specifications for the general construction of the Project. The Contractor will be responsible for the purchase of the Manufacturers Equipment from the Equipment Manufacturer as described herein and in Proposal. In return, Equipment Manufacturer must agree to enter into an agreement with the Contractor who is selected by the Owner to construct the Project, to provide the bonds, equipment and services as established in the Proposal. Equipment Manufacturer must also agree to:

4.1.1. Honor the equipment, materials, and services costs for an expected Project bid opening and Notice to Proceed18 months from the proposal due date.

4.1.2. In the event that the Notice to Proceed date for the General Contract occurs later than 18 months after the proposal due date, Equipment Manufacturer agrees to provide the equipment, materials, and services at a price negotiated with the Owner.

4.1.3. Provide assistance to Engineer in the preparation of the detailed construction documents related to the goods and serviced provided by Equipment Manufacturer.

4.1.4. The Owner reserves the right to delete optional items from the scope of supply and deduct the cost of these optional items from the price.

4.1.5. Agree to the following Payment and Retainage Terms:

4.1.5.1. Payments are subject to the 5 percent retainage imposed upon the General Contractor as part of the larger Project.

4.1.5.2. 10 percent of total price payment upon approval of all shop drawing submittals submitted through the Contractor.

4.1.5.3. 5 percent of total price payment upon approval of Operation and Maintenance manuals.

4.1.5.4. 70 percent of total price payment upon delivery of equipment to the Project site specified in Section 44 42 19.05, High Speed Turbo Air Compressors.

4.1.5.5. 5 percent of total price payment upon completion of installation, O&M training, startup assistance and testing, and successful demonstration testing.

4.1.5.6. 10 percent of total price payment upon completion of all services described in Section 44 42 19.05, High Speed Turbo Air Compressors, including acceptance of the installation by the Owner.

4.1.6. All retainage shall be released upon the Final Completion of the larger project. It is anticipated that the Project will have an 18-month Project duration.

END OF SECTION

REQUEST FOR PROPOSAL
PROPOSAL FORM

Bidder: _____

1. PROPOSAL RECIPIENT.

1.1. This proposal is submitted to:

Gabriel Varca
Director of Finance and Administration
260 East Street
New Haven, CT 06511
Reference: Process Air Compressor System for Low Level Nitrogen Removal at the East Shore Water Pollution Abatement Facility
CWF 2019-04
Process Air Compressor Equipment Preselection

2. EQUIPMENT MANUFACTURER'S ACKNOWLEDGEMENTS.

2.1. Equipment Manufacturer accepts all of the terms and conditions of the Request for Proposal (Process Air Compressor Equipment) documents, including without limitation those dealing with consumption guarantees, performance guarantee, and liquidated damages.

2.2. Equipment Manufacturer acknowledges that upon acceptance of proposal, Equipment Manufacturer shall prepare preliminary shop drawings for Engineer to use in completing the construction bid documents. The successful proposal will be included in the bid documents to be advertised for bidding by Contractors who will subsequently provide and install this material as part of the Contract. Payment to the Equipment Manufacturer will be by the Contractor. Bid documents for the Contractor are anticipated to be in 2022 with an 18 month Project duration.

2.3. Equipment Manufacturer has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Equipment Manufacturer has discovered in Proposal Documents, and written resolution thereof by Engineer is acceptable to Equipment Manufacturer.

3. OTHER CONDITIONS.

3.1. Equipment Manufacturer agrees to honor the equipment, materials, and services costs in the Proposal for a Notice to Proceed date to the Contractor within 18 months from the proposal due date.

3.2. In the event that the Notice to Proceed date for the Project occurs later than 18 months after the proposal due date, Equipment Manufacturer agrees to provide the equipment, materials, and services at an adjusted selling price negotiated with the Owner.

3.3. The Authority reserves the right to delete alternate items from the scope of supply and deduct the cost of these optional items from the price.

3.4. If for any reason the Authority does not award the Project, the Authority is under no obligation to purchase the equipment, materials, and services in the Proposal.

3.5. The selected Equipment Manufacturer shall be required to provide Performance and Payment Bonds to the Owner and Contractor as part of their agreement with Contractor. Performance and Payment Bond, each in an amount equal to one hundred percent (100%) of the Lump Sum Cost as security for the faithful performance of this Proposal and as security for the payment of all persons performing Labor and furnishing Materials under this Contract. The surety shall be such surety company or companies that are acceptable to the Owner and Contractor and that are authorized to transact business in the State of Connecticut.

4. CONSUMPTION GUARANTEES.

4.1. The Proposer guarantees that the Process Air Compressor equipment offered in the Proposal will continuously meet the following Guarantees:

4.1.1. See Guaranteed Performance under Section 44 42 19.05, High Speed Turbo Air Compressors.

5. PROPOSAL SUBMISSION.

5.1. Completely fill and submit the attached Proposal Form.

PROPOSAL FORM

Bidder: _____

Project CWF 2019-4: Purchase of Process Air Compressor for Low Level Nitrogen Removal Equipment

Item	Description	Lump Sum Cost USD
1	Process Air Compressor System, as specified in section 44 42 19.05 High Speed Turbo Air Compressors.	

Lump Sum Cost (words)

USD_____

Manufacturer's Extended Warranty:

Cost of extension of specified 1 year warranty to 5 years.
USD_____

Annual Service Contract amount for Years 2 Through 5 of annual recommended maintenance.

USD_____

Equipment Manufacture's Options/Alternates:

The following Options or Alternate Prices are offered in addition to the Base Proposal:

Alternate / Option	Description	Unit Cost USD Add (Deduct)
1		
2		
3		

Addenda Receipt:

Receipt of the following RFP Addenda is hereby acknowledged:

Addendum No. _____ Date: _____
Addendum No. _____ Date: _____
Addendum No. _____ Date: _____

Agreement to Accept the Terms and Provisions of the RFP Documents:

We have reviewed the provisions of the RFP, the RFP Documents attached to the RFP, and the Addenda received and ***agree to accept the provisions without exception*** on any Order resulting from this RFP.

☐ **YES** ☐ **NO**

If NO, our exceptions are listed below a detailed on a separate document attached hereto. We understand that exceptions may be grounds for rejection of the Proposal:

Technical Exceptions:

_____
_____
_____

Authorization:

The undersigned, having carefully examined the RFP Documents hereby offers and agrees to furnish all goods and services for the proposal sums proposed above and in accordance with the provisions set forth in the RFP Documents and the Proposal Form.

This Proposal submitted by:

Company Name: _____
Email Address: _____
Address: _____
_____
_____

Authorized Agent: _____
(name)

Authorized Agent: _____
(Signature)

Title: _____
For example: President, Vice-President

Submitted with this Proposal Form per Specification 00 41 65, Section 2:

1. Proposal Submittal Information
2. Proposal Security

Corporate Seal

End of Section

Required Construction Contract Provisions Under the Connecticut Department of Environmental Protection's Clean Water Fund

REQUIRED CONSTRUCTION CONTRACT PROVISIONS UNDER THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION'S CLEAN WATER FUND

22a-482-4 (g) Required Provisions for Construction Contracts.
Municipalities must include, when appropriate, subdivisions (1) to (14), inclusive, of this subsection, or their equivalent, in each subagreement and may substitute other terms for "grantee" and "contractor" in their subagreements.

(1) Supersession

The municipality and the contractor agree that the following general provisions, or their equivalent, apply to eligible work to be performed under this contract and that these provisions supersede any conflicting provisions of this contract.

(2) Privity of Contract

This contract is expected to be funded in part by the State of Connecticut. Neither the state, nor any of its departments, agencies, or employees is or will be a party to this contract or any lower tier subcontract. This contract is subject to sections 22a-482-1 to 22a-482-4, inclusive, of the Regulations of Connecticut State Agencies.

(3) Changes for Contracts for Construction.

(A) The municipality may, at any time, without notice to any surety, by written order designated or indicated to be a change order, make any change in the work within the general scope of the subagreement, including but not limited to changes:

(i) in the specifications (including drawings and designs);

(ii) in the time, method, or manner of performance of the work;

(iii) in the municipality-furnished facilities, equipment, materials, services, or site; or

(iv) directing acceleration in the performance of the work.

(B) A change order shall also be any other written or oral order (including direction, instruction, interpretation or determination) from the municipality which causes any change, provided the contractor gives the municipality written notice stating the date, circumstances, and source of the order and that the contractor regards the order as a change order.

(C) Except as provided in subdivision (3) of this subsection, no order, statement, or conduct of the municipality shall be treated as a change under subdivision (3) of this subsection or entitle the contractor to an equitable adjustment.

(D) If any change under subdivision (3) of this subsection causes an increase or decrease in the contractor's cost or the time required to perform any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the subagreement modified in writing. However, for claims based on defective specifications, no claim for any change under subparagraph (B) of this subdivision shall be allowed for any costs incurred more than 20 days before the contractor gives written notice as required in subparagraph (B) of this subdivision. In the case of defective specifications for which the municipality is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the contractor in attempting to comply with those defective specifications.

(E) If the contractor intends to assert a claim for an equitable adjustment under this clause, he shall, within thirty (30) days after receipt of a written change order under subparagraph (A) of this subdivision, or the furnishing of a written notice under subparagraph (B) of this subdivision, submit to the grantee a written statement setting forth the general nature and monetary extent of such claim. The municipality may extend the

30-day period. The statement of claim may be included in the notice under subparagraph (B) of this subdivision.

(F) No claim by the contractor for an equitable adjustment shall be allowed if made after final payment under this contract.

(4) Changes for Contracts for Supplies.

(A) The municipality may at any time, by a written order and without notice to the sureties, make changes within the general scope of this subagreement in any one or more of the following:

(i) drawings, designs, or specifications, where the supplies to be furnished are to be specially manufactured for the municipality;

(ii) method of shipment or packing; and (iii) place of delivery.

(B) If any change causes an increase or decrease in the cost or the time required to perform any part of the work under this subagreement, whether or not changed by any such order, an equitable adjustment shall be made in the subagreement price or delivery schedule, or both, and the subagreement shall be modified in writing. Any claim by the contractor or adjustment under this clause shall be asserted within thirty (30) days from the date of receipt by the contractor of the notification of change. lf the municipality decides that the facts justify such action, the municipality may receive and act upon any such claim asserted at any time before final payment under this subagreement. Where the cost of property is made obsolete or excessive as a result of a change is included in the contractor's claim for adjustment, the grantee shall have the right to prescribe the manner of disposition of such property. Nothing in this subdivision shall excuse the contractor from proceeding with the subagreement as changed.

(5) Differing Site Conditions.

(A) The contractor shall promptly, and before such conditions are disturbed, notify the municipality in writing of:

(i) subsurface or latent physical conditions at the site differing materially from those indicated in this subagreement; or

(ii) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this subagreement. The municipality shall promptly investigate the conditions and, if it finds that conditions are materially different and will cause an increase or decrease in the contractor's cost or the time required to perform any part of the work under this subagreement, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the subagreement modified in writing.

(B) No claim of the contractor under this subdivision shall be allowed unless the contractor has given notice required in subparagraph (A) of this subdivision. However, the municipality may extend the prescribed time.

(C) No claim by the contractor for an equitable adjustment shall be allowed if asserted after final payment under this subagreement.

(6) Suspension of Work.

(A) The municipality may order the contractor, in writing, to suspend, delay, or interrupt all or any part of the work for such period of time as the municipality may determine to be appropriate for the convenience of the municipality.

(B) If the performance of all or any part of the work is suspended, delayed, or interrupted for an unreasonable period of time by an act of the municipality in administration of the contract, (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract

(excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing. However, no adjustment shall be made under this subdivision for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the contractor, or for which an equitable adjustment is provided for, or excluded, under any other provision of the contract.

(C) No claim under this subdivision shall be allowed for any costs incurred more than twenty (20) days before the contractor notified the municipality in writing of the act or failure to act involved (this requirement does not apply to a claim resulting from a suspension order), and unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the contract.

(7) Termination.

(A) This contract may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this subagreement through no fault of the terminating party, provided that no termination may be effected unless the other party is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(B) This contract may be terminated in whole or in part in writing by the municipality for its convenience, provided that the contractor is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(C) If termination for default is effected by the municipality, an equitable adjustment in the price provided for in this contract shall be made but no amount shall be allowed for anticipated profit on unperformed services or other work, and any payment due to the contractor at the time of termination may be adjusted to cover any additional costs to the municipality because of the contractor's default. If termination for default is effected by the contractor, or if termination for convenience is effected by the municipality, the equitable adjustment shall include a reasonable profit for services or other work performed. The equitable adjustment for any termination shall provide for payment to the contractor for services rendered and expenses incurred prior to the termination in addition to termination settlement costs reasonably incurred by the contractor relating to commitments which had become firm prior to the termination.

(D) Upon receipt of a termination action pursuant to subparagraphs (A) or (B) of this subdivision, the contractor shall promptly discontinue all services affected (unless the notice directs otherwise), and deliver or otherwise make available to the municipality all data, drawings, specifications, reports, estimates, summaries and such other information and materials as may have been accumulated by the contractor in performing this contract whether completed or in process.

(E) Upon termination under subparagraphs (A) or (B) of this subdivision the municipality may take over the work and may award another party a contract to complete the work under this contract.

(F) If, after termination for failure of the contractor to fulfill contractual obligations, it is determined that the contractor had not failed to fulfill contractual obligations, the termination shall be deemed to have been for the convenience of the municipality. In such

event, adjustment of the price provided for in this contract shall be made as provided in subparagraph (C) of this subdivision.

(8) Remedies.

Except as may be otherwise provided in this contract, all claims, counter- claims, disputes, and other matters in question between the municipality and the contractor arising out of or relating to this contract or the breach thereof will be decided by arbitration, if the parties mutually agree, or in a court of competent jurisdiction within the district in which the municipality is located.

(9) Price Reduction for Defective Cost or Pricing Data.

NOTE– This subdivision is applicable to any contract negotiated between the municipality and its contractor in excess of $500,000; negotiated change orders in excess of $500,000 or 10 percent of the contract, whichever is less, affecting the price of a formally advertised, competitively awarded, fixed price contract; or any lower tier subcontract or purchase order in excess of $500,000 or 10 percent of the assistance agreement, whichever is less, under a contract other than a formally advertised, competitively awarded, fixed price subagreement. This subdivision is not applicable for contracts to the extent that they are awarded on the basis of effective price competition.

The contractor and subcontractor, where appropriate, warrant that cost and pricing data submitted for evaluation with respect to negotiation of prices for negotiated contracts, lower tier subcontracts and change orders is based on current, accurate, and complete data supported by their books and records. If the municipality or the Commissioner determines that any price (including profit) negotiated in connection with this contract, any lower tier subcontract, or any amendment thereunder was increased by any significant sums because the data provided was incomplete, inaccurate, or not current at the time of submission, then such price, cost, or profit shall be reduced accordingly, and the contract shall be modified in writing to reflect such reduction. Failure to agree on a reduction shall be subject to subdivision (8) of this subsection.

NOTE– Since the contract is subject to reduction under this subdivision by reason of defective cost or pricing data submitted in connection with lower tier subcontracts, the contractor may wish to include a clause in each lower tier subcontract requiring the lower tier subcontractor to appropriately indemnify the contractor. It is also expected that any lower tier subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by lower tier subcontractors.

(10) Audit; Access to Records.

(A) The contractor shall maintain books, records, documents, and other evidence directly pertinent to performance on grant work under this contract in accordance with generally accepted accounting principles and practices consistently applied. The contractor shall also maintain the financial information and data used by the contractor in the preparation or support of the cost submission required under section 22a-482-4 (i) (6) for any negotiated contract or change order and a copy of the cost summary submitted to the municipality. The municipality and the Commissioner or any of his or her authorized representatives shall have access to all such books, records, documents, and other evidence for the purpose of inspection, audit and copying during normal business hours. The contractor will provide proper facilities for such access and inspection.

(B) If this is a formally advertised, competitively awarded, fixed price contract, the contractor agrees to make subparagraphs (A) to (F), inclusive, of this subdivision applicable

to all negotiated change orders and contract amendments affecting the contract price. In the case of all other types of prime contracts, the contractor agrees to include subparagraphs (A) to (F), inclusive, of this subdivision in all his subcontracts in excess of $10,000 and to subparagraphs (A) through (F), inclusive, of this subdivision applicable to all change orders directly related to project performance.

(C) Audits conducted under this subdivision shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit departments and shall meet the requirements of section 7-396a of the General Statutes.

(D) The contractor agrees to disclose all information and reports resulting from access to records under subparagraphs (A) and (B) of this subdivision to any of the parties referred to in subparagraph (A) of this subdivision.

(E) Records under subparagraphs (A) and (B) of this subdivision shall be maintained and made available during performance on assisted work under this contract and until three years from the date of final state payment for the project. In addition, those records which relate to any dispute appeal arising under a grant assistance agreement, to litigation, to the settlement of claims arising out of such performance, or to costs or items to which an audit exception has been taken, shall be maintained and made available until three years after the date of resolution of such appeal, litigation, claim, or exception.

(F) This right of access provision (with respect to financial records) applies to:

(i) negotiated prime subagreements:

(ii) negotiated change orders or contract amendments in excess of $10,000 affecting the price of any formally advertised, competitively awarded, fixed price contract; and

(iii) subcontracts or purchase orders under any contract other than a formally advertised, competitively awarded, fixed price contract. However, this right of access does not apply to a prime contract, lower tier subcontract, or purchase order awarded after effective price competition, except with respect to records pertaining directly to contract performance, (excluding any financial records of the contractor), if there is any indication that fraud, gross abuse, or corrupt practices may be involved or if the contract is terminated for default or for convenience.

(11) Covenant Against Contingent Fees.

The contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the contractor for the purpose of securing business. For breach or violation of this warranty the grantee shall have the right to annul this agreement without liability or, at its discretion, to deduct from the contract price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

(12) Gratuities.

(A) If the municipality finds, after a notice and hearing, that the contractor, or any of the contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the municipality or the state, in an attempt to secure a contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this agreement, the municipality may, by written notice to the contractor, terminate this agreement. The municipality may also pursue other rights and remedies that the law or this agreement provides. However, the existence of the facts on which the municipality bases such findings shall be in issue and may be reviewed in proceedings under subdivision (8) of this subsection.

(B) In the event this contract is terminated, as provided in subparagraph (A) of this subdivision, the municipality may pursue the same remedies against the contractor as it could pursue in the event of a breach of the contract by the contractor and, as a penalty, in addition to any other damages to which it may be entitled by law, may pursue exemplary damages in an amount (as determined by the grantee) which shall be not less than three nor more than ten times the costs the contractor incurs in providing any such gratuities to any such officer or employee.

(13) Responsibility of the Contractor.

(A) The contractor agrees to perform all work under this agreement in accordance with this agreement's designs, drawings, and specifications.

(B) The contractor warrants and guarantees for a period of one (1) year from the date of substantial completion of the system that the completed system is free from all defects due to faulty materials, equipment or workmanship; and the contractor shall promptly make whatever adjustments or corrections necessary to cure such defects, including repairs of any damage to other parts of the system resulting from such defects. The municipality shall give notice to the contractor of observed defects with reasonable promptness. In the event that the contractor fails to make adjustments, repairs, corrections or other work that may be made necessary by such defect, the municipality may do so and charge the contractor the cost incurred. The performance bond shall remain in full force and effect through the guarantee period.

(C) The contractor's obligations under this subdivision are in addition to the contractor's other express or implied warranties under this agreement or state law and in no way diminish any other rights that the municipality may have against the contractor for faulty material, equipment, or work.

(14) Final Payment.

Upon satisfactory completion of the work performed under this agreement, as a condition before final payment under this agreement, or as a termination settlement under this agreement, the contractor shall execute and deliver to the municipality a release of all claims against the municipality arising under or by virtue of this agreement, except claims which are specifically exempted by the contractor to be set forth therein. Unless otherwise provided in this agreement or by state law or otherwise expressly agreed to by the parties to this agreement, final payment under this agreement or settlement upon termination of this agreement shall not constitute a waiver of the municipality's claims against the contractor or his sureties under this agreement or applicable performance and payment bonds.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

MEMORANDUM

SUBJECT: Prohibition on Certain Telecommunication and Video Surveillance Services or Equipment in the SRF Programs

FROM: Kiri Anderer, P.E., Acting Associate Branch Chief
Infrastructure Branch, OGWDW

KIRSTEN ANDERER Digitally signed by KIRSTEN ANDERER Date: 2020.12.11 07:55:52 -05'00'

Michael Deane, Branch Chief
State Revolving Fund Branch, OWM

MICHAEL DEANE Digitally signed by MICHAEL DEANE Date: 2020.12.11 17:56:38 -05'00'

TO: SRF Branch Chiefs
Regions 1-10

Effective August 13, 2020, recipients and subrecipients of EPA funded assistance agreements, including borrowers under EPA funded revolving loan funds, must comply with regulations at 2 CFR 200.216, *Prohibition on certain telecommunication and video surveillance services or equipment*, implementing section 889 of Public Law 115-232. The regulation prohibits the use of Federal funds to procure (enter into, extend, or renew contracts) or obtain equipment, systems, or services that use "covered telecommunications equipment or services" identified in the regulation as a substantial or essential component of any system, or as critical technology as part of any system. Prohibitions extend to the use of Federal funds by recipients and subrecipients to enter into a contract with an entity that "uses any equipment, system, or service that uses covered telecommunications equipment or services" as a substantial or essential component of any system, or as critical technology as part of any system. Certain equipment, systems, or services, including equipment, systems, or services produced or provided by entities subject to the prohibition are recorded in the System for Award Management exclusion list.

As described in section 889 of Public Law 115-232, covered telecommunications equipment or services includes:

- Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
- For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
- Telecommunications or video surveillance services provided by such entities or using such equipment.

- Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

Applicability in the State Revolving Fund (SRF) Programs

Clean Water and Drinking Water SRF (CWSRF and DWSRF) programs may not expend equivalency funds for these products on or after August 13, 2020. States must ensure that equivalency assistance agreements include the telecommunications prohibition condition provided by EPA's Office of Grants and Debarment (OGD) in OGD's most recent EPA General Terms and Conditions. The condition must also be in construction contracts associated with equivalency assistance agreements.

There is no exhaustive list of components and services that fall under the prohibition. State SRF managers and local assistance recipients should exercise due diligence and be particularly mindful of project components with internet or cellular connections. For example, recipients should be mindful of automatic meter reading (AMR) technology and advanced metering infrastructure (AMI), instrumentation control systems (e.g. process control systems, distributed control systems and programmable logic controls), and security cameras and other electronic security measures to ensure that those items are procured from a non-excluded entity. Items included in the prohibition are not eligible SRF costs, and the SRF programs cannot reimburse borrowers for these costs.

The prohibition also applies to the CWSRF administrative funds (if states are billing those costs to the federal CWSRF capitalization grant) and the four DWSRF set-asides. States should be mindful of items such as cell phones, computers, and mobile WiFi routers or hotspots funded by those accounts.

If you have questions on the implementation of this grant condition, please contact Michael Deane at Deane.Michael@epa.gov or Kiri Anderer at Anderer.Kirsten@epa.gov.

Eff: 8/13/2020

Per EPA Guidance, the following language must be inserted in all bid/Specification documents to ensure proper compliance to the Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment:

Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment
This term and condition implements 2 CFR 200.216 and is effective for obligations and expenditures of EPA financial assistance funding on or after 8/13/2020. As required by 2 CFR 200.216, EPA recipients and subrecipients, including borrowers under EPA funded revolving loan fund programs, are prohibited from obligating or expending loan or grant funds to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities). Recipients, subrecipients, and borrowers also may not use EPA funds to purchase: a. For the purpose of public safety, security of government facilities, physical security surveillance of critical Page 4 of 29 infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities). b. Telecommunications or video surveillance services provided by such entities or using such equipment. c. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country. Consistent with 2 CFR 200.471, costs incurred for telecommunications and video surveillance services or equipment such as phones, internet, video surveillance, and cloud servers are allowable except for the following circumstances: a. Obligating or expending EPA funds for covered telecommunications and video surveillance services or equipment or services as described in 2 CFR 200.216 to: (1) Procure or obtain, extend or renew a contract to procure or obtain; (2) Enter into a contract (or extend or renew a contract) to procure; or (3) Obtain the equipment, services, or systems. Certain prohibited equipment, systems, or services, including equipment, systems, or services produced or provided by entities identified in section 889, are recorded in the System for Award Management exclusion list.

Executive Order No. Three

STATE OF CONNECTICUT
BY HIS EXCELLENCY
THOMAS J. MESKILL
GOVERNOR
EXECUTIVE ORDER NO. THREE

WHEREAS, sections 4-61d (b) and 4-11a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services and

WHEREAS, section 4-61e (c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws.

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state con-tracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a pro-vision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state and federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II

Each contractor having a contracting containing the provisions prescribed in section 4-11a of the 1969 supplement to the general statutes, shall file and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order of any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III

Whenever the contractor or subcontractor has a collective bargaining agreement or contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's practices and policies including but not limited to matters concerning personnel, training, apprenticeship, member-ship, grievance and representation, and upgrading, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV

The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase order from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respects a separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V

Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI

The labor commissioner may investigate the employment practices and procedures of any state contractor or sub-contractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions, hereinabove specified or statutes of the state respecting they have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII

The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or member or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

VIII

The labor commissioner shall use his best efforts directly and through contracting agencies, or other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, and the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and provide training, employment and upgrading opportunities for disadvantaged workers, in accordance with section 31-51 (d) of the 1969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing or supervising apprentice-ship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements or state or federal law.

IX

The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

X

(a) The labor commissioner may hold or cause to be held hearings, prior to imposing, ordering or recommending the imposition or penalties and sanctions under this Order. No order for disbarment or any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

(1) Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.

(2) Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provisions or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations or applicable law, of organizations, individuals or groups who prevent directly or indirectly or seek to prevent directly or indirectly compliance with the provisions of this Order.

(3) Recommend that criminal proceedings be brought under chapter 939 of the general statutes.

(4) Cancel, terminate, suspend or cause to be canceled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a pro-gram for future compliance approved by the contracting agency.

(5) Provide that any contracting agency shall refrain from entering into any further contract or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.

(6) Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts within a reasonable period of time to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be can-celled or terminated in whole or in part for failure of the contractor or subcontractor to com-ply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI

If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII

Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor com-missioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of non-discrimination in compliance with the provision of this Order.

XIII

The labor commissioner may delegate to any officer, agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV

This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including these issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superseded by appropriate authority, to the extent that they are not inconsistent with this Order.

This Order shall become effective thirty days after the date of this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

_____
GOVERNOR

GUIDELINES AND RULES
OF STATE LABOR COMMISSIONER
IMPLEMENTING GOVERNOR'S EXECUTIVE
ORDER NO. THREE

SEC. 1 PERSONS AND FIRMS SUBJECT TO EXECUTIVE ORDER NO. THREE AND GUIDELINES AND RULES.

a. Every contractor, or subcontractor as defined in Sec. 2 hereof, supplier of goods or services, vendor, bidder and prospective contractor or subcontractor, having ten or more employees as defined in Sec. 3 of these guidelines, having or entering into or bidding to enter into any type of contractual relationship with the State of Connecticut or any of its agencies, boards, commissions, departments or officers, and if the consideration, cost, subject matter or value of the goods or services exceeds $5,000.00, shall be subject to the Governor's Executive Order No. Three and these Guidelines and Rules.

b. A copy of the Governor's Executive Order No. Three and of these Guidelines and Rules shall be available to each said contractor, subcontractor, supplier, vendor, bidder and prospective contractor and subcontractor, and the said Executive Order No. Three and these Guidelines and Rules shall be incorporate by reference and made a part of the contract, purchase order, agreement or document concerned. A copy of the Executive Order and of these Guidelines and Rules shall be furnished to a contracting party or bidder on request.

c. All persons, partnerships, associations, firms, corporations and other entities having less than ten employees as defined in Sec. 3 at the time of the bid and execution of the contract and continuing through the performance of the contract are exempt from the provisions of the said Executive Order and these Guidelines and Rules. All contracts, subcontracts, purchase orders and agreements wherein the consideration ins $5,000.00 or less shall be exempt from Executive Order No. Three and from these Guidelines and Rules.

SEC. 2 SUBCONTRACTORS

As used herein, subcontractors are persons, partnerships, associations, firms or corporations or other entities having contractual relationship with a contractor who in turn has a contract with the State of Connecticut or any of its agencies, board, commissions or departments. Subcontractors below this tier are exempt from the Executive Order and from these Guidelines and Rules.

SEC. 3 EMPLOYEES

As used herein, employees are persons working full or part-time irrespective of personnel classification whose wages, salaries, or earnings are subject to the Federal Insurance Contribution Act and/or to Federal Withholding Tax as a matter of law (whether in fact or not any actual withholding occurs in a given case), in an employee-employer relationship at the time of bid, contract execution, or offer or acceptance, and/or during any time thereafter during the existence of the performance period of the contract to the conclusion thereof.

SEC. 4 REPORTS

a. Prior to the execution of the contract or prior to acceptance of a bid, as the case may be, the contractor, subcontractor, bidder or vendor shall file a report with the State Labor Commissioner, which report shall be complete and contain all of the information therein prescribed. The report shall be on Form E.0.3-1, a facsimile of which is attached hereto and made a part hereof, or in lieu thereof the contractor, subcontractor, bidder or vendor shall submit a detailed report containing all of the information required in Form E.O. 3-1.

b. The Labor Commissioner may require the filing of additional reports prior to final payment or prior to any renewal or extension of the contract and during the duration of the contract at such times as the Commissioner may, in his discretion, from time to time deem necessary. The Labor Commissioner may require the filing of additional information or reports, and the contractor, subcontractor, bidder or vendor shall furnish said information or report within the time prescribed by the Labor Commissioner.

c. The Labor Commissioner may, at his discretion, also require timely statistical reports on the number of minority employees employed or to be employed in the performance of the contract, and the Labor Commissioner may de-fine such minority groups or persons.

d. Reports filed pursuant to these Guidelines and Rules in Implementation of Executive Order No. Three are not public records subject to public inspection, but may be inspected only by federal and state officials having jurisdiction and authority to investigate matters of this type. All federal and state agencies empowered by law to investigate matters relating to Executive order No. Three shall have access to these reports for inspection or copying during regular business hours.

e. Any person who willfully, wantonly or through negligence destroys or permits to be destroyed, alters or allows to be altered after filing any reports submitted in compliance herewith shall be subject to penalties as pre-scribed by law.

SEC. 5. MANDATORY CLAUSES IN DOCUMENTS

a. All contracts shall contain the following provisions verbatim:

This contract is subject in the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971 and, as such, this contract may be canceled, terminated or suspended by the state labor commissioner for violation of or noncompliance with said Executive Order No. Three, or any state or federal law concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the state labor commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor) agrees, as part consideration hereof, that his (order) (contract) is subject to the Guidelines and Rules issued by the state labor commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the state labor commissioner.

These provisions are in addition to and not in lieu of other clauses required by law.*

*N.B. The above paragraphs contain requirements additional to those set forth in July 16, 1971 directive to state agencies.

b. Every purchase order or like form submitted by a vendor or bidder, as applicable, shall contain the following clause verbatim:

Vendor agrees, as part of the consideration hereof, that this order is subject to the provisions of Executive Order No. Three and the Guidelines and Rules issued by the Labor Commissioner implementing said Order as to nondiscrimination, and vendor agrees to comply therewith.

c. Where preprinted contract forms have been prescribed by federal authority and the rules of the federal agency prohibit the alteration thereof, the compliance officer of the State agency concerned shall submit to the Labor Commissioner a suggested short form or addendum acceptable to the federal agency, and such cases, after approval by the Labor Commissioner, said clause may be substituted.

SEC. 6. COOPERATION OF STATE AGENCIES, BOARDS AND COMMISSIONS

Every agency, board, commission and departments of the State of Connecticut shall cooperate with the Labor Commissioner in the implantation of Executive Order No. Three and shall furnish such information and assistance as the Labor Commissioner may from time to time request.

SEC. 7. INVESTIGATIONS, COMPLAINTS

The Labor Commissioner may initiate an investigation upon receipt of a complaint alleging discrimination. The Labor Commissioner may request that an investigation be conducted by the State agency which is the party to the contract in question. Investigations shall be conducted in accordance with acceptable legal standards, safeguarding the rights of all parties involved and obtaining all of the relevant facts necessary for a complete determination of the issues. If the Labor Commissioner is not satisfied with the investigation or any part thereof he may order it to continue or to proceed further.

SEC. 8. HEARINGS

The Labor Commissioner or officers designed by the heads of the State agencies, boards and commissions may conduct hearings on complaints filed. Hearings shall be held only after a report of the complaint has been filed with the Labor Commissioner and after a hearing on the complaint has been authorized or directed by the Labor Commission-er. Hearings shall be in accordance with the accepted principles of administrative law. All parties shall be afforded the opportunity to a full, fair, impartial and complete hearing, the opportunity to examine and cross examine witnesses and to be present at all sessions of the hearing. If any party is vulnerable to a charge of a violation of the law, he shall be afforded the opportunity to procure counsel who say be present at the hearing.

SEC. 9. EQUAL EMPLOYMENT OPPORTUNITIES

All State contracting agencies, employers, and labor unions shall use their best efforts to provide equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers in accordance with section 31-51 (d) of the General Statutes.

SEC. 10. DUTIES OF CONTRACTING AGENCIES

All State contracting agencies shall be responsible for compliance with said Executive Order and with all state and federal laws relating to equal employment opportunities. All contracting agencies conducting investigations for the Labor Commissioner pursuant to Executive Order No. Three and these Guidelines and Rules shall report to the Labor Commissioner the action taken or recommended with regard to each complaint filed. Each officer of the executive department, every commissioner, and each executive head of each State agency, board, and commission in the executive branch of the State government is expected to assume the responsibility of seeing to complete compliance with the Governor's Executive Order No. Three and shall forthwith take steps to assure and guarantee that there shall be no discrimination within their departments, agencies, boards or commissions in the performance of any state contract or subcontract on the basis of race, creed, color, sex, age, national origin or national ancestry, or in any way in violation of any state or federal law relating thereto.

BY VIRTUE OF THE AUTHORITY VESTED IN ME PURSUANT TO EXECUTIVE ORDER NO. THREE EFFECTIVE JULY 16, 1971, AND THE GENERAL STATUTES OF CONNECTICUT.

Date in Wethersfield, Connecticut this 19th day of Nov. , 1971,

Jack Fusari
Labor Commissioner

Executive Order No. Seventeen

STATE OF CONNECTICUT
THOMAS J. MESKILL
GOVERNOR
EXECUTIVE ORDER NO. SEVENTEEN

WHEREAS, Section 31-247 of the General statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returned to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all the services offered.

NOW, THEREFORE, I, Thomas J. Meskill, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon the promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II

Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business in the state, and every bidder or prospective bidder who submits a bid or replies to an invitation
to bid on any state contract shall list all employees openings with the office of the Connecticut State Employment Service in the area where the work is in be performed or where the services are to be rendered.

III

All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

IV

Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from amount its personnel one or more persons who shall be responsible for compliance with the objectives of this Order

V

The Labor Commissioner shall be an is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conference, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI

The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII

(a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, canceled, or terminated in accordance with
law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII

If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

This Order shall become effective sixty days after the date of this Order.

Dated at Hartford, Connecticut, this 15th day of February, 1973.

_____
Governor

American Iron and Steel Act
DEEP Revised

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Memorandum

To: All Connecticut Municipalities, Water Pollution Control Facilities, and Consultants

Date: May 28, 2015

Re: Revised American Iron and Steel Memorandum

The Department of Energy and Environmental Protection's (DEEP) Municipal Water Pollution Control Section has updated the American Iron and Steel (AIS) memorandum that was distributed on May 19, 2014.

On June 10, 2014, the Water Resources Reform and Development Act of 2014 (WRRDA) was signed into law by President Obama, which amended the Federal Water Pollution Control Act (FWPCA). The FWPCA section 608 extended the AIS provision that was originally scheduled to expire on September 30, 2014.

This means that AIS is now a **permanent** project requirement for all Connecticut Clean Water Fund (CWF) projects.

The effective date for the newly codified AIS provision is the date of enactment of the WRRDA, or June 10, 2014.

A recent Environmental Protection Agency (EPA) memorandum dated September 18, 2014 indicates that EPA intends to interpret the WRRDA language for the AIS requirement in the same manner as described in an earlier EPA guidance memo dated March 20, 2014. Therefore, the March 20, 2014 EPA memorandum shall still serve as the final EPA AIS guidance on how to apply the AIS requirement, and it is attached to the revised CWF memo.

The final memorandum is now available on our website at http://www.ct.gov/dep/cwp.

Sincerely,

George V. Hicks, P.E.
Supervising Sanitary Engineer
Bureau of Water Protection & Land Reuse

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Revised Clean Water Fund Memorandum (2014-001a)

TO: All Connecticut Municipalities and Consultants

RE: Implementation of American Iron and Steel provisions on Connecticut Clean Water Fund Projects

I. PURPOSE

To provide clarification on the applicability of American Iron and Steel (AIS) provisions to construction projects funded by the Connecticut Clean Water Fund (CWF).

II. GOVERNING FEDERAL PUBLIC LAW

Section 436 of Public Law (P.L.) 113-76, Consolidated Appropriations Act, 2014.

III. APPLICABILITY

All Connecticut CWF projects must use "iron and steel products" (Section III.A) that are "produced in the United States" for construction projects. The final Environmental Protection Agency (EPA) AIS guidance memorandum dated March 20, 2014 ("final EPA AIS guidance") on how to apply the AIS requirement is attached.

This memorandum summarizes the final EPA AIS guidance, and describes how it relates specifically to Connecticut CWF projects. Section III.C details what is required for a CWF project that is subject to the AIS provisions. Any definitions provided by the final EPA AIS guidance are included in Section IV.

Section 436 of P.L. 113-76 excludes products (Section III.B) to the AIS requirement, as well as a waiver request process to exclude products or the entire project from AIS requirements (Section III.D).

A. Applicable Iron and Steel Products

1. The AIS requirement applies to all of the following products:
   a. Lined or unlined pipes and fittings;
   b. Manholes covers and other "municipal castings";
   c. Hydrants;
   d. Tanks;
   e. Flanges;
   f. Pipe clamps and restraints;
   g. Valves;
   h. "Structural steel";
   i. Reinforced precast concrete; or
   j. "Construction materials".

   Refer to Section IV for further clarification of items b, h, and j.

2. Each project item listed in Section III.A.1 and is considered to be "primarily iron or steel", or comprised of greater than 50% iron or "steel" as measured by cost, becomes subject to the AIS requirement.
   a. The cost used to determine AIS applicability shall be based on the material costs, and shall include the cost to pour and cast iron and/or steel components.
   b. The cost used to determine AIS applicability shall not include assembly cost.

3. Unlike the products listed in Section III.A.1.a – h and j, all reinforced precast concrete used in applicable products is subject to the AIS requirement, no matter how much iron or steel comprises the reinforced precast concrete. The reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. The casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

4. "Construction materials" are any products that become permanently incorporated into the project, even if those products may be considered temporary in most instances. For example, any iron or steel sheeting or piles that are not removed after construction is completed are considered to be "construction materials" subject to the AIS requirement.

B. Excluded Products

1. The AIS requirement does not apply to any mechanical and/or electrical components, equipment and systems. Mechanical and electrical components, equipment and systems are not considered construction materials.

2. The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials, and are therefore NOT subject to the AIS requirement:
   a. Pumps;
   b. Motors;
   c. Gear reducers;
   d. Drives (including variable frequency drives (VFDs));
   e. Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators);
   f. Mixers;
   g. Gates;
   h. Motorized screens (such as traveling screens);
   i. Blowers/aeration equipment;
   j. Compressors;
   k. Meters, sensors, controls and switches;
   l. Supervisory control and data acquisition (SCADA);
   m. Membrane bioreactor systems;
   n. Membrane filtration systems;
   o. Filters, clarifiers and clarifier mechanisms;
   p. Rakes, grinders;
   q. Disinfection systems;
   r. Presses (including belt presses);
   s. Conveyors, cranes;
   t. HVAC (excluding ductwork), water heaters, heat exchangers;
   u. Generators;

v. Cabinetry and housings (such as electrical boxes/enclosures);
w. Lighting fixtures;
x. Electrical conduit;
y. Emergency life systems;
z. Metal office furniture, shelving;
aa. Laboratory equipment, analytical instrumentation; and
bb. Dewatering equipment.

3. Raw materials such as iron ore, limestone, and iron/steel scrap are not covered by the AIS requirement. If any raw materials are being applied as a coating, the raw materials are similarly not covered.

C. AIS Requirements

1. For each item that meets the criteria indicated in Sections III.A, the iron and steel products contained in that item must be "produced in the United States (US)"
   a. All manufacturing processes must take place in the US, with the exception of metallurgical processes involving the refinement of steel additives.
   b. Manufacturing processes covered by the AIS requirement include: melting, refining, forming, rolling, drawing, refining, finishing, fabricating, coating.
   c. In the case of reinforced precast concrete, the casting of the concrete must also occur in the US. The cement and other raw materials used in the concrete production may come from non-US sources.
   d. Each domestic iron and steel product must remain in the US for the entire manufacturing process; otherwise, it will be considered foreign source material.
   e. Non-iron or steel components of an iron and steel product may come from non-US sources.

2. The construction contract language contained in **Appendix 4 of the attached final EPA AIS guidance** must be included in the CWF contract documents in order to obtain CWF approval of the engineering plans and specifications.

3. Certification for AIS compliance
   a. Certification must be provided for all items in Section III.A.
   b. Types of Certification
      i. Step certification process: Each handler (supplier, fabricator, manufacturer, processor, etc) of the iron and steel products certifies that their step in the process was domestically performed.
      ii. Final manufacturer certification: Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US.
   c. AIS compliance certification must be provided on company letterhead, in the format provided by **Appendix 5 of the attached final EPA AIS guidance**.
   d. These certifications shall be collected and maintained by the municipality, and must be available upon request by either the EPA or the DEEP.

D. Waiver Request Process

1. A waiver from the AIS requirement may be requested for a CWF project if at least one of the following conditions is sufficiently demonstrated:
   a. The AIS requirement will increase the cost of the overall project by more than 25 percent, as demonstrated by the inclusion of a bid alternate and backup calculations;

b. The iron and steel products are not produced in the United States in sufficient and "reasonably available quantities" and of "satisfactory quality", as demonstrated by soliciting proposals from at least three manufacturers; or
c. The AIS requirement is inconsistent with the public interest.

2. Waiver Request Format
   a. The waiver request must include a table with responses to the "Information Checklist for Waiver Request" in **Appendix 1 of the attached final EPA AIS guidance**.
   b. Evaluation of the waiver request shall include the criteria in the "HQ Review Checklist for Waiver Request" in **Appendix 2 of the attached final EPA AIS guidance.**
   c. Waiver requests shall be submitted to the Connecticut Department of Energy and Environmental Protection (DEEP) for initial screening.
   d. If the DEEP determines that a waiver to the AIS requirement has been sufficiently demonstrated, the DEEP will forward the waiver request to the EPA.

3. Final Waiver Determination
   a. The waiver request shall be made available on the EPA website and the DEEP CWF webpage.
   b. The EPA shall allow for informal public input for at least 15 days prior to making a determination.

IV. DEFINITIONS

AIS: American Iron and Steel

Assistant recipients: A borrower or grantee that receives funding from a State CWSRF program. In the case of Connecticut CWF projects, "assistance recipients" are the municipalities, as defined below.

CGS: Connecticut General Statutes

Construction materials: Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the applicable project, not including mechanical and/or electrical components, equipment and systems.

Some construction materials may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

CWF: Connecticut Clean Water Fund

CWSRF: Clean Water State Revolving Fund

DEEP: Connecticut Department of Energy and Environmental Protection

Electrical equipment: Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

EPA: Federal Environmental Protection Agency

FWPCA: Federal Water Pollution Control Act

Final EPA AIS Guidance: This refers to the attached EPA Memorandum entitled "Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014" dated March 20, 2014.

HVAC: Heating, ventilation, and air conditioning

Municipality: Any "municipality" eligible for the CWF, as defined in Section 22a-475 of the CGS. The municipalities are the "assistance recipients" for the purposes of the AIS requirement.

Iron and Steel Products: The term "iron and steel products" means the following products are made of "primarily iron or steel": lined or unlined pipes and fittings, manholes covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

Mechanical equipment: Mechanical equipment is typically that which has motorized parts and/or is powered by a motor.

Municipal castings: Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

- Access Hatches;
- Ballast Screen;
- Benches (Iron or Steel);
- Bollards;
- Cast Bases;
- Cast Iron Hinged Hatches, Square and Rectangular;
- Cast Iron Riser Rings;
- Catch Basin Inlets;
- Cleanout/Monument Boxes;
- Construction Covers and Frames;
- Curb and Corner Guards;
- Curb Openings;
- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;
- Meter Boxes;
- Service Boxes;
- Steel Hinged Hatches, Square and Rectangular;
- Steel Riser Rings;

- Trash receptacles;
- Tree Grates;
- Tree Guards;
- Trench Grates; and
- Valve Boxes, Covers and Risers.

Primarily Iron or Steel: To be considered "primarily iron or steel", the product must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

P.L.: Public Law

Production in the US: For the purposes of the AIS requirement, "production in the US" of the iron or steel used in an applicable product requires that all manufacturing processes must take place in the US, except metallurgical processes involving refinement of steel additives.

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products as specified in the project plans and designs.

SCADA: Supervisory control and data acquisition

Steel: An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel includes carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

Step Certification: A step certification is a process under which each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products certifies that their step in the process was domestically performed.

Structural steel: Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes. Some structural steel may overlap with what is also considered "construction materials" (see definition above).

RCSA: Regulations of the Connecticut State Agencies

US: United States

VFDs: Variable frequency drives

WRRDA: Water Resources Reform and Development Act of 2014

5/28/2015
Date

George V. Hicks, P.E.
Supervising Sanitary Engineer
Bureau of Water Protection & Land Reuse

Attachment: EPA Memorandum: "Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014" dated March 20, 2014.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 20 2014

OFFICE OF WATER

MEMORANDUM

SUBJECT: Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014

FROM: For Andrew D. Sawyers, Director
Office of Wastewater Management (4201M)

Peter C. Grevatt, Director
Office of Ground Water and Drinking Water (4601M)

TO: Water Management Division Directors
Regions I - X

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel (AIS)" requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Federal Fiscal Year 2014.

Section 436 also sets forth certain circumstances under which EPA may waive the AIS requirement. Furthermore, the Act specifically exempts projects where engineering plans and specifications were approved by a State agency prior to January 17, 2014.

The approach described below explains how EPA will implement the AIS requirement. The first section is in the form of questions and answers that address the types of projects that must comply with the AIS requirement, the types of products covered by the AIS requirement, and compliance. The second section is a step-by-step process for requesting waivers and the circumstances under which waivers may be granted.

Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term ''iron and steel products'' means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the ''Administrator'') finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out

the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with "split" funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A "project" consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

Lined or unlined pipes or fittings;
Manhole Covers;
Municipal Castings (defined in more detail below);
Hydrants;
Tanks;
Flanges;
Pipe clamps and restraints;
Valves;
Structural steel (defined in more detail below);
Reinforced precast concrete; and
Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the

material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;

Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-

888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products, as specified in the project plans and designs.

Assistance Recipient: A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: cwsrfwaiver@epa.gov. For DWSRF waiver requests, please send the application to: dwsrfwaiver@epa.gov.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: http://water.epa.gov/grants_funding/ais/equirement.cfm

2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General • Waiver request includes the following information: — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests • Waiver request includes the following information: — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

Appendix 2: HQ Review Checklist for Waiver Request

Instructions: To be completed by EPA. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Review Items	Yes	No	N/A	Comments
Cost Waiver Requests • Does the waiver request include the following information? — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products				
— Relevant excerpts from the bid documents used by the contractors to complete the comparison				
— A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of the market				
• Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 25%?				
Availability Waiver Requests • Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the iron and/or steel product for which the waiver is requested? — Supplier information or other documentation indicating availability/delivery date for materials — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials				
• Does supporting documentation provide sufficient evidence that the contractors made a reasonable effort to locate domestic suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers?				
• Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other relevant information)				
• Is EPA aware of any other evidence indicating the non-availability of the materials for which the waiver is requested? Examples include: — Multiple waiver requests for the materials described in this waiver request, for comparable projects in the same State — Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States — Correspondence with construction trade associations indicating the non-availability of the materials				
• Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the project plans, specifications, and/or permits?				

Appendix 3: Example Loan Agreement Language

ALL ASSISTANCE AGREEMENT MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN SRF ASSISTANCE AGREEMENTS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE LAW:

Comply with all federal requirements applicable to the Loan (including those imposed by the 2014 Appropriations Act and related SRF Policy Guidelines) which the Participant understands includes, among other, requirements that all of the iron and steel products used in the Project are to be produced in the United States ("American Iron and Steel Requirement") unless (i) the Participant has requested and obtained a waiver from the Agency pertaining to the Project or (ii) the Finance Authority has otherwise advised the Participant in writing that the American Iron and Steel Requirement is not applicable to the Project.

Comply with all record keeping and reporting requirements under the Clean Water Act/Safe Drinking Water Act, including any reports required by a Federal agency or the Finance Authority such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the Clean Water Act/Safe Drinking Water Act and this Agreement may be a default hereunder that results in a repayment of the Loan in advance of the maturity of the Bonds and/or other remedial actions.

Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of _____ ("Purchaser") and the _____ (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Appendix 5: Sample Certifications

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

American Iron and Steel Provisions - Bidder Certification

The Bidder ("Contractor") acknowledges to and for the benefit of the Greater New Haven Water Pollution Control Authority ("Purchaser") and the State of Connecticut ("State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure, including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Please Print

Bidder (Contractor): By:

Name of Contractor (Company)	Signature
Address	Print Name
City/State/Zip Code	Date

* *

CONTRACTOR'S EXEMPT PURCHASE CERTIFICATE

Town ____ Grant or Loan Identifier _______

Contract Name ____ Contract Number _________

I hereby certify under penalties of (FALSE STATEMENT) that I am engaged in the performance of a construction contract funded by the following named exempt agency or organization:

Department of Environmental Protection
79 Elm Street, Hartford, Connecticut

That such agency is, to the best of my knowledge and belief, exempt from the Education, Welfare and Public Health Tax (Sales and Use Tax) because it is a branch of the State Government, in accordance with Regulation 12-426-18 of the Sales and Use Tax Division of the State Department of Revenue Services.

That this certificate is issued to cover all purchases of material and supplies to be physically incorporated in and become a permanent part of the project referred to above.

________________________ ____________
Signature of CONTRACTOR Date

Name of Firm: ____________________________

Business Address: __________________________

____

* *

SPECIFICATIONS

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Action Submittal: Written and graphic information submitted by Bidder as part of the proposal for Engineer's review. The Equipment Manufacturer will formally re-submit the Action Submittal items through the Contractor for approval.

B. Informational Submittal: Information submitted by Equipment Manufacturer that does not require Engineer’s approval.

C. Preliminary Operation and Maintenance (O&M) Data: Initial and subsequent submissions for Engineer’s review.

D. Final O&M Data: Engineer-accepted data, submitted as specified herein.

E. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of Goods. Examples of typical maintenance operations are cleaning, lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

F. Operation and Maintenance Manual: Provided by the Equipment Manufacturer for the equipment provided as part of the Process Air Compressor for Low Level Nitrogen Removal contract.

G. Asset Management Forms: Forms provided by the Owner for the Equipment Manufacturer to record product and equipment data.

1.02 PROJECT COORDINATION

A. Onsite Coordination:

1. Contractor will coordinate the activities at the Point of Destination related to the Goods furnished under this Contract.
2. Equipment Manufacturer shall fully coordinate its activities with Contractor and other Contractors. This includes promptly bringing to Engineer’s and Contractor’s attention any conflict or coordination problem.

1.03 CONTRACT PROGRESS REPORTING

A. Progress Schedule:

1. Bar chart schedule demonstrating Equipment Manufacturer's plan for fulfilling Contract requirements.
2. Information shall be comprehensive and shall represent all activities, including submittals and procurement necessary to complete Contract.
3. Typical minimum detail on the schedule shall include, but not be limited to, the following:
   a. Delivery durations and date(s) of Shop Drawings and Sample submittals.
   b. Delivery durations and date(s) of Operation and Maintenance Data.
   c. When in relation to previous schedule items the Equipment Manufacturer places purchase orders with major subcontractors and suppliers.
   d. When in relation to previous schedule items the Equipment Manufacturer orders castings and forgings.
   e. When in relation to previous schedule items of starting assembly of specified Goods.
   f. Duration of finishing assembly of specified Goods.
   g. When in relation to previous schedule items the testing at plant is to be done.
   h. When in relation to previous schedule items to expect the shipment from Equipment Manufacturer.
   i. When in relation to previous schedule items to expect the arrival of equipment at Point of Destination.
4. Assist Contractor in determining the most current schedule information on the Contract items, including whether Equipment Manufacturer is on schedule or delayed. These requirements apply fully to telephone inquiries, personal visits, letters, or other communication.
5. Schedule Reporting: Submit Notice of Schedule Impact at any time that a Progress Schedule activity is delayed by 5 or more days.
   a. Complete and submit to party named on the form attached.
   b. Transmit completed form either in facsimile, e-mail, or mail via registered overnight mail service.

1.04 SUBMITTAL PROCEDURES

A. Direct submittals to Engineer at the following address, unless specified otherwise:

1. JACOBS
   Attn: Karina Massey
   100 Great Meadow Rd Suite 707
   Wethersfield, CT 06109
2. E-mail: Karina.massey@jacobs.com; cc mricozzi@gnhwpca.com & jmegale@gnhwpca.org

B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format.

1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
2. Electronic files that contain more than 10 pages in PDF format shall contain internal book marking from an index page to major sections of the document.
3. PDF files shall be set to open "Bookmarks and Page" view.
4. Add general information to each PDF file, including title, subject, author, and keywords.
5. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
6. Submit new electronic files for each resubmittal.
7. Include a copy of the Transmittal of Equipment Manufacturer's Submittal form, located at end of section, with each electronic file.
8. Engineer will reject submittal that is not electronically submitted, unless specifically accepted. All submittals from the Equipment Manufacturer are to be submitted via the Contractor during construction.
9. Provide Engineer with authorization to reproduce and distribute each file as many times as necessary for Project documentation.
10. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.

C. Transmittal of Submittal:

1. Review each submittal and check for compliance with Contract Documents.
2. Stamp each submittal with uniform approval stamp before submitting; stamp to include Project name, submittal number, Specification number, Equipment Manufacturer's reviewer name, date of Equipment Manufacturer's approval, and statement certifying that submittal has

been reviewed, checked, and approved for compliance with Contract Documents. Engineer will not review submittals that do not bear Equipment Manufacturer's certification as required by the General Conditions, and will return them without action.

3. Complete, sign, and transmit with each submittal package, one Transmittal of Equipment Manufacturer's Submittal form in format approved by Engineer.
4. Identify each submittal with the following:
   a. Numbering and Tracking System:
      1) Sequentially number each submittal.
      2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
   b. Specification section and paragraph to which submittal applies.
   c. Project title and Owner's project number.
   d. Date of transmittal.
   e. Names of Equipment Manufacturer, Subcontractor or Supplier, and manufacturer as appropriate.
5. Identify and describe each deviation or variation from Contract Documents.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
3. Index with labeled tab dividers in orderly manner.

E. Timeliness of Submittal: Schedule and submit in accordance with the Equipment Manufacturer's Progress Schedule, and requirements of individual Specification sections.

F. Processing Time:

1. Time for review shall commence on Engineer's receipt of submittal.
2. Engineer will act upon Equipment Manufacturer's submittal and transmit response to Equipment Manufacturer not later than 30 days after receipt, unless otherwise specified.
3. Resubmittals will be subject to same review time.
4. No adjustment of Contract Times or Price will be allowed due to delays in providing Goods or Special Services caused by rejection and subsequent resubmittals.

G. Resubmittals: Clearly identify each correction or change made.

H. Incomplete Submittals:

1. Engineer will return entire submittal for Equipment Manufacturer's revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
   a. Equipment Manufacturer's certification as required by the General Conditions.
   b. Transmittal of Equipment Manufacturer's Submittal, completed and signed.
   c. Insufficient number of copies.

I. Submittals not required by Contract Documents:

1. Will not be reviewed and will be returned stamped "Not Subject to Review."
2. Engineer will keep one copy and return all remaining copies to Equipment Manufacturer.

J. Action Submittals:

1. Prepare and submit as required by individual Specification sections.
2. Shop Drawings:
   a. Copies: Submit in electronic PDF Format.
   b. Identify and indicate:
      1) Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
      2) Goods and Component Title: Identical to title shown on Drawings.
      3) Critical field dimensions and relationships to other critical features. Note dimensions established by field measurement.
      4) Project-specific information drawn accurately to scale.
   c. Manufacturer's standard schematic drawings and diagrams as follows:
      1) Modify to delete information that is not applicable.
      2) Supplement standard information to provide information specifically applicable.
   d. Product Data: Provide as specified in individual Specifications.

e. Foreign Manufacturers: When proposed, include following additional information:
1) Names and addresses of at least two companies that maintain technical service representatives close to Project.
2) Complete list of spare parts and accessories for each piece of equipment.

3. Samples:
a. Quantity: Two, unless otherwise specified in individual Specifications.
b. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
1) Manufacturer name.
2) Model number.
3) Material.
4) Sample source.
c. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
d. Full-size Samples:
1) Size as indicated in individual Specification section.
2) Cured and finished in manner specified.
3) Physically identical with Goods proposed for use.

K. Action Submittal Dispositions: Engineer will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:

1. Approved:
a. Equipment Manufacturer may provide Goods or Special Services covered by submittal.
b. Distribution: Electronic.
2. Approved as Noted:
a. Equipment Manufacturer may provide Goods or Special Services covered by submittal, in accordance with Engineer's notations.
b. Distribution: Electronic.
3. Partial Approval, Resubmit as Noted:
a. Make corrections or obtain missing portions, and resubmit.
b. Except for portions indicated, Equipment Manufacturer may begin to provide Goods or Special Services covered by submittal, in accordance with Engineer's notations.
c. Distribution: Electronic.
4. Revise and Resubmit:
a. Equipment Manufacturer may not provide Goods or Special Services covered by submittal.
b. Distribution: Electronic.

L. Informational Submittals:

1. Copies: Electronic copies, unless otherwise indicated in individual Specification section.
2. Refer to individual Specification sections for specific submittal requirements.
3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward submittal to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will return with review comments to Equipment Manufacturer, and require that submittal be corrected and resubmitted.

1.05 OPERATION AND MAINTENANCE (O&M) DATA

A. Format and Scheduling:

1. Preliminary Data:
   a. Format: Instructional Manual.
   b. Submit subsequent to Engineer approval of Shop Drawings, but prior to shipment date.
   c. Submit two copies for Engineer's review.
      1) If data meets conditions of the Contract:
         a) One copy will be returned to Equipment Manufacturer.
         b) One copy will be retained in Engineer's file.
      2) If data does not meet conditions of the Contract:
         a) All copies will be returned to Equipment Manufacturer with Engineer's comments (on separate document) for revision.
         b) Resubmit same number of copies, revised in accordance with Engineer's comments.
2. Final Data:
   a. Submit at the time of shipment of Goods.
   b. Format: Instructional Manual and Electronic Media.
   c. Data: Submit 3 hard copies and one electronic copies.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:
   a. Project title.
   b. Designate applicable system, equipment, material, or finish.

c. Identity of separate structure as applicable.
d. Identity of general subject matter covered in manual.
e. Identity of equipment number, if applicable, and Specification section.

4. Title Page:
   a. Equipment Manufacturer's name, address, and telephone number.
   b. Subcontractor, supplier, or maintenance contractor's name, address, and telephone number, as appropriate.
      1) Identify area of responsibility of each.
      2) Provide name and telephone number of local source of supply for parts and replacement.
5. Table of Contents:
   a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
   b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
6. Paper: 20-pound minimum, white for typed pages.
7. Text: Manufacturer's printed data, or neatly typewritten.
8. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Electronic Media Format:

1. Portable Document Format (PDF):
   a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on USB drive.
      Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
   c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.
   d. Data shall be represented on the Asset Management Forms provided at the end of this section.

D. Data Content:

1. Product Data:
   a. Include only those sheets that are pertinent to specific product.
   b. Clearly annotate each sheet to:
      1) Identify specific product or part installed.
      2) Identify data applicable to installation.
      3) Delete references to inapplicable information.

c. Function, normal operating characteristics, and limiting conditions.
d. Performance curves, engineering data, nameplate data, and tests.
e. Complete nomenclature and commercial number of replaceable parts.
f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
g. Spare parts ordering instructions.
h. Where applicable, identify installed spares and other provisions for future work (for example, reserved panel space, unused components, wiring, terminals).

2. Color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
   a. Format:
      1) Provide reinforced, punched, binder tab; bind in with text.
      2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
      3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
      4) Identify Specification section and product on Drawings and envelopes.
   b. Relations of component parts of equipment and systems.
   c. Control and flow diagrams.
   d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
5. Instructions and Procedures: Within text, as required to supplement product data.
   a. Format:
      1) Organize in consistent format under separate heading for each different procedure.
      2) Provide logical sequence of instructions for each procedure.
      3) Provide information sheet for Contractor's personnel, including:
         a) Proper procedures in event of failure.
         b) Instances that might affect validity of warranties.
   b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
   c. Operating Procedures:
      1) Startup, break-in, routine, and normal operating instructions.
      2) Test procedures and results of factory tests where required.
      3) Regulation, control, stopping, and emergency instructions.

4) Description of operation sequence by control manufacturer.
5) Shutdown instructions for both short and extended duration.
6) Summer and winter operating instructions, as applicable.
7) Safety precautions.
8) Special operating instructions.

d. Maintenance and Overhaul Procedures:
1) Routine maintenance.
2) Guide to troubleshooting.
3) Disassembly, removal, repair, reinstallation, and re-assembly.

E. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
a. Function, normal operating characteristics, and limiting conditions.
b. Performance curves, engineering data, nameplate data, and tests.
c. Complete nomenclature and commercial number of replaceable parts.
d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards:
a. Electrical service.
b. Controls.
c. Communications.
3. List of electrical relay settings and control and alarm contact settings.
4. Electrical interconnection wiring diagram, including control and lighting systems.
5. Operating Procedures:
a. Routine and normal operating instructions.
b. Sequences required.
c. Safety precautions.
d. Special operating instructions.
6. Maintenance Procedures:
a. Routine maintenance.
b. Guide to troubleshooting.
c. Adjustment and checking.
d. List of relay settings, control and alarm contact settings.
7. Manufacturer’s printed operating and maintenance instructions.
8. List of original manufacturer’s spare parts, manufacturer’s current prices, and recommended quantities to be maintained in storage.

F. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
   b. "Unit" is the unit of measure for ordering the part.
   c. "Quantity" is the number of units recommended.
   d. "Unit Cost" is the current purchase price.

1.06 SUPPLEMENTS

A. The Supplements listed below, following "End of Section," are part of this Specification:

1. Notice of Schedule Impact.
2. Transmittal of Equipment Manufacturer's Submittal Form.
3. Asset Maintenance Forms:
   a. Asset Summary Form.
   b. Maintenance Summary Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

NOTICE OF SCHEDULE IMPACT

(Send this form as addressed if delay is over 5 days. Send either via e-mail.)

To: _____

Attention: _____

Address: _____

E-mail: _____

RE: Contract No.: _____

Name of Contract: _____

Type of Goods: _____

Nature of Delay: _____

New Estimated Date for Final Shop Drawings: _____

New Estimated Date for Start of Manufacture: _____

New Estimated Date for Finish of Manufacture: _____

New Estimated Date for Shipment: _____

New Estimated Date for Arrival at Point of Destination: _____

EQUIPMENT MANUFACTURER:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

E-mail: _____

By (Name/Title): _____ Date: _____

TRANSMITTAL OF EQUIPMENT MANUFACTURER'S SUBMITTAL
(ATTACH TO EACH SUBMITTAL)

Date: _____

TO:_____
_____
_____
_____
_____

Submittal No.:_____
☐ New Submittal ☐ Resubmittal
Project:_____
Project No.:_____
Specification Section No.:_____
(Cover only one section with each transmittal)
Schedule Date of Submittal:
_____

FROM:_____
Equipment Manufacturer
_____
_____
_____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

EQUIPMENT MANUFACTURER hereby certifies that (i) EQUIPMENT MANUFACTURER has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____
EQUIPMENT MANUFACTURER (Authorized Signature)

ASSET SUMMARY FORM

Owner Name: GNHWPCA **Project Number/Name:** _____

General:

Description: _____ Tag #: _____

Type: _____

Area: _____

Building/Room: _____

Vendor: _____ Website: _____

Manufacturer: _____ Website: _____

Model #: _____ Serial #: _____ Mfg Job #: _____
if serial # is unavailable

Install Date: _____ Purchase Date: _____

Start-up Date: _____ Warranty End Date: _____

Specification(s):

Pump Size/Size	Pump Flow	Pump Head	Pump Media

HP	Frame	RPM	Voltage

Component(s):

		Specifications (if applicable)			
ID	Component Name - Mfg.	HP	Frame	RPM	Voltage
1					
2					
3					
4					
5					

ASSET SUMMARY FORM cont.

Attachment(s):

ID	Attachment Name
1	
2	
3	

Existing Asset(s):

If replacing existing asset, record the tag and descripition of each existing asset:

Tag	Description

Contact Information:

General Contr.: _____ Email: _____

Phone: _____

Design Engineer: _____ Email: _____

Phone: _____

Sub-Contractor: _____ Email: _____

Phone: _____

For Owner Use Only:

Representative: _____ CMMS Upload Date: _____

CMMS Asset ID: _____

ASSET SUMMARY FORM

Owner Name: GNHWPCA **Project Number/Name:** _____

General:

Description: _____ Tag #: _____

Type: _____

Area: _____

Building/Room: _____

Vendor: _____ Website: _____

Manufacturer: _____ Website: _____

Model #: _____ Serial #: _____ Mfg Job #: _____
if serial # is unavailable

Install Date: _____ Purchase Date: _____

Start-up Date: _____ Warranty End Date: _____

Specification(s):

Pump Size/Size	Pump Flow	Pump Head	Pump Media

HP	Frame	RPM	Voltage

Component(s):

		Specifications (if applicable)			
ID	Component Name - Mfg.	HP	Frame	RPM	Voltage
1					
2					
3					
4					
5					

ASSET SUMMARY FORM cont.

Attachment(s):

ID	Attachment Name
1	
2	
3	

Existing Asset(s):

If replacing existing asset, record the tag and descripition of each existing asset:

Tag	Description

Contact Information:

General Contr.: _____ Email: _____

Phone: _____

Design Engineer: _____ Email: _____

Phone: _____

Sub-Contractor: _____ Email: _____

Phone: _____

For Owner Use Only:

Representative: _____ CMMS Upload Date: _____

CMMS Asset ID: _____

SECTION 01 43 34
SPECIAL SERVICES

PART 1 GENERAL

1.01 DEFINITIONS

A. Startup Assistance: Assistance provided from the Equipment Manufacturer in order to plan out the testing phase of the project.

B. Factory Testing: Controlled tests necessary to demonstrate that Equipment meet specified performance requirements.

C. Functional Testing: Field tests necessary to demonstrate that installed Equipment function and operate in the manner intended. Functional testing is a prerequisite to demonstration testing when specified.

D. Demonstration Testing: Field tests necessary to demonstrate, after successful functional testing, that Equipment meet specified performance requirements within acceptable tolerances as specified.

E. Installing Contractor: The entity, under separate contract with the Contractor, whose responsibilities include the installation of the Equipment provided under this Contract.

1.02 MANUFACTURER'S REPRESENTATIVE

A. Where Special Services are specified, Equipment Manufacturer shall furnish a qualified representative of manufacturer.

B. If manufacturer's representative is found deficient in training or experience by Contractor or Engineer, furnish replacement representative after acceptance of resume and other qualification documentation of proposed representative.

1.03 INSTALLATION ASSISTANCE

A. See Section 44 42 19.05, High Speed Turbo Air Compressors.

1.04 COMMISSIONING ASSISTANCE

A. Startup Assistance: Where specified, furnish representative to assist installing contractor with startup of furnished Equipment:

1. Equipment Manufacturer's representative shall be present during prestartup meetings.

2. Furnish labor and materials, tools, instruments, and services for checking, testing, and startup specified.
3. Develop a standard record of testing. This record shall:
   a. Be subject to approval of Engineer.
   b. Include name of Equipment and subsystem, if applicable.
   c. Have provisions for recording dates of completion for checking, inspection by manufacturer, verification of instrumentation and controls, and completion of subsystem tests.
   d. Allow space for describing problems remaining with Equipment, and for signature of Engineer indicating acceptance.

B. Functional Testing: Where specified, assist installing contractor in performing functional (or run) testing of furnished Equipment. Furnish representative to assist with test and necessary adjustments.

C. Demonstration Testing: Where specified, assist installing contractor in conducting demonstration testing of furnished Equipment. Furnish representative to assist with tests as specified for the particular Equipment and to correct malfunctions.

1.05 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by Equipment Manufacturer's representative.

B. Such form shall certify signing party is a duly authorized representative of Equipment Manufacturer, is empowered by Equipment Manufacturer to inspect, approve, and operate their Equipment and is authorized to make recommendations required to ensure that the Equipment are complete and operational.

1.06 DEMONSTRATION AND TRAINING

A. Where specified, furnish Equipment Manufacturer's representative to instruct Contractor's personnel in proper operation and maintenance techniques for the furnished Equipment:

B. Training services may include classroom or onsite instruction, either prestartup or post-startup, as stated in the Specifications.

C. Prestartup Training:

1. Prestartup training shall be completed at least 14 days prior to actual startup.
2. Operation and Maintenance Data shall be reviewed and accepted before initiation of prestartup training.

D. Post-Startup Training: Furnish and coordinate specified manufacturers' services and Equipment Manufacturer's personnel for post-startup training of Owner's operating and maintenance personnel.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are part of this Specification.

1. Forms: Manufacturer's Certificate of Proper Installation.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

CONTRACTOR: _____ EQPT SERIAL NO: _____

EQPT TAG NO: _____ EQPT/SYSTEM: _____

PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

_____

_____

_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate its equipment and (iii) authorized to make recommendations required to ensure that the Equipment furnished by the Equipment Manufacturer are complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20___

Equipment Manufacturer: _____

Manufacturer's Authorized Representative: _____
(Authorized Signature)

SECTION 01 61 01
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. As specified in Section 44 42 19.05, High Speed Turbo Air Compressors.

1.02 PREPARATION FOR SHIPMENT

A. Where specified, factory test results shall be reviewed and accepted by Contractor or Engineer before Equipment are shipped.

B. When practical, Equipment shall be factory assembled. When impractical:

1. Furnish assembly instructions.
2. Mark or tag the separate parts and assemblies for field assembly.
3. Cover machined and unpainted parts that may be damaged by elements with a strippable protective coating.

C. Package or crate Equipment to provide protection from damage during shipping, handling, and storage.

D. Marking: Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of project and Equipment Manufacturer, equipment number, and approximate weight.

E. Spare Parts and Special Tools:

1. Deliver at same time as Equipment delivery.
2. Mark to identify associated products by name, equipment, and part number.
3. Package parts for protection against damage from elements during shipping, handling, and storage.
4. Ship in boxes or containers marked to indicate contents and as stated above.

F. Accessories:

1. Deliver at same time as Equipment delivery.
2. Furnish accessories required to place each item of equipment in full operation.
3. Accessories include, but are not limited to, adequate oil and grease as required for first lubrication of equipment and additional maintenance required by manufacturer prior to Contractor turning equipment over to

Owner, light bulbs, fuses, hydrant wrenches, valve keys, chain operators, special tools, and other items as required for initial operation.

1.03 DELIVERY OF EQUIPMENT

A. Notify Contractor, on Equipment Manufacturer's Notice of Shipment of Equipment form attached to this Section, 15 days prior to shipment of Equipment in accordance with Article 6 of General Conditions. Provide all applicable information requested on form.

B. In accordance with Article 6 of the General Conditions, provide 24-hour telephone notice prior to expected delivery time at the Point of Destination. Notice shall include approximate hour of delivery.

C. Delivery of Equipment shall be made during regular daytime working hours, Monday through Friday, unless other arrangements have been made previously with the Contractor.

D. Inspection on Delivery:

1. Construction Contractor will record receipt of Equipment at the Point of Destination.
2. Upon receipt of Equipment at the Point of Destination, Construction Contractor and Engineer will inspect for completeness and evidence of damage during shipment.
3. Should there appear to be damage, Construction Contractor or Engineer will immediately inform the transportation carrier.
4. Damaged or incomplete Equipment to be returned to Equipment Manufacturer for replacement will not be unloaded, except as necessary to expedite return shipment.
5. Equipment Manufacturer shall expedite replacement of damaged, incomplete, or lost items.

1.04 UNLOADING OF EQUIPMENT

A. After acceptance by inspecting party, Equipment will be unloaded by Construction Contractor in accordance with manufacturer's instructions, or as specified.

1.05 SUPPLEMENTS

A. The Supplements listed below, following “End of Section,” are part of this Specification:

1. Equipment Manufacturer's Notice of Shipment of Equipment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

EQUIPMENT MANUFACTURER'S NOTICE OF SHIPMENT OF EQUIPMENT

Delivery of this notice should be either via fax, e-mail, or registered overnight mail to Contractor, Engineer and Owner.

To: _____

Attention: _____

Address: _____

_____

Fax No.: _____

E-mail: _____

RE: Contract No.: _____

Name of Contract: _____

Equipment to be Shipped: _____

_____

ATTACH BILL(S) OF LADING FOR ALL SHIPMENTS TO THIS FORM.

Date of Shipment: _____

Manner of Shipment/Name of Carrier: _____

Anticipated Date of Delivery: _____

Special Equipment or Services Required for Unloading/Storage: _____

_____

_____

EQUIPMENT MANUFACTURER:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

E-mail: _____

By (Name/Title): _____ Date: _____

SECTION 44 42 19.05
HIGH SPEED TURBO AIR COMPRESSORS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section covers the work and services necessary to design, fabricate, test, deliver to site, and startup of High Speed Turbo Air Compressors and all appurtenances as specified herein.

B. The compressors shall be complete pre-packaged units. High efficiency, high speed motors shall be furnished as an integral part of the compressor core assembly. In general, each compressor shall be housed in a sound attenuating enclosure with flanged inlet and outlet connections, shall have an inlet air filter, inlet silencer, inlet and outlet flexible joints, outlet silencer, check valve, electric actuated isolation valve, blow-off valve and silencer, motor cooling air outlet silencer, adjustable frequency drive, instruments and integral local control panel, magnetic bearings, uninterruptible power supply (UPS) and other appurtenances as described in this specification section needed for a complete system. Harmonic filters required to reduce harmonic distortion to the limits specified herein, shall also be supplied either in separate enclosures or inside the compressor enclosures. The compressor system shall also be supplied with a single master control panel (MCP), located remotely, to monitor and control the compressors based on operational requirements and motor run time. The same supplier shall furnish the turbo air compressors and accessories.

C. The compressors will be installed in the Process Air Facility at the East Shore Water Pollution Abatement Facility with suction taken from a plenum within the building and discharged to a common discharge manifold to supply air for aeration within the Biological Reactor Basins (Bioreactors).

D. Compressors shall be complete pre-packaged units as described below:

1. High efficiency, high speed, single-stage, radial centrifugal turbo air compressor with magnetic bearing and direct coupled electric motor providing absolutely oil-free air to the aeration system.
2. A UL listed adjustable Frequency Drive (AFD) to vary the speed of the motor/compressor.
3. An inlet filter and inlet silencer.
4. AFD/motor cooling air outlet silencer.
5. Discharge check valve.
6. Discharge butterfly isolation valve (electrically actuated).

7. Blowoff valve with flanged silencer.
8. Inlet and outlet flexible connections.
9. Pressure and temperature monitoring devices.
10. Local Control Panel (LCP) with uninterruptible power supply (UPS) mounted and prewired on a common base plate with each turbo air compressor.
11. A single Main Control Panel (MCP), located remotely as shown on the drawings to monitor and cycle all of the compressors based on air requirements and motor run time. The master panel shall be designed to control all compressors, including standby unit.
12. Harmonic filters.

E. The compressor equipment shall be produced and assembled by the compressor manufacturer at a facility owned and operated by the compressor manufacturer and under the direct supervision and control of the compressor manufacturer.

F. The compressor manufacturer may provide the compressor control panels and adjustable frequency drives from another manufacturer. However, all of this equipment shall be the responsibility of the compressor manufacturer to furnish and coordinate.

G. Compressors shall be automatically sequenced, through the MCP, to control compressor speed and number of compressors based on either system flow or a constant discharge header pressure with mode selection and setpoints received from Plant SCADA over a Rockwell EtherNet/IP network when MCP is remote mode or received from MCP when in local mode.

H. Supplier of High Speed Turbo Air Compressor system shall participate in applications software (PLC and OIT programming) workshops. The purpose of the workshops is to coordinate project scope of work, system functionality, network communications and messaging, alarms, displays, and required interlocks between Plant SCADA, MCP, and LCPs. Workshop can be conducted remotely via Zoom or Microsoft Teams or through telephone conference. Provide total minimum of 8 hours for the workshops during design and 40 hours for workshops and coordination with the SCADA developer during construction and programming.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Bearing Manufacturers' Association (ABMA).
2. American Iron and Steel Institute (AISI).
3. American National Standards Institute (ANSI).

4. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): 52.2, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
5. American Society of Mechanical Engineers (ASME):
   a. PTC-13, Performance Test Code on Compressors and Exhausters.
   b. PTC 36, Measurement of Industrial Sound.
6. ASTM International (ASTM):
   a. A48/A48M, Standard Specification for Gray Iron Castings.
   b. A278, Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 343 degrees C.
7. Institute of Electrical and Electronics Engineers (IEEE):
   a. 85, Test Procedure for Airborne Sound Measurements on Rotating Electric Machinery.
   b. 112, Standard Test Procedures for Polyphase Induction Motors and Generators.
8. National Electrical Manufacturers Association (NEMA): MG 1, Motors and Generators.
9. Occupational Safety and Health Administration (OSHA).
10. Underwriters Laboratories, Inc. (UL):
    a. 674, Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.
    b. 1283, Standard for Safety for Electromagnetic Interference Filters.

1.03 DEFINITIONS

A. Actual Cubic Feet per Minute (acfm): Air volume in cubic feet per minute corrected to site conditions of elevation, temperature, and relative humidity.

B. Ambient (Inlet) Pressure: absolute pressure of the ambient air measured in the vicinity of the compressor inlet measured at the stagnation condition. This will equal barometric pressure under typical conditions.

C. Ambient (Inlet) Temperature: total temperature of the ambient air in the vicinity of the compressor package, but unaffected by it.

D. Input Horsepower (IHP): Input horsepower (or wire power) is the total horsepower required to operate the compressor motor and all ancillary equipment drive motors.

E. Compressor Package: Compressor package is defined by the limits of the scope of supply as specified in the overall project contractual agreement pertaining to the compressor installation. This shall include all deliverable components including valves, control panels, disconnects, etc. as specified herein to form an operational machine including but not limited to inlet, discharge, and all power devices that affect power consumption.

F. Discharge Pressure: Pressure in pounds per square inch gauge (psig) at compressor package discharge flange. Typically measured downstream of the check valve at rated capacity.

G. Inlet Cubic Feet per Minute (icfm): The rate of flow which is determined by delivered mass flow rate divided by inlet total density as defined by the inlet to the package. Air volume in cubic feet per minute entering compressor at inlet pressure and temperature conditions corrected for Site conditions and includes inlet filter and inlet line losses.

H. Overall (Wire to Air) Efficiency: Is the wire to air isentropic efficiency of the entire compressor package. This includes energy losses from all components within the compressor package. This is the ratio of total measured wire-to-air (system) power demand to the power of compression due to an assumed reversible, adiabatic compression process with constant entropy.

I. Pressure Rise: Difference between pressure at the compressor package discharge flange (typically downstream of the check valve) and the package inlet flange in pounds per square inch (psi).

J. Standard Cubic Feet per Minute (scfm): Air volume in cubic feet per minute corrected to standard conditions of 68 degrees F, 14.70 psia, and 36 percent relative humidity.

K. Compressor Package Total Wire Power (kW or hp): The compressor package total wire power is the electrical power measured at the power input to the compressor package. This shall include all power consuming electrical components of the compressor package as required for installation and normal operation. i.e., drive motor, motor cooling fan, magnetic bearing and controller, bearing cooling fans, coolant pump and heat exchanger, enclosure and package cooling fan, sine wave filter or output reactor, variable frequency drive and cooling fan, input choke or line reactor, harmonic filter, local control panel, PLC or processor, HMI and miscellaneous electronics, voltage transformer(s), DC power supplies, power conditioner, etc. If the compressor package receives multiple power feeds, this is the sum of all wire powers measured individually.

1.04 COMPRESSOR DESIGN CRITERIA

A. Each Turbo Air Compressor system shall be designed for the following conditions of service:

Table 1
Design Criteria Summary Table

Total Number of Compressors	6 (5 duty, 1 standby)
Method of Operation	In parallel, continuous system operation with cycling of units as determined by air demand of the system
Compressor Type	High Speed Turbo
Drive Type	Direct coupled
Design Site Elevation (NAVD 88)	19 feet
Inlet Pressure	Ambient
Maximum Compressor Inlet Pressure Loss (all pipes, dirty filter and inlet silencer)	0.25 psi
Design Total Compressor System Capacity	43,600 scfm
Design Discharge Pressure[1]	7.7 to 10.25 psig
Package Discharge Flange	ANSI 150-pound. bolt pattern
Primary Air Source	Ambient air
Package Inlet Flange	ANSI 150 lb. bolt pattern[2]
Available Power Voltage	480 V
Available Power Phase/Frequency	3-Phase / 60 Hz
Maximum Noise at 3 Feet (free field)(3)	<80 dba
Allowable vibration level	<1 mm/sec

[1]The discharge pressure (delivered pressure) as measured downstream of the check valve.

[2]The inlet pipe is the piping between the inlet flange and the compressor inlet filter.

[3]When measured in accordance with ASME PTC 36, Measurement of Industrial Sound, and operating at the maximum design capacities.

B. Compressor continuous duty design operating conditions at design service conditions listed below:

Table 2
Continuous Duty Design Operating Conditions (5 Duty, 1 Standby)

Design Operating Condition	Total Air Rate (scfm)	Inlet Temperature (deg. F)	Relative Humidity (%)
Winter	9,500 to 31,900	-5 to 82	54 to 74
Fall/Spring	9,500 to 39,000	15 to 74	54 to 85
Summer	13,000 to 43,600	40 to 104	50 to 86

Notes:

1) Each discharge operating condition shall be considered at a discharge pressure range between 7.7 and 10.25 psig.

2) Maximum dewpoint of 84 degrees Fahrenheit.

a. Compressors shall be capable of continuously operating on any points on Table 2.
b. Total Power Consumption: Manufacturer shall supply Total Power Consumption for all listed operating design points under all service conditions.

2. Compressor Requirements:
   a. The system shall be designed to operate continuously over the entire air requirement range. One standby compressor shall be available at all times over the entire air requirement range.
   b. Individual compressors shall ALL be identical in size.
   c. All compressors shall be sequenced through a Master Control Panel (MCP).
   d. Manufacturer shall confirm 5 duty units will meet the specified range of operating design points.
3. Motor Size (hp): As determined by Supplier, not to exceed 600 hp at 480 volts.

1.05 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 30 00, Administrative Requirements. All submittal dimensions, calculations, and other information shall be in English units of measure.

B. Action Submittals:

1. Proposal Submittal: Submittals provided with the Proposal Documents shall be for the purpose of determining responsiveness and shall be used by the Owner in selecting the successful compressor manufacturer. Proposal Documents must adequately represent the facilities to be constructed. Use the key words at the beginning of each item below for tab labels in the submittal. Submittals required with proposal documents:
   a. Scope:
      1) Identify all items in the Manufacturer's proposal including equipment and manufacturer services provided. Manufacturer shall also clearly state all items specifically not included in the proposal.
      2) A manufacturing and delivery schedule for the compressor and all appurtenances specified herein.
   b. Exceptions:
      1) Identify any exceptions to these Proposal Documents. Exceptions will be considered during the evaluation process.
      2) Provide any recommendations to make the compressor systems more cost-effective. For each recommendation, identify any sacrifices in terms of operational flexibility, system performance, or operations and maintenance requirements.
      3) Identify any components that are not specified but are necessary to provide a fully operational compressor system. Missing items should be included as separate alternate/options line items on the Form of Quotation.
   c. Installation List: Include a comprehensive list of high speed turbo air compressors installed in the United States and Canada. The list must include equipment model, flow, head, horsepower, service application and years in service. Include a reference contact name with phone number and email for each installation.
   d. Service Network: Manufacturer shall describe their current service network by listing the nearest factory authorized service center and /or qualified service representative. Identify service technicians and include pertinent certifications to substantiate their knowledge and expertise. Manufacturer shall list locations of the nearest parts warehouse and the types and quantities of spare parts kept in stock.

e. Technical:
1) Mechanical:
a) Data on the characteristics and performance of the units to indicate ability to meet the system performance specified herein.
b) Compressor curves showing package discharge pressure and flow capacity, wire to air efficiency and compressor package total wire power demand over the entire range from shutoff to maximum capacity. Clearly show the surge pressure and surge margin associated with each of the performance speed curves. Provide compressor curves for all design operating conditions specified herein.
(1) On the performance curves indicate the pressure (psig), flow capacity (scfm), power demand (hp), and wire to air efficiency at guarantee points as per Table 2 above.
(2) Furnish performance curves at full speed and a minimum of four lower speeds to indicate specified volume turndown. Include the capacity line above which the unit should be operated to preclude surging. Include the capacity line below which the unit should be operated to preclude run out.
(3) Flow ranges (plus or minus for a given operating condition) will not be acceptable.
c) Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction for the compressor and all appurtenances.
d) General Arrangement Drawings: Drawings of the compressor system/equipment and all appurtenances (including plans and elevations) based on the conceptual Process Air Facility drawings provided herein.
e) Equipment: Preliminary Equipment list detailing manufacturers, suppliers, and materials of construction for all major components and appurtenances. Also provide the recommended lifting height and horizontal clearances required for removal and maintenance of the equipment.
f) Estimated compressor sound level data, for both inlet and radiated conditions, and description of sound

control measures required to meet the specified sound levels.

g) Maximum heat dissipation from compressor enclosure to the space and any ventilation requirements.

h) Provide information about internal and external heat exchangers if applicable. If external heat exchangers are required, provide remote location installation and mounting requirements.

2) Instrumentation and Control:

a) Process and Instrumentation Diagrams: Provide process and instrumentation diagrams (P&IDs) for the compressor system. Clearly delineate on P&IDs those items, including piping, that are part of the manufacturer's scope of supply and those items to be provided by Contractor.

b) Instrumentation: Describe instrumentation, software, hardware, control features, remote system, monitoring, data storage, and alarms. Provide a control system block diagram identifying PLC hardware.

c) Provide an instrument list showing make, model number, and process variable range.

3) Electrical:

a) Provide the total connected and expected electrical demand in kW, kVA, HP, and amperes for each compressor when operating at 100 percent load. Provide the required load information and power requirements for any compressor components that are externally mounted from each compressor enclosure.

b) List all components that will require a separate power supply other than the 480V power supply that is provided to each dedicated compressor enclosure. Additionally, provide the voltage and ampacity requirements for each power feed to all equipment remotely mounted from each compressor enclosure.

c) Provide detailed data on all electrical equipment associated with the proposed compressor system. The literature provided shall, as a minimum, include the following:

(1) Catalog cut sheets on the AFD, harmonic mitigating equipment, compressor motor, enclosure disconnecting means, and all other electrical equipment located within each compressor enclosure. The cut sheets provided

shall include the maximum ampacity and temperature ratings associated with the AFDs and harmonic mitigating equipment proposed.

(2) Voltage and amperage ratings for the AFD and the associated harmonic mitigating equipment located within each compressor enclosure. Each AFD provided shall be sized at 1.15 X the nameplate rating of the motor.

(3) One-line diagram for each compressor enclosure that includes the disconnecting means, control power transformer, AFD, harmonic mitigating equipment, and the specific controls associated with each compressor.

(4) Minimum short circuit ratings of all equipment that is located within each compressor enclosure. All AFDs and associated equipment provided shall be provided with a minimum short circuit ratings of 65KA rms symmetrical.

(5) Calculations that verify the proposed harmonic mitigating equipment meets the harmonic limits specified under all specified operating conditions.

(6) Enclosure proposed for all electrical equipment located either within each compressor enclosure or remotely mounted from the compressor enclosure.

(7) Documentation to verify that the compressor and all associated electrical equipment provided is UL certified.

(8) Detailed drawings that includes the front elevation and the internal control panel logic of the Master Control Panel (MCP). Additionally, the associated enclosure ratings and the materials used to construct the Master Control Panel (MCP) shall be included.

(9) Detailed data on the proposed compressor motor. The data provided shall include the manufacturer and the enclosure ratings provided with the motor. The voltage, amperage, frequency, and service factor ratings shall also be included in the literature provided. The data shall include documentation that verifies that the proposed motor is inverter duty rated as specified.

(10) Detailed catalog cut sheets on the AFD and the associated harmonic filters proposed. The submitted information shall clearly indicate that the electrical equipment proposed is suitable for installation within the environment in which the compressors will be installed. The maximum allowable temperature ratings for all electrical equipment proposed shall be provided.

(11) List any special requirements for the compressors or any electrical equipment associated with the compressor system proposed.

f. Energy Requirements:

1) Provide estimated annual energy requirements for system, in kWh based on the guaranteed power requirements listed in the Specification herein. Describe assumptions for energy calculations: nameplate power, absorbed power, efficiency, etc. Provide estimated maximum demand in kW for the system. Use an electricity cost of $0.125/kWh.

2) Submit Table 3 under Article 1.10, herein, fully completed by the Manufacturer showing guaranteed wire power.

3) Engineer to perform 20-year life cycle cost as part of the evaluation process.

g. Warranties: Provide information on the compressor system equipment warrantees, specific to this Project, including those described herein.

h. Warranty and Service Agreements: Submit a detailed description of the manufacturer's extended warranty and service agreement options.

1) Extended Warranty: Include a detailed description of the manufacturer's extended warranty options, modified as necessary to meet requirements specified herein. Description shall include pricing structure.

2) Service Agreements: Include a detailed description of the manufacturer's service options. Description shall include pricing structure.

2. Shop Drawings and Product Data (to be provided after Equipment Manufacturers selection):

a. Structural: Anchorage and bracing data sheets and Drawings as required.

b. Bill of Materials: Complete bill of materials of all components and equipment supplied. Bill of materials shall include make and

model number and replacement cost of the primary components including, but not limited to, the following:

1) Compressor.
2) Motor.
3) AFD.
4) PLC.
5) Harmonic filters.
6) Heat exchangers.
7) Instruments and Sensors (temp, pressure, magnetic bearing controller, etc.).
8) Control transformer.
9) Local control panels
10) Uninterruptible power supply (UPS).
11) Master Control Panel (MCP).

c. Spare Parts: Include a list of manufacturer-recommended spare parts and nearest supplier (identify supplier's name and address, and other pertinent contact information). Include a statement of availability of all parts.

d. Documentation of modifications to the manufacturer's standard design to meet the requirements specified in this section and where the manufacturer's standard design does not comply with the specified performance, features, functions, and materials of construction specified herein.

e. Mechanical:

1) Complete Specifications, descriptive drawings, catalog cuts, and descriptive literature which shall include make, model, dimensions and weight of the compressors, motors, and accessories. Include weight of largest components requiring removal for maintenance.
2) Number of required units for each operating design point, including one standby unit.
3) Detailed layout drawings and dimensional data, including minimum clearance distances around equipment required to access equipment for normal service, repair, and removal.
4) Data on the characteristics and performance of the units to indicate ability to meet the system performance specified herein:
    a) Compressor curves showing package discharge pressure and flow capacity, wire to air efficiency and compressor package total wire power demand over the entire range from shutoff to maximum capacity. Clearly show the surge pressure and surge margin associated with each of the performance speed curves.

Provide compressor curves for all design operating conditions specified herein.

(1) On the performance curves indicate the pressure (psig), flow capacity (scfm), power demand (hp), and wire to air efficiency at guarantee points.

(2) Furnish performance curves at full speed and a at least four lower speeds including minimum speed to indicate specified volume turndown. The capacity line above which the unit should be operated to preclude surging. The capacity line below which the unit should be operated to preclude run out.

5) Inlet and discharge flexible connectors.
6) Inlet air filter and silencer.
7) Heat exchangers if required.
8) Air cooling system fans and waste heat exhaust silencer, etc.
9) Blow-off valve (and electric actuator) and silencer.
10) Check valve.
11) Discharge isolation valve and electric actuator and silencer.
12) Enclosure details.
13) Estimated compressor sound level data, for both inlet and radiated conditions, and description of sound control measures required to meet the specified sound levels.
14) Maximum heat dissipation from compressor enclosure to the space and any ventilation requirements.
15) Provide information about internal and external heat exchangers. If external heat exchangers are required, provide remote location installation and mounting requirements.

f. Electrical:

1) Motor Data: Complete motor data shall be submitted with the driven machinery shop drawings. Motor data shall include items applicable to this motor, such as:
   a) Descriptive information.
   b) Nameplate data in accordance with NEMA MG 1.
   c) Service factor.
   d) Voltage, phase, and frequency ratings.
   e) Full load current.
   f) Locked rotor current.
   g) No load current.
   h) Full load speed.
   i) Safe stall time.

j) Insulation class and temperature rise classification. Certification that motors are inverter duty rated.
k) Multispeed load classification (for example, variable torque).
l) Guaranteed maximum full load wire-to-air power. Also provide nominal air-to-airpower at 1/2 and 3/4 load.
m) Description, rating, and wiring diagram of thermal protection or over temperature protection.
n) Power factor at 1/2, 3/4, and full design flows and conditions.

2) Total wire-to air power consumption per unit for each operating design point.
3) System wiring diagrams, with recommended power feeder conductors sizes and feeder breaker sizes.
4) Bearing type, lubrication, and life.
5) Adjustable Frequency Drive Data:
a) Overall drive system operating data, including efficiencies, input currents, and power factors, at driven equipment actual load and rated system input voltage, at 0, 40, 60, 80, 100, and 110 percent of rated speed.
b) Information on harmonics generated by the drive, along with descriptive information on all reactors, filters, or other harmonics mitigation equipment.
c) Complete system rating, including all nameplate data, continuous operation load capability throughout speed range of 0 to 120 percent of rated speed.
6) UPS installed in each LCP:
a) Estimated load when on UPS.
b) Estimated time for UPS to power critical loads.
c) Estimated load of Magnetic Bearing on UPS.

g. Outline drawings for all items that are shipped loose.

3. Quality of Construction and Qualifications:
a. Proof of listing for Compressor Package by the Nationally Recognized Testing Laboratory (NRTL) such as UL/CSA certification in accordance with UL 1450 or equivalent TUV certification on the same model and size proposed. Certification must be demonstrated prior to acceptance of proposed equipment.
b. Statement of conformance letter stating conformance to specifications with all exceptions noted. Statement of conformance must be signed by an individual authorized to make such statements.

4. American Iron and Steel Bidders Certification.

5. Manufacturer's Certification that Bidder, if not Manufacturer, is authorized by Manufacturer to submit Proposal and Manufacturer will abide by submitted Proposal.
6. Proof of Financial Strength: supply documentation to demonstrate the financial strength of the firm bidding and the Manufacturer.

C. Informational Submittals (to be provided after Equipment Manufacturer selection):

1. Detailed factory test procedure with complete piping and instrumentation configuration diagram per ASME PTC-13 showing inlet and discharge air test pipe size. The location, type, and quantity of all major instruments necessary for performance data, including those on air, water, and lube oil with corresponding distances from reference points, shall be identified per ASME PTC 13 requirements. As a minimum, the detailed test plan shall include:
   a. Quality control procedures.
   b. Test procedure and method of calculating results.
   c. Functional testing of entire package, including oil lube system, instrumentation, ancillary components, and LCP.
   d. Insert the actual test report in the Operations and Maintenance Manual.
   e. Field Test: Submit a detailed test procedure for complete compressor systems.
2. Sound power values, when measured in accordance with ASME PTC 36, Measurement of Industrial Sound.
3. Master Control Panel (MCP) Factory Test Results:
   a. Submit factory test plan outlining all required testing activities within this section for Engineer approval a minimum of 2 weeks prior to testing.
   b. Submit factory test results including manufacturer’s quality assurance.
   c. Include copies of original test data collection forms.
4. Manufacturer’s Field Report: Submit manufacturer’s field report of inspections, tests, and observations for all items furnished under this section.
5. Operation and maintenance data as specified in Section 01 30 00, Administrative Requirements.
6. Manufacturer’s written equipment, material and spare parts storage and safeguard instructions including any special shipping, storage and protection, and handling instructions.
7. Manufacturer’s printed installation instructions.
8. Manufacturer’s Certificate of Proper Installation, in accordance with Section 01 43 34, Special Services.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility: All compressors and appurtenances furnished under this Section shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. Compressor manufacturer shall also provide a written warranty for the compressor and compressor package and shall state that they have reviewed the design and application and that the equipment has not been misapplied.

B. The manufacturer of the high-speed turbo air compressors shall be completely responsible for the proper design or selection of their system components, including but not limited to; compressors, adjustable frequency drives, harmonic filters, heat exchangers, blow-off valves, and all applicable compressor controls. All equipment shall perform as specified and the completed installation shall operate in accordance with the requirements of the Drawings and Specifications.

C. Equipment must meet the detailed requirements specified herein. Manufacturers shall not state a "standard product" cannot meet the spec. Such products shall be modified, redesigned from the standard mode for this specific project, and shall be furnished with special features, accessories, materials of construction or finishes as may be necessary to conform to the quality mandated by the technical and performance requirements of the Specification.

1.07 DELIVERY, STORAGE AND HANDLING

A. Shipping:

1. Ship equipment, materials and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.
2. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which they are intended.
3. Deliver spare parts at same time as pertinent equipment.

B. Receiving:

1. The Manufacturer shall provide an authorized representative to witness, inspect and inventory items upon delivery to Site.
2. The Contractor shall verify all items on manifest have been off-loaded and are undamaged.
3. Confirmation from the Contractor that items have been received.

4. The Contractor shall inspect each box to confirm that each spare part has been received.
5. The Contractor shall photograph each item off-loaded.
6. The Manufacturer shall obtain Contractor's signature on the bill of lading confirming that each item was delivered and provide a copy to the Owner and Engineer.

C. The Manufacturer shall submit written equipment, material and spare parts storage and safeguard instructions.

D. The Contractor shall store equipment per Manufacturer's written instructions.

1.08 OPERATING ENVIRONMENT

A. Compressor package will be installed in an indoor, dry, moderately dusty, mildly corrosive, non-hazardous building located at a wastewater treatment plant: Typical building temperatures from 50 to 105 degrees F. The building is a ventilated, industrial space. All equipment, including controls and electronics provided by the Manufacturer shall be suitable for continuous and standby operation in such an environment.

1.09 WARRANTY

A. The Manufacturer shall provide a standard 1-year warranty for compressors and appurtenances to commence upon Owner's acceptance of partial utilization of equipment.

B. Provide the additional cost for an extended warranty for Owner's consideration as follows:

1. Additional 4-year warranty (total of five).
2. Compressors and appurtenances shall be warranted to be free from defects in workmanship, design or material. If the equipment should fail during the 5-year warranty period due to a defective part(s), it shall be replaced and the unit(s) restored to service at no expense to the Owner.
3. The 5-year warranty shall include cost of parts and labor.

C. This warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and is in addition to and runs concurrent with the warranties made under the general warranty requirements of Contract Documents.

D. Time and materials required to correct defective equipment shall be provided by the compressor manufacturer at no additional cost to Owner.

E. Compressor manufacturer shall guarantee to ship any parts required for emergency repairs on all compressors within 5 working days of acknowledged receipt of the order, or the parts are free of charge to the Owner.

1.10 POWER GUARANTEE

A. Guaranteed Performance: The manufacturer shall submit guaranteed compressor package total wire power (kW) values with the proposal and submittal at the listed design points for both 7.7 psig and 10.25 psig discharge pressures as outlined in Table 3 below. The wire power shall include all losses associated with the compressor package at all specified operating points. The completed table shall be submitted by Manufacturer with the proposal and will be considered the basis of the power guarantee and all related requirements as specified herein.

B. Actual Performance: The actual performance of the compressor package total wire power (kW) will be obtained during the factory performance test as specified herein. Include the results for each compressor package with the factory performance test submittal.

Table 3
Guaranteed Performance Evaluation [1]

Operating Condition	Total Flow (scfm)	Inlet Temp. (deg. F)	Relative Humidity (%)	Recommended No. of Compressors Online [3]	Flow per Compressor (scfm) [3]	Total Wire Power per Compressor Package (kW)[2]	Power Evaluation Factor	Factored Total Wire Power per Compressor Package (kW)
Condition 1	9,500	-5	54				0.15	
Condition 2	31,900	-5	54				0.20	
Condition 3	16,000	50	70				0.30	
Condition 4	13,000	40	86				0.20	
Condition 5	43,600	104	50				0.15	

[1] Allowable Deviation: Flow 0%, Pressure 0%, Power + 1 %.

[2] Guaranteed data shall be provided for each compressor package at each discharge operating condition at both discharge pressures of 7.7 and 10.25 psig.

[3] Manufacturer to provide recommended number of online compressors at the given operating condition. This shall be used to determine flow per compressor for each test condition.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Magnetic bearing turbo air compressors shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the equipment to be furnished.

B. Magnetic bearing turbo air compressors that meet all of the requirements of this Specification.

C. Alternate compressor and package selections must submit itemized descriptions of how the selection differs from the Specifications.

2.02 MATERIALS

A. Materials specified are considered the minimum acceptable for the purposes of durability, strength, and resistance to erosion and corrosion. The Manufacturer may propose alternative materials for the purpose of providing greater strength or to meet required stress limitations. However, alternative materials must provide at least the same qualities as those specified for the purpose.

B. Major compressor components shall be manufactured from the following materials.

1. Casings and Inlet Inducer: High-strength aluminum alloy.
2. Impellers: High-strength forged aluminum alloy.
3. Rotor Shafts: Alloy steel or titanium alloy with permanent magnets.
4. Compressor and Motor Frame: Welded steel.
5. Inlet and Outlet Accessories: Hot dipped galvanized steel.
6. Expansion Joints: AISI Type 316 stainless steel.
7. Check Valve: AISI Type 316 stainless steel/FKM seal.

2.03 EQUIPMENT FEATURES

A. General:

1. The compressors shall meet all design, performance and operating criteria listed in the Design Criteria portion of this section.
2. The compressors shall be of single-stage centrifugal design utilizing oil free non-contacting magnetic bearing technology with the following design characteristics.
   a. The compressors shall be designed for heavy, continuous, industrial service, be capable of providing a minimum of 6 starts

per hour and have a minimum design life of 20 years before any major rebuild will be needed.

b. The compressors will withstand up to 5,000 shutdowns under full power failure without damage to the bearings.
c. Regardless of theoretical bearing life calculations, the bearings shall be sized for a minimum of expected 20,000 on/off cycles between major overhauls. Bearings that fail before 20,000 on/off cycles shall be replaced by the Compressor Manufacturer at no cost to the Owner.
d. Operate within specified vibration levels without overloading the drive motor.
e. The rotor shall remain levitated at all times while power is being supplied to the turbo air compressor. Turbo air compressors with rotors that rest on bearings while in the standby mode with power supplied to the compressor shall not be considered as an equal.
f. Operate without sign of distress when operating at specified operating point and at off design conditions.
g. Have a pressure-volume curve, which extends from the design system pressure to the upper system surge pressure with a continuously rising pressure characteristic.
h. Will not surge at or above specified flow rates corresponding to specified differential pressure.
i. The maximum input motor horsepower should not exceed specified nameplate horsepower when operating at design flows.
j. The turbo air compressor must deliver oil-free and non-pulsation air at all times to the aeration process.

3. Design compressor cooling system to consist of liquid or air cooling. Design liquid cooling system as a closed loop system, requiring no external connections or water supply from the plant. Provide cooling system capable of accommodating range of ambient conditions expected.

3. Supply each compressor with a sound enclosure covering the entire compressor package; fabricated of stainless steel or aluminum. Design sound enclosure to permit easy inspection and maintenance of all compressor package components. Provide quick release panels, each with at least two handle locations and weighing less than 55 pounds (as mandated by OSHA), enabling easy and quick access for routine maintenance of the compressor package components. Should the panels be heavier than 55 pounds, supply hinged doors with the appropriate frame, reinforcements, and supporting elements.
4. Wire to air power must include all motor, thermal, mechanical and electrical losses of the turbo air compressor as well as losses of all auxiliary equipment such as all lubrication systems, cooling systems, etc.

5. The compressors shall be capable of variable speed operation with a minimum turndown no higher than 45 percent from its maximum capacity over the entire temperature range and shall use an integral adjustable frequency drive. Turndown of the compressors must be sufficient to ensure that gaps do not occur during transition; overlapping should occur at any continuous duty design operating conditions; refer to Table 2 herein. Each compressor shall be capable of operating continuously and satisfactorily at any point between the minimum and maximum flows without any surge, vibration, hunting, or excessive heating of bearings or motor.
6. Rotor critical speed must be a minimum of 20 percent above the operating design speed. Each compressor shall be designed to operate to maximize overall system efficiency over the range of operating conditions.
7. Maximum unfiltered peak-to-peak radial or axial displacement of the rotor shaft shall not exceed 1.25 mils at all operating speeds when measured at on the motor or the turbo air compressor base.
8. Free field (R=infinity) sound pressure level without accessories shall not exceed 80 dBA at any point 3 feet from the turbo air compressor assembly, including inlet air filter, when operating at specified air flow rates and differential pressure.
9. Complete compressor package shall be certified by a NRTL such as UL, CSA, or TUV.

B. Compressors:

1. Casing: The spiral volute casing with horizontal intake and vertical discharge connection shall be provided with intake and discharge flanges in accordance with and manufactured to DIN 2576, PN 10 standards. The compressor inlet inducer shall be integral to the compressor volute.
2. Impellers:
   a. The impeller shall be shaped from a solid forging on a numerical machining center using computer aided manufacturing technology to ensure consistent efficiency.
   b. Semi-open impeller design with three dimensional shaped blades optimized for the design range of each compressor.
   c. The impeller shall be attached directly to the motor shaft using an aircraft technology fastener system without a coupling or keyway.
   d. The impeller shall be a standard design configuration.
3. Magnetic Bearing System:
   a. The motor rotor shaft shall be continuously levitated in a magnetic field by the magnetic bearing system. This system shall consist of two radial and two axial active magnetic bearings, two rotor

position sensors, and a magnetic bearing controller (MBC). Compressors that use bearing systems that contact stationary parts during start up or if power is lost are not an acceptable alternate.

b. The position sensors shall continuously measure the shaft position and send a signal to the MBC controlling the energy in the active magnetic bearings keeping the motor rotor shaft levitated and centered.

c. There shall be no mechanical contact at any time between any moving and stationary surfaces during the compressor operation eliminating friction and wearing of all moving parts.

d. The magnetic bearing system shall not require any oil lubrication.

e. The magnetic bearing controller shall be powered by a three-phase, 60-Hz with a power supply that has the same voltage as the main power supply. The magnetic bearing shall be powered from UPS in LCP to provide power during power interruptions.

f. The bearings shall be designed to a minimum of 20,000 starts or a minimum of 10 years between replacements.

g. The compressors shall withstand up to 5,000 shutdowns under full power failure without damage to the bearings.

4. Noise Enclosure:

a. The high speed unit shall be enclosed in a noise reduction system that reduces the noise levels to less than 80 dBA.

b. Enclosure panels shall be easily removable for inspection of the high speed unit.

c. For all panels heavier than 50 pounds, hinged doors must be supplied. The compressor package enclosure shall protect against falling water, condensation, and dust.

d. Noise enclosure shall be designed for easy inspection and maintenance of all compressor package components.

C. Each compressor shall be designed with a flanged inlet to introduce air from an outside air source through an inlet filter.

D. Intake and filter performance losses shall be included by the compressor vendor in the compressor performance calculation. Filters shall be easily serviceable.

E. Compressors shall not allow heat caused by motor or electrical cooling to be exhausted into compressor room.

F. Each compressor shall be supplied with built in vibration isolating mounts. Compressor manufacturer shall be responsible for attenuating noise and vibration in the compressor package such that no special installation base shall be required nor shall any vibration from the compressor package be

transmitted to the floor or intake and discharge base or the piping. Manufacturer shall supply acceptable vibration levels for the entire compressor assembly over the entire operational range of the supplied unit.

G. Each compressor shall be equipped with an integrated, electrically actuated blow-off valve. The valve discharge shall also be supplied with a properly sized blow-off silencer.

H. Noise criteria: Each compressor enclosure and blow-off valve shall not exceed 80 dBA at 100 percent speed and 9.5 psig discharge pressure. Manufacturer shall supply sound pressure levels (dBA) at 100 percent speed and discharge pressure and for all operating design points outlined in this specification.

2.04 ELECTRICAL COMPONENTS AND ACCESSORIES

A. Provide all necessary electrical components and wiring on the compressor skid for a complete, functional compressor system. All equipment on the compressor skid shall be prewired.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. All wiring shall meet the requirements of NFPA 70 or nationally recognized testing laboratory. All insulation shall be rated 600 volts, minimum. All low-voltage (24V dc) analog signals shall be run in twisted, shielded pair cable with 600-volt rated insulation.

C. Power Disconnect: Compressors shall be provided with an externally operable power disconnect located on the enclosure exterior accessible from the front of the compressor enclosure.

D. Compressor Drive Motor:

1. Each compressor shall be supplied with a Permanent Magnet Synchronous Motor (PMSM) high speed motor that has no physical connection between stator and shaft, therefore eliminating brushes, slip rings, or break resistors. The PMSM must be combined with a Sine-Wave Filter (Sinus Filter) and Input Line Reactor to maintain cool motor operation and constant motor efficiency with motor turndown. Induction or Brushless DC motors shall not be acceptable.
2. Each motor shall operate on 460/480 volts, three-phase, 60-Hz input power. The maximum allowable motor horsepower shall be as specified in the Design Criteria. Motors shall be premium efficiency type.

3. The motor shall be able to start under the starting conditions required. Compressor manufacturer shall be responsible for coordinating the starting torque requirement of the compressor and the motor with the AFD to ensure proper operation of the system.
4. Motor shall have a guaranteed minimum efficiency of 95 percent.
5. The motor rotor shaft shall be supported by magnetic bearings at all times while power is supplied to the turbo-compressor providing a smooth vibration free rotation over the entire speed range. Compressors that use bearing systems that contact stationary parts during start up or if power is lost are not an acceptable alternate.
6. The motor shall be air cooled by a cooling fan that is mounted directly to the bottom end of the motor rotor shaft or liquid cooled.
7. Additional requirements for the compressor motors are:
   a. Insulation: Epoxy coated Class H rated to 180 degrees C (356 degrees F).
   b. Stator Temperature Monitoring: Internal thermocouple embedded in motor windings with triple redundancy.
   c. Maximum Ambient Temperature: 105 degrees F.
   d. Minimum Ambient Temperature: 50 degrees F.

E. Adjustable Frequency Drive:

1. Adjustable frequency drive (AFD) shall be manufacturer's standard design, generally of the pulse-width modulation design, with all necessary components to provide a complete and functioning compressor system capable of meeting the design requirements.
2. A six-pulse AFD shall be acceptable provided that the harmonic mitigating equipment provided with each compressor allows the cumulative number of compressors in operation to meet the specified harmonic limits. Alternatively, higher pulse AFDs can also be provided in lieu of a six-pulse AFD to better mitigate the harmonics generated at the source of the non-linear load provided that the overall harmonic limits specified are met.
3. AFD inverter shall be listed by a National Recognized Testing Laboratory (NRTL).
4. AFD shall have a service and support facility operation in the U.S.A. for supply, support, and the provision of replacement components.
5. Drive shall be integrally mounted within the compressor enclosure.
6. AFD shall have a sinusoidal filter consisting of an inductor and capacitor filter to increase motor life.
7. The adjustable frequency drive shall be integrally mounted within compressor enclosure, the associated harmonic filter for harmonics mitigation shall be mounted in a companion standalone NEMA 12 enclosure or mounted within the compressor enclosure.

8. Adjustable frequency drive provided for each compressor shall have a components and design strategy to mitigate the impacts of heat and stress on the PMSM that decrease motor life. Each AFD shall have an integrated user interface that includes field bus connection and support software. Provide control of AFD via Compressor LCP touch screen.
9. Harmonic Distortion Limits:
   a. Normal and Standby Source Harmonic Distortion Limits: Compute the normal and standby source harmonic distortion limits. Using the one-line diagrams, compute the normal and standby source individual and total current and voltage harmonic distortion at the point identified as the PCC. The PCC is the switchgear bus the compressor is connected to. The current and voltage harmonic distortion shall not exceed limits specified herein. Use the values of short circuit current I_{SC} and demand load current I_L specified on diagrams. The harmonic calculations shall be performed with all compressors in operation.
   b. Percent total voltage harmonic distortion at the PCC shall not exceed 5 percent.
   c. The short circuit current available at the PCC is 38,500A RMS symmetrical at 480V.
      1) Note that the short circuit available depends on equipment procured therefore coordination between the Vendor and Electrical System Analysis provider will be required.
   d. Compute normal source and the standby source individual and total current harmonic distortion at the PCC in accordance with IEEE Standard 519. Individual current harmonic distortion and the total demand distortion expressed as percent of maximum demand load current I_L for PCC shall not exceed values specified in Table 4 below for both the normal and standby sources.

Table 4

Individual Harmonic Order (Odd Harmonics)	Harmonic Current Distortion Percent of Max. Demand Load Current IL1
h < 11	4.0
11 ≤ h < 17	2.0
17 ≤ h < 23	1.5
23 ≤ h < 35	0.6
35 ≤ h	0.3
Total Demand Distortion (TDD)	5.0

Table 4	
Individual Harmonic Order (Odd Harmonics)	**Harmonic Current Distortion Percent of Max. Demand Load Current IL1**
[1]For harmonic computations, assume all compressors are in operation and that these compressors are operating at full load.	
[2]Limits specified in Table 1 are for AFDs utilizing six-pulse rectifiers. Supplier may choose to provide higher than six-pulse rectifiers or harmonic filters in order to meet the current distortion limits. For converters higher than six pulses, the limits for characteristic harmonics are increased by a factor of $\sqrt{(q/6)}$, where q is the pulse number, provided that the amplitudes of non-characteristic harmonics are less than 25 percent. Characteristic harmonics are defined as $kq \pm 1$ where k is an integer and q is the pulse number.	

F. Passive Harmonic Filter:

1. Ampere rating suitable for driven equipment, de-rated for altitude as required.
2. Open magnetics and capacitor assembly to achieve specified harmonic distortion requirements.
3. Enclosure: NEMA 2.
4. Manufacturer: MTE Matrix AP, or-equal.

2.05 APPURTENANCES

A. Inlet Filter and Silencer:

1. Each compressor shall be provided with an inlet filter and silencer.
2. Provide inlet filter units that are 98 percent efficient at 10-micron.
3. Inlet filter shall be installed in the plenum as shown on conceptual Process Air Facility drawings provided herein.
4. Inlet silencer shall reduce sound power levels at inlet filter as indicated in Table 1, Design Criteria Summary Table.

B. Panel Filter Element: Each compressor shall be supplied with a 24-gauge galvanized steel frame, adhesive potted on all four sides. Upstream and downstream, 24-gauge galvanized, flattened, expanded metal screens. Pleat separating glue beads on upstream side, full-face 1/4-inch closed-cell neoprene rubber gasket on downstream side. Includes synthetic medium, 98 percent efficient at 10-micron (nom). Max (clean) initial pressure drop at rated flow 0.5 inch of water. Max (dirty) final pressure drop 6 inches of water.

C. Inlet and Discharge Expansion Joint: Provide each compressor with an inlet and discharge expansion joint capable of withstanding the vacuum, pressure,

and high discharge air temperature up to 300 degrees F under all operating conditions. The expansion joints shall include carbon steel flanges drilled for standard ANSI 150-pound pattern. The expansion joints shall be stainless steel bellows or EPDM type.

D. Each compressor package shall include a flexible connector to be installed on the discharge aeration piping prior to the main air header. The flexible connectors shall be sized for a standard pipe diameter and shall prevent the transmission of noise and vibrations from the compressor package into the piping. The flexible connector shall be suitable for the maximum operating temperature and pressure ratings of the equipment in the air stream. Provide stainless steel restraining bolts and hardware.

E. Each compressor shall be supplied with an electrically actuated butterfly valve for the compressor discharge, which shall be fully closed when the compressor is not in operation and opened when the compressor is called to start. Valves and electric actuators shall be Type V510 as follows:

1. Type V510 Lug Style Butterfly Valve, Resilient Seated, 2 Inches to 20 Inches for Low Pressure Process Air Service:
   a. Lug style cast-iron body, aluminum bronze discs, Type 316 stainless steel one-piece stem, self-lubricating sleeve type bushings, EPDM replaceable resilient seat suitable for operating temperatures up to 250 degrees F, 150 psi working pressure rating, bubble-tight at 50 psi differential pressure, valve body to fit between ASME B16.1 Class 125/150 flanges.
   b. Manufacturers and Products:
      1) Bray Controls; Series 31.
      2) Tyco/Keystone; Model AR2.
      3) Or-equal.
2. Electric Motor Actuators, 480 Volts:
   a. General:
      1) Comply with latest version of AWWA C542.
      2) Size to 1-1/2 times required operating torque. Motor stall torque not to exceed torque capacity of valve.
      3) Controls integral with actuator and fully equipped as specified in AWWA C542.
      4) Stem protection for rising stem valves.
   b. Actuator Operation—General:
      1) Suitable for full 90-degree rotation of quarter-turn valves or for use on multiturn valves, as applicable.
      2) Manual override handwheel.
      3) Valve position indication.

4) Operate from FULL CLOSED to FULL OPEN positions or the reverse in 60 seconds maximum.

c. Open-Close(O/C) Service:
1) Size motors for one complete OPEN-CLOSE-OPEN cycle no less than once every 10 minutes.
2) LOCAL-OFF-REMOTE Selector Switch, padlockable in each position:
a) Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control valve in LOCAL position.
b) Remote OPEN-STOP-CLOSE momentary control dry contact inputs in REMOTE position. Integral seal-in circuits for remote OPEN and CLOSE commands; valve travel stops when remote STOP contact opens.
c) Auxiliary contact that closes in REMOTE position.
3) OPEN and CLOSED indicating lights.
4) Integral reversing motor starter with built-in overload protection.
5) Integral or externally mounted power disconnect switch, lockable in the off position.

d. Limit Switch:
1) Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120V ac.
2) Each valve actuator to have a minimum of two auxiliary transfer contacts at end position, one for valve FULL OPEN and one for valve FULL CLOSED.
3) Housed in actuator control enclosure.

e. Valve shall remain in last position upon loss of signal.

f. Manufacturers and Products:
1) Rotork Controls; IQ/IQT Series.
2) Flowserve Limitorque; MX/QX Series.
3) AUMA; SA/SQ Series.

F. Blow-off Valve: Provide manufacturer’s standard actuated valve. Controls for the valve shall be mounted in each LCP.

G. Each compressor shall be supplied with one Type 316 stainless steel wafer-style, dual-disc check valve installed on the discharge line. Check valves shall be Type V612 as follows:

1. Type V612 Double Disc Swing Check Valve 2 Inches to 48 Inches:
a. Wafer style, spring loaded, Type 316 stainless steel body and discs, EPDM resilient seats, and Type 316 stainless steel spring, hinge pin, and stop pin.

b. Valves 2 inches through 12 inches rated 200 psi nonshock working pressure and valves 14 inches through 48 inches rated 150 psi nonshock working pressure.
c. Temperature Rating: -20 to 300 degrees F.
d. Maximum Headloss through Valve: 0.2 psi when installed in vertical.

H. Each compressor shall be equipped with flanged silencers sized to reduce sound power levels as specified herein for blow-off valve discharge and air cooling waste heat exhaust vent.

I. Each compressor shall be equipped, at a minimum, with the following integrated instrumentation:

1. Inlet differential pressure sensor (before and after each inlet filter).
2. Compressor inlet pressure sensor.
3. Compressor discharge pressure sensor.
4. Compressor inlet temperature sensor.
5. Compressor discharge temperature sensor.
6. Air flow sensor (or method to calculate it).
7. Compressor speed sensor (or method to estimate it).
8. Magnetic bearing controller system.

J. Equipment identification Plate: 16-gauge Type 304 stainless steel with 3/8 inch die-stamped equipment tag number securely mounted in a readily visible location.

K. Anchors: Manufacturer shall size and supply anchor bolts.

L. Provide lifting eyes on the equipment housing for lifting equipment.

2.06 INSTRUMENTATION AND CONTROLS

A. General:

1. Each compressor shall be supplied with a Rockwell ControlLogix PLC or approved controller local control panel (LCP). LCPs shall be Manufacturer’s standard controls.
2. A Rockwell ControlLogix PLC-based master control panel (MCP), used to interface with LCPs and Plant SCADA over Rockwell EtherNet/IP, to sequence compressors ON and OFF, control compressor flow and pressure requirements, and control total air flow as described herein. The manufacturer shall develop and provide the hardware and programming to perform control functions. These functions are identified herein as the MCP control. Note that PLC in MCP shall not

be the sole controller for individual compressors. Remote I/O racks in LCP connected to PLC in MCP is not acceptable. Each LCP shall be provided with associated PLC processor.

3. The MCP shall be capable of receiving a Header Pressure set-point from Plant SCADA. Plant SCADA shall also be able to designate the Lead, Lag1, Lag2, Lag3, Lag 4, and standby compressor. These can also be set locally at the MCP OIT.
4. PLC program shall be clearly annotated defining critical functions. Program shall be ladder or function block.

B. Local Control Panel (LCP):

1. General:
   a. The LCP shall provide for control of all components of an individual compressor. The LCP shall provide all control and monitoring functions required for the operation, monitoring, and protection of the compressor including, but not limited to, timing, interlocks, and permissive functions required for safe operation of its specific compressor.
   b. The LCP shall be factory assembled and wired such that field wiring shall consist only of connection to panel terminals.
   c. All controls and instruments shall fail into a safe condition. The controls shall be designed such that the compressor cannot operate unless the controls are energized, nor can they operate with any defective controls.
   d. Communications between LCPs and MCP shall be via Rockwell EtherNet/IP. Provide unmanaged Ethernet switch if required.
   e. LCP programming and assembly shall support local (manual) stand-alone compressor operation without interface with Main Control Panel (MCP). Interface with MCP required for remote (automatic) start-stop and set-point control and sequencing of compressors.
2. Functional Requirements:
   a. The compressors shall start under an automatic sequence initiated by the local start signal at the LCP when in LOCAL control, or the remote start signal from the MCP when in REMOTE control.
   b. There shall be three means of shutting down the compressor:
      1) Normal Stop: Initiated by pushing the local stop button or remote stop from the plant SCADA. Machine normally stops such that no surging occurs.
      2) Soft Stop Initiated by surge.

3) Emergency Stop Initiated by:
   a) Pushing EMERGENCY STOP button on the local OIT screen. Restart shall require manual reset of the EMERGENCY STOP button.
   b) MCP PLC failure.
4) Power Loss: Upon restoration of power, the system shall require manual restart at MCP or SCADA.

c. The surge detection system shall bypass air through the blow-off valve or shut down the compressor.
d. The compressor machine control and protection system shall include the following instrumentation, as a minimum:
   1) Compressor inlet air temperature transmitter.
   2) Compressor discharge air temperature transmitter.
   3) Compressor inlet air pressure transmitter.
   4) Compressor discharge air pressure transmitter.
   5) Inlet air filter differential pressure Transmitter.
   6) The temperature monitoring system shall monitor and display actual winding temperatures at the LCP. A high temperature (as determined by the compressor manufacturer) shuts down the compressor and gives an alarm. The alarm/shutdown shall be displayed until reset.
   7) Air flow measurement indication (calculated).
   8) Compressor speed and indication.

3. Panel Construction:
   a. Rated to match compressor enclosure and suitable for indoor installation.
   b. Heat rejected by the LCP components shall be cooled by air fans and rejected to the compressor room. Electric motor cooling exhaust shall be rejected to outside of the compressor room.
   c. Power distribution within panel. Circuit breakers only. Fuses considered under specific exceptions.
   d. All conductors clearly marked with permanent labels; handwritten labels not acceptable.
   e. Provide Panel Mounted Operator Interface Terminal (OIT), incorporating manufacturer's standard functions, controls, alarms, and meters in easy-to-interpret operator interface displays.
   f. An unmanaged Ethernet switch shall be provided at each compressor LCP for connecting a portable computer to access OIT, PLC, or communications to MCP.
   g. Each LCP will be supplied with an uninterruptible power supply (UPS) 120V ac control power source and suitable voltage for magnetic bearings.
      1) UPS shall provide power for the magnetic bearings and controlled shutdown during power failure.

h. Power supply for blowoff valve shall be from the LCP.

4. LCP Interfaces with MCP:
   a. All status, alarms, and compressor process variables monitored at the LCP shall be communicated to the MCP, including but not limited to the following items:
      1) Compressor ON.
      2) Compressor FAULT.
      3) Motor Speed.
      4) Inlet Air Temperature.
      5) Inlet Air Filter Differential Pressure.
      6) Surge Parameters and alarms.
      7) Differential Pressure (Inlet/Discharge).
      8) Discharge pressure.
      9) Discharge Isolation Valve OPEN/CLOSE status. Wired directly to the MCP.

C. Master Control Panel (MCP):

1. General:
   a. Provide one MCP capable of controlling all compressors.
   b. MCP shall incorporate non-redundant PLC arrangement.
   c. Rockwell PanelView Plus 6 1500 (15-inch display) Operator Interface Terminal (OIT) to control each compressor unit.
2. Functional Requirements:
   a. The MCP shall bring compressors online and offline, increase/decrease online compressor capacity resulting in a gradual increase/decrease of air throughout the entire range of one to multiple compressors online. In the event of a compressor failure, the next compressor in the preselected start sequence shall come online. Provide control scheme to operate with a minimum number of compressors online while maintaining maximum system efficiency.
   b. On return of power, following a loss of plant power, the compressors shall not restart until the SYSTEM START is initiated by the operator from the MCP or from SCADA. On receiving the RUN command, the MCP shall initiate a sequenced re-start of the compressors. During power outage and return of power, the magnetic bearing shall be powered down through the UPS.
   c. The MCP shall control compressor operation to ensure one available to run compressor remains in standby.
   d. Compressor Control: In Auto Mode, the MCP shall generate commands to the LCPs to start/stop compressors and adjust compressor capacity to maintain the process air flow based on

either a flow, pressure or DO setpoint (control mode to be operator selectable). Pressure control shall be the primary control mode. The MCP shall provide air header flow control over a range of 5,000 to 50,000 scfm with any of the compressors in service. When the MCP is in LOCAL mode, the sequence selection, discharge mode and setpoint will be manually entered by the operator at the MCP. When the MCP is in REMOTE mode, the sequence selection, discharge mode and setpoint will be received from plant SCADA HMI.

e. The OIT for the MCP shall be configured to display multiple graphic screens for displaying operating variables, valve positions, and other relevant data. Operating screens shall include as a minimum:
   1) Screen for start sequence selection of compressors, and compressor SYSTEM START initiation. The compressors shall start in the selected sequence when SYSTEM START is initiated from the MCP or from SCADA.
   2) Discharge pressure setpoint adjustment.
   3) Displays and controls shall be provided to monitor all process variables related to each compressor including signals from two air header pressure transmitters used for control of the compressors when in pressure control mode.
   4) Monitor and modify all process related setpoints, as required.
   5) Display all alarm conditions within entire compressor system.
   6) Control of the compressors and air flow as a manual function.
   7) As a minimum, the MCP shall have status indicators for each compressor as follows:
      a) Compressor in remote.
      b) Compressor ready for start.
      c) Compressor on.
      d) Common alarm.
      e) Compressor START/STOP signal.
      f) Calculated air flow.
      g) AFD speed.

3. Panel Construction:
   a. Enclosure shall be a freestanding NEMA 12 . Enclosure shall be constructed of painted steel or unpainted aluminum, 14 gauge minimum.
   b. The dimensions of the panel shall be freestanding approximately 24 inches wide, 72 inches tall, and 24 inches deep.
   c. Full height, fully gasketed access doors.

d. Latches: Three-point, Southco Type 44.
e. Handles: Keylock handle.
f. Hinges: Full length, continuous, piano type, steel hinges with stainless steel pins.
g. Power distribution within panel. Circuit breakers only. Fuses considered under specific exceptions.
h. All conductors clearly marked with permanent labels, handwritten labels not acceptable.
i. The MCP will be supplied with an integral uninterruptible power supply (UPS) 120V ac control power source.
j. An unmanaged Ethernet switch shall be provided at the MCP for connection to the individual LCPs, the Plant SCADA, and to laptop.
k. Provide dc power supplies as required for lower voltage device and control requirements.
l. Provide the following fully prewired inputs/outputs:
    1) 16 digital inputs.
    2) 16 digital outputs. Provide interposing relays. Relay shall be provided with mechanical or electrical indication that relay is On. Provide pushbutton or lever on relay to manually test output.
    3) 4 analog inputs. Special note: Provide two fused 24V dc circuit to power the two 2-wire discharge pressure transmitters, provided by Contractor under construction contract, to be connected to one of the analog inputs. The pressure transmitters are redundant.
    4) 4 analog outputs.

4. MCP Interfaces with plant SCADA:
    a. All control, monitoring, and alarm signals available to the MCP shall be made available to the plant SCADA via the data communication system. Data shall be organized within contiguous memory blocks in the MCP PLC to simplify coordination and interface with the plant SCADA.
    b. MCP Control Interfaces with the plant SCADA shall include but not be limited to the following:
        1) Discharge isolation valve positions.
        2) Discharge header pressure.
        3) Discharge air flow (Calculated).
        4) Air flow setpoint.
        5) Compressor status, conditions, and alarms.
        6) Sequence selections.
        7) MCP ON status.
        8) MCP FAIL status.
        9) MCP IN REMOTE.

10) MCP READY.
11) Header pressure HIGH alarm.
12) Header pressure LOW alarm.
13) MCP SHUTDOWN command.

2.07 SOURCE QUALITY CONTROL

A. Factory Testing:

1. All furnished compressors and components supplied within this specification shall be tested. Testing of similar size units and components not actually furnished will not be allowed.
2. The compressor package manufacturer must submit a factory test procedure for approval. Pre-requisite for scheduling the factory test is an approved test procedure at least 2 weeks prior to scheduling the factory test.
3. The test procedure shall include the completed attached supplement, Process and Fluid Components and Electrical Power Related Components – Factory Testing Summary Checklists.
4. The test procedure shall include a sketch of the test setup showing the piping and instrumentation.
5. Upon completion of assembly, the compressor system shall be tested at the place of assembly. Provide 4 weeks' notice, in writing, for the witnessing of the testing.
6. Owner and/or Engineer may witness shop tests, inspect and check testing equipment used and observe the calibration of pressure gauges and transducers. Pressure measurement devices calibrated at a location remote from the factory will not be acceptable. The use of computer data acquisition systems shall be acceptable. However, all readings must be independently verifiable from certified and/or calibrated instruments.
7. Allow proper time for inspection and witnessing of shop testing of material and equipment. Proper time shall be defined as the time required to successfully complete the specified factory test. Each compressor package shall be factory tested for a duration not less than 4 hours under varying operating conditions.
8. Each individual compressor package including blowoff valve and LCP shall be tested before shipment. The LCP shall be connected to all enclosure instruments, and appurtenances. All start/stop and running sequences and all safety alarm systems shall be tested. The witnessing engineer shall sign the test procedures and results, certifying that the assembled compressors, auxiliaries, blowoff valves, and control panel were tested together, as a system, in the compressor manufacturer's shop.
9. Each compressor package shall be tested in accordance with the ASME Wire-to-Air Performance Test Code for Compressor Systems, PTC-13-2018. Tests shall be conducted using the job motor at actual voltage and

frequency. Calibrated high-accuracy power analyzers shall measure the package wire power at the package power input terminals and include all auxiliary system electric loads as per Section 4-1 of the ASME PTC-13. The test shall include determination of the surge point and verification of the guarantee points. Power factor for each compressor shall be tested. The manufacturer shall verify the compressor motors operate at a power factor equal to or higher than that specified.

10. The compressor delivered flow rate (scfm) and discharge pressure (psi) shall be guaranteed with no negative tolerance. There shall be no other tolerances or measuring uncertainties used in reporting test results. The witnessing Engineer shall sign each copy of the test data log sheet certifying that the required tests were performed in strict accordance with these Specifications and the ASME PTC-13.
    a. The capacity of the compressor shall be derived as described in the ASME PTC-13.
    b. The test shall construct operating curves of inlet to discharge pressure plotted against delivered flow rate (SCFM).
    c. All test equipment shall be calibrated and certified by an independent test agency no more than 12 months prior to the test date. Certificates shall show the stability of calibration over a period of at least 1 year per ISO 9001. All test equipment shall be per Section 4 of ASME PTC-13.
    d. Velocity vibration versus frequency levels shall be recorded within 10-1,000 and 10-10,000 Hz frequency range.
    e. Appurtenances, fittings or specially configured piping on the inlet or the outlet of the machine will ONLY be permitted if they were submitted as part of the Shop Drawing review AND that they can be installed with the equipment and preserve the existing building design. Distance that the machine extends into the room and the centerline elevation of the common discharge header shall be maintained.
11. The compressor test report shall present computations in exact accordance with Section 5 and 6 of ASME PTC-13 with performance curves showing capacity, pressure, and wire power.
12. Provide total power consumption calculations for each compressor for each specified operating conditions.
13. Test results of the motors and compressors shall be included in the Operation and Maintenance Manual.
14. The manufacturer shall provide copies of the test data and all certifications of Factory Testing for approval by the Engineer prior to shipping equipment.
15. The equipment manufacturer shall furnish all air and ground transportation, lodging, miscellaneous travel expenses, and meals for two representatives of Owner and the Engineer for a total of 3 people.

All Factory Tests to be available for the owner and engineer to witness via remote means such as Microsoft Teams or Zoom. The equipment manufacturer shall furnish all air and ground transportation, lodging, miscellaneous travel expenses, and meals for the initial witness testing and any subsequent testing necessitated by failed tests.

B. Master Control Panel Factory Tests:

1. The Owner and Engineer reserves the right to witness the tests specified herein and to inspect the fabrication procedures at any time during the fabrication of the panel.
2. Witnessed panel factory tests shall be conducted per pre-approved factory test plan procedures.
3. Provide 4 weeks' notice, in writing, for the witnessing of the testing.
4. Perform functional tests as follows:
    a. Gather and furnish test information necessary to show conformance to specified requirements.
    b. Manufacturer's Test Representative shall certify test results.
    c. Perform tests on panel(s) actually furnished after construction is complete and final application software is loaded onto all PLCs and OITs.
    d. Simulate interlocks and signals from other connected equipment in order to demonstrate specified operator interface functions and controls.
    e. Provide temporary test software to simulate properly operating motors and valves when actual motors or valves are not connected.
5. Testing shall include, as a minimum:
    a. Inspection for proper construction.
    b. Verification of conformance with OIT standards.
    c. Verification of SCADA remote monitoring and control functions:
        1) Provide test screen for simulating outputs from SCADA and display SCADA monitored points.
    d. Monitoring and control of all connected devices, included those provided by others including two air discharge header pressure transmitters.
    e. Compressors Lead and Lag selections.
    f. Alarm functions.
    g. Switching logic between available and not available compressors.
    h. Power recovery.
    i. All automatic sequences including:
        1) Normal start.
        2) Normal stop.
        3) Controlled shutdown.

4) Local E-stop.
5) Remote E-stop.
6) Power recovery.

j. Obtain acceptance of test reports from Engineer prior to shipment of equipment.

2.08 SHOP PAINTING

A. The compressor enclosure shall be factory painted per manufacturer's standard system and color for interior installation for all cast iron and carbon steel. Aluminum, stainless steel, and brass shall not be painted.

B. Manufacturer shall furnish small quantity kits for touchup painting and for painting other small areas identical to factory paint system and color.

2.09 ACCESSORIES

A. Provide four lifting eyes on the equipment housing and lifting beam as required.

B. Provide touchup paint for field painting. Coating type and color shall match shop paint coating.

C. Tools: Manufacturer shall furnish two sets of special tools required for complete assembly or disassembly of compressor system components for each type or size of compressor specified, together with a neat metal box (or boxes) for the same. The tool kit(s) shall be sufficiently complete to permit normal repair and maintenance of all equipment furnished.

PART 3 EXECUTION

3.01 INSTALLATION

A. Manufacturer shall coordinate the installation, finishing, and the commissioning of the compressors and all appurtenances in accordance with the manufacturer's recommendations and shall furnish written instructions to Engineer. Manufacturer shall inspect installation and provide a certificate of proper installation prior to startup and testing.

B. The compressor supplier shall supply compressor packages shipped completely pre-assembled. Only accessories, silencers, electrical/control connections, discharge air pipe connections, inlet air connections, etc. shall be installed onsite under separate contract.

C. All compressor package deficiencies must be corrected prior to startup or testing.

3.02 STARTUP ASSISTANCE AND TESTING

A. Functional Testing:

1. After the installation of the units and all appurtenances, each unit shall be subjected to functional testing as defined herein. The functional tests shall be conducted under the installation contract by the Manufacturer's Representative. The functional tests shall demonstrate that under all conditions of operation each unit:
   a. Has not been damaged by transportation or installation.
   b. Has been properly installed.
   c. Has no mechanical defect.
   d. Is in proper alignment.
   e. Has been properly connected.
   f. Has current to all motor electrical leads balanced.
   g. Has been properly connected.
   h. Has fully functional instruments that are properly calibrated and set.
   i. Will start, run, and stop in the prescribed manner.
   j. Will run through entire range of specified pressure and flow.
   k. Is free of overheating of any parts.
   l. Is free of all objectionable vibration.
   m. Is free of excessive noise.
   n. Is free of overloading of any parts.
   o. Shall operate as specified with the control system.
2. After each blower has passed functional testing outlined above, the blower system shall pass a functional test to prove the blowers and controls will operate as specified herein. The blower system must pass this functional test before proceeding with demonstration testing. Details of the system functional test requirements will be developed during the construction contract.
3. All labor, and incidentals required to complete the functional tests will be provided by the Contractor under the installation contract. The compressor Manufacturer shall prepare functional testing procedures, assist during functional testing and approve functional testing results. The Contractor shall provide testing equipment including, but not limit to portable power monitoring equipment, recording devices, and pressure sensors to verify field testing results. The compressor Manufacturer shall coordinate all testing requirements with the Engineer prior to commencing functional testing.

B. Demonstration Testing:

1. Once the Manufacturer confirms compressors are correctly installed and properly functioning, the compressors can be connected to diffuser piping to conduct demonstration testing prior to placing compressors in service,
2. Conduct a demonstration test on each set of compressors including instrumentation, controls, and valves. The test shall demonstrate that the compressors will be operated in the entire range of specified pressure and flow while in remote with control from SCADA. The test shall be conducted with the aeration basins full of plant effluent or mixed liquor at normal operating levels.
3. Conduct demonstration of each compressor's ability to be manually restarted through LCP, MCP and SCADA following a plant wide power failure.
4. A Demonstration Test Log shall be submitted to Engineer on completion of each test which records the compressor model number, compressor serial number, test date, beginning test time, ending test time, motor horsepower, motor speed, amperage draw, and all of the key operating parameters specified in the Design Criteria. In addition to this information, Table 5 must be completed during field startup and testing to demonstrate proper operation. Functional test results shall be certified by the manufacturer/manufacturer's representative and witnessed by Engineer.

Table 5
Compressor Demonstration Test Results

Design Point	Input kW Reading	Discharge Mass Flow (scfm)	Discharge Pressure (psig)	Ambient Temp. (degrees F)	Discharge Temp. (degrees F)	Relative Humidity (%)
2						
3						
4						
5						
6						
7						
8						

5. The Contractor will provide, calibrate, and install all temporary gauges and meters, shall make necessary tapped holes in the pipes and install all

temporary piping and wiring required for the demonstration tests. Written test procedures will be submitted to the Engineer for approval a minimum of 60 days prior to testing.

6. For any packages that do not operate properly, corrective measures shall be taken by the Manufacturer at no additional expense to the Owner.
7. Demonstration Testing shall verify that the compressors will operate across the entire range of specified pressures and flows while in remote with control from SCADA.
8. Conduct a minimum of 8-hour demonstration test on multiple scenarios where various numbers of compressors are operating. The test shall demonstrate that the compressors are able to sequence on and off as lead and lag systems as required to maintain the pressure set point received from SCADA. Demonstration testing shall verify the compressors properly operate across the entire range of specified operating flows.

C. Harmonic Distortion Tests: The manufacturer shall retain an independent harmonic testing company to conduct a harmonic distortion tests on the new operational compressor system under the installation contract as outlined below:

1. With each new compressor, as well as combinations of each compressor up to the full operating load, measure current harmonic distortion at the PCC for all harmonics up to 35th harmonic.
2. Show that the percent current harmonic distortion is below specified limits.
3. Measure total voltage distortion at the MCC with two new compressors operating at full load.
4. Measured results should approximate Engineer-approved calculations submitted by the compressor manufacturer.
5. Provide distortion analyser, current, and potential transformers required for the test set up.
6. Submit a test plan for Engineer's review and approval prior to implementing the actual test. An approved test plan is mandatory before conducting a test.
7. Provide at least 2 weeks' notice before conducting test.
8. Submit all test documentation for approval.

D. Compressors failing to meet the specifications to the satisfaction of Engineer shall be corrected and re-tested by the Equipment Manufacturer. If a packaged compressor fails the second test, the unit will be rejected and the Equipment Manufacturer shall furnish a unit which shall perform as specified.

3.03 MANUFACTURER'S SERVICES

A. Contractor will coordinate the work schedule of the manufacturer's service personnel during construction, testing, startup, and acceptance.

B. Provide services of a factory trained service engineer, specifically trained on the type of equipment specified. Submit qualifications of service engineer for approval.

C. Manufacturer's field services provided under the installation contract include followings:

1. 1 site visit of 5 person-days for installation assistance.
2. 1 site visit of 5 person-days for functional testing.
3. 1 site visit of 5 person-days for demonstration testing.
4. 1 site visit of 2 person-days for PAC Local Control Panel and instrumentation communicate with MCP prior to startup.
5. 1 site visit of 5 person-days for coordination with SCADA.
6. 1 site visit of 4 person-days for pre-training prior to startup. Training shall not commence until a detailed lesson plan for each training activity has been reviewed and accepted by Engineer.
7. 1 site visit of 8 person-days for Operation and Maintenance Training. Training shall consist of 2 shifts for Operators and 2 shifts for maintenance staff as a minimum. Training shall not commence until a detailed lesson plan for each training activity has been reviewed and accepted by Engineer.

D. See Section 01 43 34, Special Services.

3.04 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are a part of this Specification:

1. Process and Fluid Components and Electrical Power Related Component – Factory Testing Summary Checklists.
2. Process Air Compressor Facility Preliminary Drawings.

END OF SECTION

PROCESS AND FLUID COMPONENTS AND ELECTRICAL POWER RELATED COMPONENTS -- FACTORY TESTING CHECKLISTS

1. Process and Fluid Components:

No.	Component	Included in Performance Boundary		
		Included in Test	Determine by Calculation	Not Applicable
1	Inlet filter			
2	Inlet silencer			
3	Discharge silencer			
4	Inlet isolation valve			
5	Throttling valve			
6	After cooler			
7	Misc. pipe and fittings			
8	Inlet air cooler			
9	Discharge check valve			
10	Discharge isolation valve			
11	Enclosure doors or panel openings			
12	Estimated system inlet press. drop			
13	Blow-off valve			
14	Blow-off silencer			
15	Additional components not listed shall be included as forming the compressor package.			

2. Electric Power Related Components:

No.	Component	Included in Performance Boundary		
		Included in Test	Determine by Calculation	Not Applicable
1	Drive Motor			
2	Motor Cooling Fan(s)			
3	Magnetic Bearing and Controller			
4	Bearing cooling fan(s)			
5	Coolant Pumps			
6	Lubrication Pumps and Accessories			
7	Heat Exchanger Fans			
8	Package Cooling Fan			
9	VFD			
10	VFD Line Side Power Conditioning Equipment			
11	VFD Load Side Power Conditioning Equipment			
12	Eddy Current or Variable Speed Clutch			
13	Operation Control Panel(s)			
14	Power/Isolation Transformers and Power Supplies			
15	Power Conditioner			
16	Compressor and Motor Cooling			
17	VFD Cooling			
18	Electronics compartment A/C			
19	Additional components not listed shall be included as forming the compressor package.			

SHEET KEYNOTES

1. CONTRACTOR TO FIELD VERIFY TOP OF EXISTING GRATING ELEVATION AND CONSTRUCT AIR FACILITY FLOOR ELEVATION TO MATCH.

SHEET KEYNOTES

2. REMOVABLE RAILS FOR 8'-0" SECTION ONLY.
3. INSULATE PIPE IN ELECTRICAL ROOM.

AUTOMATIC TRANSFER SWITCH
480V PANELBOARD DP-55
208/120V PANELBOARD LP-55
A 55-DA-301
96'-0"
6'-8" 4'-0" 13'-4" 4'-0" 8'-0" 4'-0" 8'-0" 4'-0" 8'-0" 4'-0" 8'-0" 4'-0" 8'-0" 4'-0" 8'-0"
LOUVER, TYPICAL OF 6
BLOWER AIR FILTER, TYPICAL OF 6
ELECTRICAL ROOM
⊗ 18.38
14'-0"
39'-4"
NORTH PLENUM
⊗ 18.38
5'-4"
38'-0"
SOUTH PLENUM
⊗ 18.38
⊗ 10.75±
UP
SUBSTATION NO. 7
8" CMU WALL, TYPICAL
PASSIVE HARMONIC FILTER, TYP OF 6
38'-0"
34'-8"
FRONT
⊗ 10.75±
UP
6'- 1/2 "
4'-9"
4'-9"
4'-9"
4'-9"
4'-9"
4'-8 1/2 "
PROCESS AIR COMPRESSOR NO. 1
PROCESS AIR COMPRESSOR NO. 2
PROCESS AIR COMPRESSOR NO. 3
PROCESS AIR COMPRESSOR NO. 4
PROCESS AIR COMPRESSOR NO. 5
PROCESS AIR COMPRESSOR NO. 6
SUBSTATION NO. 7 POWER MONITORING CONTROL SYSTEM PANEL (PMCS)
36" DISCHARGE HEADER, SEE DWG 50-D-201 FOR CONTINUATION
PROCESS AIR COMPRESSOR ROOM
⊗ 18.38 1 TYP
⊗ 18.38
CONCRETE LANDING
2
3'-4"
2'-0"
8'-0"
3'-4"
19'-0"
3
AL LADDER TO ROOF
BLOWERS MASTER CONTROL PANEL (MCP)
EXPANSION JOINT
TOP OF EXISTING GRATING EL 18.38±
1
5'-4" 3'-4" 12'-0" 3'-4" 6'-0" 12'-0" 4'-0" 12'-0" 4'-0" 12'-0" 4'-0" 12'-0" 4'-0" 8'-0" 6'-0"
⊗ 18.38
1 ⊗ 18.38
UP
⊗ 17.58
INSULATED TRANSLUCENT PANEL, TYP OF 5
25'-9"
20'-0"
GRATING WALKWAY TO ACCESS VALVE
TOP OF EXST AERATION BASIN WALL EL 17.45±
A 55-DA-301
AERATION BASIN
AERATION BASIN

NOT FOR SUBMITTAL PURPOSES
REFERENCE COPY ONLY

N

FLOOR PLAN
1/4"=1'-0"

NO.	DATE	DR	REVISION	CHK	BY	APVD
DSGN	R SIEBERS	SA KORCSMAROS		APVD	DL LYNCH	

Jacobs

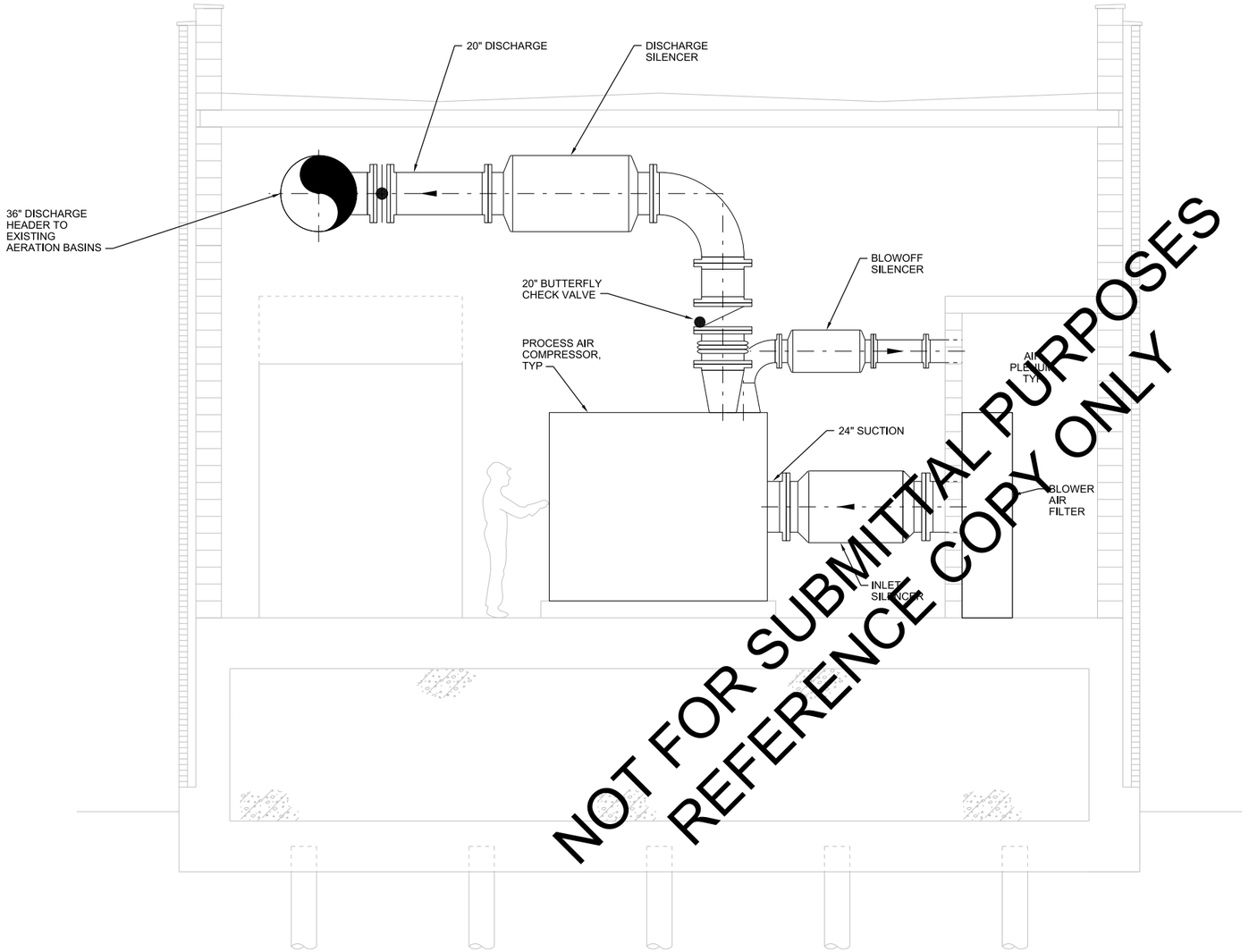
PROCESS AIR FACILITY
ARCHITECTURAL FLOOR PLAN

PROCESS AIR COMPRESSOR SYSTEM FOR LOW LEVEL NITROGEN REMOVAL at the EAST SHORE WATER POLLUTION ABATEMENT FACILITY
Greater New Haven Water Pollution Control Authority
New Haven, CT

PRELIMINARY DESIGN REPORT

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2021
PROJ	E2X90000
DWG	55-A-201
SHEET	X of X



A SECTION
3/8"=1'-0"
55-A-201

NO.	DATE	REVISION	BY	APVD
DSGN	K BAIRD	DR SA KORCSMAROS	CHK	APVD

DL LYNCH

PROCESS AIR COMPRESSOR SYSTEM
FOR LOW LEVEL NITROGEN REMOVAL
at the
EAST SHORE WATER POLLUTION
ABATEMENT FACILITY
Greater New Haven Water Pollution Control Authority
New Haven, CT

Jacobs

PROCESS AIR FACILITY

PROCESS MECHANICAL SECTION

PRELIMINARY DESIGN REPORT

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

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PROJ	E2X90000
DWG	55-D-301
SHEET	X of X