



City of Hailey

Woodside WRF Equipment Procurement - UV Disinfection

Procurement Documents Project Manual

Issued for Bid

January 13, 2022

HDR Project No. 10162649



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NOT USED

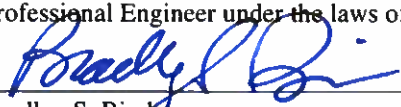


DIVISION 00

PROCUREMENT AND CONTRACTING
REQUIREMENTS



SECTION 00 01 07
SEALS AND SIGNATURES

	<p>I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of Idaho.</p> <p style="text-align: center;"> 01/13/2022</p> <p>Bradley S. Bjork HDR Engineering (208) 387-7073</p>
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SECTION 00 11 13
NOTICE OF ADVERTISEMENT FOR BIDS

Sealed bids will be received by the City Clerk of the City of Hailey (Buyer), Idaho, at Hailey City Hall, 115 Main Street South, Suite H, Hailey, Idaho 83333, on the **26th** day of **January 2022** until the hour of **2 p.m.**, local time, of said day for supply of UV disinfection equipment for the Woodside Water Reclamation Facility consisting of the following:

Furnish Goods and Special Services consisting of one (1) Open-Channel Ultraviolet Disinfection System for installation in two existing concrete channels, and all associated lamps, ballasts, level control gates, lamp cleaning systems and control panel. All system components delivered to the project site. Special Services shall include: installation certification, operations and maintenance manuals, start-up services and training of Buyers personnel. Equipment installation will be by others.

Bids will be opened at the office of the City Clerk at **2:00** o'clock **p.m.** on said date. The Project Manual, including bid forms, bidder's instructions, contract forms, specifications, and figures, is available to interested bidders at the office of the Deputy City Clerk. Electronic versions of the Project Manual in PDF format will be available at no cost.

All bids shall be presented or delivered in a sealed envelope or delivered electronically as a pdf in an attachment to an e-mail. If delivered in an envelope, address to Brian Yeager / Hailey Public Works Director, 115 Main Street South, Suite H, Hailey, ID 83333. The sealed envelope shall identify the UV Equipment Bid inside. Likewise, for electronic bidding the subject line shall identify the bid contained in the attachment. The electronic bid e-mail shall be addressed only to brian.yeager@haileycityhall.org. Mr. Yeager shall send a return acknowledgement of receiving the e-mail. The attachment will not be opened until the designated bid opening date and time.

The Project Manual may be examined at:

- Woodside WRF, 4297 Glenbrook Drive, Hailey, Idaho, 83333. steve.holyoak@haileycityhall.org
- Hailey City Hall, 115 Main Street South, Suite H, Hailey, Idaho 83333.
Nancy.arellano@haileycityhall.org.
- HDR Engineering, Inc., 412 East Parkcenter Blvd, Suite 100, Boise, ID 83706.
brad.bjerke@hdrinc.com

The successful bidder (Seller) shall be required to provide performance bond per Idaho statutes. Questions regarding this Project Manual should be submitted in writing via email to Nancy Arellano with cc to Brad Bjerke..

The right is reserved to reject any or all bids.

Dated: January 7, 2022

Mary Cone / City Clerk

Publish: **January 12, 2022**
January 19, 2022

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SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

1. Defined Terms

Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

- 1.1 Bidder - The individual or entity who submits a Bid directly to Buyer.
- 1.2 Buyer – City of Hailey, Idaho.
- 1.3 Issuing Office - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. For this project, the Issuing Office is the office of the City Clerk of the City of Hailey as listed in the Notice of Advertisement for Bids.
- 1.4 Seller – The individual or entity furnishing the Goods and Special Services.
- 1.5 Successful Bidder – The lowest responsible Bidder submitting a responsive Bid to whom Buyer makes an award (on the basis of Buyer's evaluation as herein provided).

2. Copies of the Project Manual

- 2.1 Project Manuals for a fee, if any, stated in the Notice of Advertisement for Bids shall be obtained from the Issuing Office.
- 2.2 Complete Project Manuals must be used in preparing Bids; neither Buyer nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete information.
- 2.3 Buyer and Engineer in making copies of the Project Manuals available on the above terms do so only for the purpose of obtaining Bids for the Goods and Special Services and do not confer a license or grant for any other use.

3. Qualification of Bidders

- 3.1 To demonstrate Bidder's qualifications to furnish Goods and Special Services, Bidder shall submit written evidence of Bidder's qualifications as specified in Section 46 66 56 with the bid.

4. Examination of Project Manual, Other Related Data, and Site.

- 4.1 It is the responsibility of each Bidder before submitting a Bid, to:
 - 4.1.1 Examine and carefully study the Project Manual, any Addenda, and other related data identified in the Bidding Documents.
 - 4.1.2 Understand the equipment layout to become familiar with and satisfy Bidder as to the general, local and site conditions that may affect equipment design, cost, progress, performance or furnishing of the Goods and Special Services.

- 4.1.3 Consider federal, state, and local Laws and Regulations that may affect costs, progress, performance, and furnishing of the Goods and Special Services.
 - 4.1.4 Carefully study, consider, and correlate the information known to Bidder; information commonly known to sellers of similar goods doing business in the locality of the Point of Destination and the site where the Goods will be installed or where Special Services will be provided; information and observations obtained from Bidder's visits, if any, to the Point of Destination and the site where the Goods are to be installed or Special Services are to be provided; and any reports and drawings identified in the Bidding Documents regarding the Point of Destination and the site where the Goods will be installed or where Special Services will be provided, with respect to the effect of such information, observations and documents on the cost, progress, and performance of Seller's obligations under the Contract Documents.
 - 4.1.5 Promptly notify Engineer of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Project Manual and such other related documents.
- 4.2 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon furnishing Goods and Special Services required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions (if any) thereof by Engineer are acceptable to Bidder, and that the Bidding documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing Goods and Special Services.

5. Availability of Lands for Work, etc. (NOT USED)

6. Interpretations and Addenda

- 6.1 All questions about the meaning or intent of the Project Manual are to be submitted to the Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Project Manual. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.2 Addenda may also be issued to clarify, correct, or change the Project Manual as deemed advisable by Buyer or Engineer.

7. Contract Times

The number of days within which, or the dates by which, furnishing of the Goods and Special Services is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement Between Buyer and Seller.

8. Liquidated Damages

Any provisions for liquidated damages, such as those for Seller's failure to attain a Milestone, or to deliver the Goods or furnish Special Services within the Contract Times, are set forth in the Agreement Between Buyer and Seller.

9. “Or-Equal” Items

- 9.1 The Contract, if awarded, will be on the basis of material and equipment specified or described in the Bidding documents without consideration of possible “or-equal” items. Whenever it is specified or described in the Bidding documents that an “or-equal” item of material or equipment may be furnished or used by Seller if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submittal of any such application by Seller and consideration by engineer is set forth in the General Conditions and may be supplemented in the Supplementary Conditions.
- 9.2 Bidders may propose “or equal” materials and equipment, which if approved by Engineer will be identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed “or-equal” unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each such request shall conform to the requirements of Paragraph 5.04 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. Bidders shall not rely upon approvals unless set forth in an Addendum.

10. Subcontractors, Suppliers and Others (NOT USED)

11. Preparation of Bid

- 11.1 The Procurement Bid Form is included with the Bidding Documents. Additional copies of Bidding Documents may be obtained from the City Clerk.
- 11.2 All blanks on the Procurement Bid Form shall be completed in ink and the Procurement Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Procurement Bid Form. A Bid price shall be indicated for each item listed therein. In the case of optional alternates the words “No Bid,” “No Change”, or “Not Applicable” may be entered.
- 11.3 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.
- 11.4 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- 11.5 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 11.6 A Bid by an individual shall show the Bidder’s name and official address.
- 11.7 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Procurement Bid Form. The official address of the joint venture shall be shown.
- 11.8 All names must be typed or printed in ink below the signature.
- 11.9 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Procurement Bid Form.

11.10 Each Bidder shall list the postal address, e-mail address, and telephone number for communications regarding the Bid.

11.11 The Bidder shall include adequate information on the proposed equipment supply for the bid items (bank number, module number, lamp numbers, ballast numbers, etc.). This information includes description of all modifications required to the existing concrete UV channels to accommodate the proposed equipment.

12. Submittal of Bid

A bid shall be submitted no later than the date and time prescribed, and in the manner indicated in the Notice of Advertisement for Bids.

13. Modification and Withdrawal of Bid

13.1 A Bid may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

13.2 If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with Buyer and promptly thereafter demonstrates to the reasonable satisfaction of Buyer that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid Security will be returned. Thereafter, if the Goods and Special Services are rebid, that Bidder will be disqualified from further bidding on the Goods and Special Services as described in this Project Manual.

14. Opening of Bids

Bids will be opened at the time and place indicated in the Notice of Advertisement for bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Base Bids and Alternate Bids, if any, will be made available to Bidders after the opening of Bids.

15. Bids to Remain Subject to Acceptance

All Bids will remain subject to acceptance for sixty days after the day of the Bid opening, but Buyer may, in its sole discretion, release any Bid prior to the end of this period.

16. Award of Contract

16.1 Buyer intends to award the contract to the lowest responsive, responsible Bidder(s) on the basis of the lump sum total bid price as described in Section 00 41 13 Procurement Bid Form. The Buyer may also evaluate the cost impact of required existing channel modifications to accommodate the Sellers equipment on the total project price.

16.2 If the Contract is to be awarded, Buyer will give Successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening. The form for Notice of Award for Procurement Contracts is included in the Project Manual for reference.

16.3 Buyer reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced or conditional Bids. Buyer also reserves the right to waive all informalities not involving price, time or changes in the Goods and Special Services. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

- 16.4 The Buyer reserves the right to reject any Bid if the information submitted by, or investigation of, the Bidder fails to satisfy the Buyer that such Bidder is sufficiently qualified to carry out the obligations of the Agreement and has a history of successfully furnishing similar projects with goods and special of the type contemplated herein. A Bid may be rejected for any one or more of the following, or similar, reasons:
- 16.4.1. More than one proposal on the same project from a bidder, under the same or different names.
 - 16.4.2 Evidence of collusion with any other bidder or bidders. Participants in such collusion shall be disqualified from submitting bids on any future work.
 - 16.4.3 Insufficient experience and organization to establish a proven history of responsibility for satisfactory furnishing of similar goods and special services.
 - 16.4.4 An unsatisfactory performance record which may indicate disregard for project schedules, specifications, necessary skills, quality of work, laws, regulations, or safety.
 - 16.4.5 Projects in progress, whether for the Buyer or others, which might hinder or prevent the furnishing of the goods and special services being bid.
 - 16.4.6 Failure to pay or settle bills for labor or materials on any previous contracts.
 - 16.4.7 Default in the performance of any previous written public contract, or conviction of a crime arising from a previous public contract.
 - 16.4.8 Failure to comply with the requirements of the Instructions to Bidders.

18. Contract Security and Insurance

Article 4 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Buyer's requirements as to Bonds and Insurance. When the Successful Bidder delivers the executed Agreement Between Buyer and Seller to Buyer, it must be accompanied by the required Bonds and the evidence of insurance as required.

19. Execution of Contract

- 19.1 Notice of Award for Procurement Contracts will obligate the Successful Bidder to immediately return acknowledgement of receipt of Notice of Award for Procurement Contracts and, within fifteen (15) days, execute and return the Agreement Between Buyer and Seller, furnish the required Performance Bond, and provide evidence of insurance as required.
- 19.2 If the lowest responsive, responsible Bidder fails to execute and deliver the Agreement Between Buyer and Seller and furnish the required Bonds and satisfactory evidence of insurance within fifteen (15) days after the Notice of Award, Buyer may annul the Notice of Award for Procurement Contracts and may award a contract to the next lowest responsive, responsible Bidder, or may reject all bids.
- 19.3 The Buyer, within fifteen (15) days of receipt of the Agreement Between Buyer and Seller, signed by the Seller, and acceptable forms of security as required, shall sign the Agreement Between Buyer and Seller, specify the effective date of the agreement, and return a fully executed duplicate to the Seller. Should the Buyer not execute the Agreement Between Buyer and Seller within such period, the Bidder may by written notice withdraw

its signed Agreement Between Buyer and Seller. Such notice of withdrawal shall be effective upon receipt by the Buyer.

20. Notice to Proceed

20.1 The Notice to Proceed with Special Services for Procurement Contracts shall be issued by the Buyer at any time within thirty (30) days after the Effective Date of the Agreement. The form, to be issued by the Buyer, is included in the Project Manual for reference.

20.2 The Contract Times will commence to run on the day indicated on the Notice to Proceed.

20.2 In no event will the Contract Times commence to run later than sixty (60) days after Bid Opening or thirty (30) days after the Effective Date of the Agreement Between Buyer and Seller, whichever date is earlier, without mutual agreement between the Buyer and the Seller.

21. Taxes

The Buyer is tax exempt per Idaho State Tax Commission Sales Tax Resale or Exemption Certificate ST-101 item 3 (State Government Entity) or item 5 (Pollution Control). The signed copy of said certificate shall be provided with the Agreement.

END OF SECTION

SECTION 00 41 13
PROCUREMENT BID FORM
Woodside WRF Equipment Procurement –
UV Disinfection
City of Hailey, Idaho

It is the intent of the Buyer to award a contract to the lowest responsive, responsible bidder on the basis of the lump sum total price written below.

The Bidder hereby certifies that the costs for all labor, services, equipment, tools, materials, licenses, permits, fees, and taxes (unless exempt) necessary for furnishing the Goods and Special Services according to the Project Manual are included in the price(s) for the items shown herein.

1. Bid Item Description:

This section, in general, describes the bid items included in the Bid Schedule. The description of Bid Items is provided for clarity purposes only. It is not intended to replace, supersede, or preclude any information in the plans and specifications. Unless specified otherwise, all lump sum Bid Items will be paid as a shown in the Agreement Between Buyer and Seller. Descriptions of the project Bid Items are provided below:

Bid Item No. A: Open-Channel Ultraviolet Disinfection System. This lump sum Bid Item includes all labor, equipment, materials and special services to furnish an Open-Channel Ultraviolet Disinfection System, specified in Section 46 66 56, with two banks total either installed in series or parallel treating up to 2.8 MGD (design peak hourly flow) to river discharge disinfection standards, delivery of equipment and appurtenances; delivery to the specified site at Woodside Water Reclamation Facility, performing Special Services such as necessary for installation certification, startup, testing, training, and all associated state and local taxes (as applicable), complete.

Bid Item No. B: Open-Channel Ultraviolet Disinfection System. This lump sum Bid Item includes all labor, equipment, materials and special services to furnish an Open-Channel Ultraviolet Disinfection System, specified in Section 46 66 56, with four banks installed in two channels treating 1.48 MGD (maximum day) to reuse discharge disinfection standards, delivery of equipment and appurtenances; delivery to the specified site at Woodside Water Reclamation Facility, performing Special Services such as necessary for installation certification, startup, testing, training, and all associated state and local taxes (as applicable), complete.

2. Bid Schedule:

BID ITEM NO.	DESCRIPTION	UNIT	EST QTY	UNIT PRICE	BID PRICE
A	Open-Channel Ultraviolet Disinfection System: River Disinfection Criteria	Lump Sum	1	-	\$ _____
Total Contract Bid Price for Item A					
(use words)					
BID ITEM NO.	DESCRIPTION	UNIT	EST QTY	UNIT PRICE	BID PRICE
B	Open-Channel Ultraviolet Disinfection System: Reuse Disinfection Criteria	Lump Sum	1	-	\$ _____
Total Contract Bid Price for Item A					
(use words)					

3. Lowest Responsive BIDDER:

Determination of the lowest responsive BIDDER will be primarily based on the lump sum price but may also include ancillary costs to accommodate the proposed system in the existing concrete channels.

4. Completion:

BIDDER agrees that the Goods will be furnished and Special Services will be substantially completed and ready for final payment in accordance with Paragraph 10.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement Between Buyer and Seller.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified in the Agreement Between Buyer and Seller.

Dated: _____

Name of Business: _____

Authorized Signature: _____

Name: _____

Title: _____

SECTION 00 41 13.01

BID PROPOSAL

For

**Woodside WRF Equipment Procurement – UV Disinfection
City of Hailey, Idaho**

From: _____

To: Woodside Water Reclamation Facility,
Hailey City Hall, 115 Main Street South, Suite H, Hailey, Idaho 83333

The undersigned, as Bidder, declares that we have received and examined the Project Manual for the **Woodside WRF Equipment Procurement – UV Disinfection** that we are well-qualified to supply the Goods and Special Services, that we are familiar with the Goods and Special Services, applicable federal, state, and local laws, ordinances, rules, and regulations, and conditions affecting cost, progress, or performance of the Goods and Special Services, and have made such independent investigations as Bidder deems necessary.

We acknowledge that the Project Manual provides the contract requirements, the general conditions of the contract, the technical specifications, as well as the referenced federal, state, and local laws, ordinances, rules, and regulations.

We acknowledge that addenda numbers ____ through ____ have been received and have been examined as part of the Project Manual.

We acknowledge that this price includes the following completed documents: Bid Proposal, and Procurement Bid Form.

The undersigned, as Bidder, proposes and agrees that if this bid is accepted we will contract with the City of Hailey, hereinafter referred to as Buyer, on the form of Agreement Between Buyer and Seller provided herewith to furnish the Goods and Special Services according to the Contract Documents with all terms and conditions contained therein. We agree to sign the Agreement Between Buyer and Seller without qualification and to furnish the performance and payment bonds and the required evidence of insurance within fifteen (15) calendar days after receiving written Notice to Proceed for the contract.

We further propose and agree, if our bid is accepted and a contract for furnishing the Goods and Special Services is entered into with the Buyer, to plan the furnishing and to prosecute it with such diligence that the Goods and Special Services shall be completely furnished within the time stipulated, and to accept as full payment the bid price(s) written in the following Procurement Bid Form.

We agree that this Bid Proposal constitutes an offer, which shall be binding on the undersigned for sixty (60) days from the date of this Bid Proposal.

The party by whom this proposal is submitted and by whom the contract will be entered into in case the award is made to him:

Bidder (State whether business is a Corporation, a Partnership, or an Individual)

_____, a _____

Bidder's Address:

State of Incorporation:

Corporate Address:

Bidder's Phone Number: _____

Bidder's Fax Number: _____

Bidder's E-mail Address: _____

Dated: _____ (SEAL)

Signature:

Name of Authorizing Official:

Title: _____

Attested By:

Title: _____

END OF SECTION

SECTION 00 41 13.02 BIDDER'S CHECKLIST

This Bidder's Checklist is offered to the prospective bidder as a means of checking the Bidder's Bid Proposal in order to ensure that a complete Bid is submitted, free from omissions and errors that could possibly lead to rejection of the Bid. This checklist is provided only as a convenience for Bidders and is not intended to be a detailed or complete listing of all actions and documents that may be required. Bidders are advised to carefully read all portions of the Project Manual and to comply with all requirements.

BID PROPOSAL

- _____ 1. Have questions arising from the Project Manual been submitted to the proper authority and resolved in the proper manner?
- _____ 2. Are all blank spaces filled out on Bid Proposal, including required signatures?
- _____ 3. Have all Addenda been received, factored into the bid price, and acknowledged on the Bid Proposal?

PROCUREMENT BID FORM

- _____ 4. Is bid price shown correctly including totals? Recheck for errors and omissions. Total lump sum bids must be shown in words and figures.
- _____ 5. Are all required signatures included?

BIDDER QUALIFICATION

- _____ 6. Is the written evidence of Bidder's qualifications to furnish Goods and Special Services included in the bid package?

BID PACKAGE SUBMITTAL

- _____ 7. Are all required Bid Forms ready for delivery in either electronic or hard-copy to the specified authority prior to the time for the Bid Opening?

END OF SECTION

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SECTION 00 41 13.03
SUCCESSFUL BIDDER'S CHECKLIST

Upon Notice of Award, the successful bidder will be required to submit, for approval, the following information prior to execution of the contract by the Buyer and formal Notice to Proceed.

- _____ 1. Signed Acceptance of the Notice of Award for Procurement Contracts sent by the Buyer
- _____ 2. Signed Agreement Between Buyer and Seller (original-quality form mailed to Successful Bidder by Buyer)
- _____ 3. Performance Bond (according to form included herein)
- NA_____ 4. Payment Bond (according to form included herein)
- _____ 5. Evidence of Insurances (certificates with requested cancellation clause and naming Buyer and Engineer(s) as additional insureds):
 - a. General Liability
 - b. ~~Automobile Liability~~
 - c. ~~Workman's Compensation~~

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SECTION 00 50 13
AGREEMENT BETWEEN BUYER AND SELLER

This Agreement is between the _____ (Buyer) and
_____ (Seller).

Buyer and Seller, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - GOODS AND SPECIAL SERVICES

- 1.01 Seller shall furnish to Buyer the Goods and Special Services as specified or indicated in the Contract Documents.

ARTICLE 2 - THE PROJECT

- 2.01 The Project for which the Goods and Special Services to be provided under the Contract Documents may be the whole or only a part is generally described as follows:

Woodside WRF Equipment Procurement – UV Disinfection

ARTICLE 3 - ENGINEER

- 3.01 The Contract Documents for the Goods and Special Services have been prepared by HDR Engineering, Inc., who is hereinafter called Engineer and who is to assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the furnishing of Goods and Special Services.

ARTICLE 4 - POINTS OF DESTINATION

- 4.01 The places where the Goods are to be delivered are defined in the STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS as the Points of Destination and designated as: City of Hailey Water Reclamation Facility.

ARTICLE 5 - CONTRACT TIMES

5.01 *Time of the Essence*

- A. All time limits for Milestones, the delivery of Goods and the furnishing of Special Services as stated in the Contract Documents are of the essence. The statement herein that time is of the essence shall not be construed to limit the Seller's cure rights as set forth in the Contract Documents upon default, or any other provision of the Contract Documents or under applicable law that would afford Seller a time certain or a reasonable time to perform its contractual obligations.

5.02 Dates for Goods and Special Services

- A. Special Services required by the Contract Documents will be performed pursuant to the schedule set forth:

<u>ITEM NO.</u>	<u>MILESTONE EVENT</u>	<u>CONTRACT TIMES</u>	<u>CALENDAR DAYS</u>
1	Shop Drawing Submittals		
a	Process & Instrumentation Drawings, Equipment Data/Cut Sheets, Electrical Drawings, Instrumentation and Control Wiring Diagrams (I/O), Electrical Equipment Cut Sheets.	Notice to Proceed	60
2	Review of Shop Drawing Submittals (by Engineer)	After Shop Drawing Submittal (item 1.a.)	14
3	Fabrication & Delivery of Goods	After Approval of Shop Drawings by Engineer (item 2)	180
4	Spare Parts	With Delivery of Good	
5	Installation Manuals	After Approval of Shop Drawings by Engineer (item 2)	90
6	Final O&M Manual	After Approval of Shop Drawing by Engineer (item 2)	150
7	Completion of Installation Certification	Time Period after Installation Contractor states equipment is ready for commencement of manufacturer's field services	45
8	Operator Training	Time Period after Installation Contractor states equipment is ready for commencement of manufacturer's field services	45
9	Successful Completion of Performance Demonstration Period (14 days uninterrupted operation)	Time Period after Installation Contractor states equipment is ready for commencement of manufacturer's field services	60

5.03 Liquidated Damages

- A. Buyer and Seller recognize that time is of the essence of this Agreement and that Buyer will suffer financial loss if the Goods are not delivered at the Point of Destination and ready for receipt of delivery by Buyer within the times specified for delivery of Goods and Special Services, plus any extensions thereof allowed in accordance with Article 7 of the GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS. The parties also recognize that the

timely performance of services by others involved in the Project are materially dependent upon Seller's specific compliance with the requirements for delivery of Goods and Special Services. Further, they recognize the delays, expense and difficulties involved in proving the actual loss suffered by Buyer if complete acceptable Goods are not delivered on time. Accordingly, instead of requiring such proof, Buyer and Seller agree that as liquidated damages for delay (but not as a penalty) Seller shall pay Buyer \$ 500.00 for each calendar day that expires after the time specified for delivery of each item. Liquidated damages shall also be applicable to the times specified for each item of Special Services (\$ 500.00/calendar day). The maximum total amount for liquidated damages shall be limited to ten (10) percent of the Total Contract Price in Article 6.

- B. The liquidated damages provided in this Specification Section shall be Buyer's sole and exclusive remedy for Seller's late delivery of Goods and Special Services. Seller shall have no liability to Buyer under this Article if Seller's delay causes no damages or losses to Buyer.
- B. If Seller is prevented from achieving the delivery times, milestone submittal dates or response times, as defined in Article 5.02A. and 5.02B., for any reason beyond Seller's reasonable control and not attributable to its actions or inactions, Seller shall not be assessed liquidated damages and shall be entitled to an adjustment of the Contract Times and the Contract Price in an amount equal to the duration of the reason or event causing the delay in delivery to the extent that the delay is caused by Buyer.
- D. Upon receipt of Buyer's Notification to Proceed with Fabrication of Equipment that satisfies Seller's requirements for meeting the delivery schedule, Seller shall commence fabrication of equipment. The place of delivery specified therein shall be firm and fixed, provided that Buyer may notify Seller no later than 45 days prior to the scheduled shipment date of the products of an alternate point of delivery (the "Alternate Delivery Site"). Provided the parties agree to a Variation to take into account any additional cost or delay incurred by Seller in implementing this change, the Alternate Delivery Site shall become the agreed place of delivery for all purposes under this Agreement. In such event the following conditions shall apply: (i) title and risk of loss shall pass to the Buyer upon delivery of the products to the Alternate Delivery Site; (ii) any amounts payable to the Seller upon delivery or shipment shall become payable upon delivery of the products to the Alternate Delivery Site; (iii) any additional expenses incurred by the Seller in connection with such shipment to storage shall become payable by the Buyer upon submission of the Seller's invoice(s) (including but not limited to costs of any additional transportation, preparation for and placement into storage, handling, inspection, preservation, insurance, storage, removal charges and any applicable taxes); (iv) transportation of the products from the storage facility to their place of installation shall be the Buyer's responsibility; and, (v) if the Contract includes Services, subject to the terms and conditions in the Contract the Seller shall resume provision of Services to Buyer when instructed to do so by Buyer provided that all amounts due hereunder plus any cost incurred by Seller in delaying such Services have been paid.

ARTICLE 6 - CONTRACT PRICE

6.01 Buyer shall pay Seller for furnishing the Goods and Special Services in accordance with the Contract Documents in current funds pursuant to the schedule below:

<u>MILESTONE EVENT</u>	<u>PERCENT PAYMENT</u> <u>AT EACH EVENT</u>	<u>PRICE</u>
Notice to Proceed	10	\$
Approval of Shop Drawing Submittals	20	
Delivery of Installation Manuals	5	\$
Delivery of Goods	50	\$
Final O&M Manual	5	\$
Satisfactory Install Certification/Performance	10	
Testing/Operator Training		\$
Total Price	100	\$

ARTICLE 7 - PAYMENT PROCEDURES

7.01 Submittal and Processing of Payments

- A. Seller shall submit Applications for Payment to Buyer in accordance with the Contract Documents. Applications for Payment will be processed by Engineer as provided in the Contract Documents.

7.02 Progress Payments

- A. Buyer shall make payments on account of the Contract Price on the basis of Seller's Applications for Payment as recommended by Engineer for items listed in Article 6.

7.03 Final Payment

- A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 10.06 of the GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS, Buyer shall make final payment thirty (30) days after acceptance by the City Council.

ARTICLE 8 - INTEREST

All moneys not paid when due hereunder shall bear interest at the maximum statutory rate allowed by law at the place of BUYER'S project in accordance with State of Idaho.

ARTICLE 9 - SELLER'S REPRESENTATIONS

9.01 In order to induce Buyer to enter into this Agreement, Seller makes the following representations:

- A. Seller has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. If specified or if, in Seller's judgment, any local condition may affect cost, progress or the furnishing of the Goods and Special Services, Seller has visited the Point of Destination and become familiar with and is satisfied as to the local conditions that may affect cost, progress or the furnishing of the Goods and Special Services.

- C. Seller is familiar with and is satisfied as to all local federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of the Goods and Special Services.
- D. Seller has carefully studied and correlated the information known to Seller, and information and observations obtained from Seller's visits, if any, to the Point of Destination, with the Contract Documents.
- E. Seller has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Seller has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Seller.
- F. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing Goods and Special Services.
- G. Seller's relationship to the Buyer in performance of this Agreement is that of an Independent Contractor. The personnel performing services under this Agreement shall at all times be under the Seller's exclusive direction and control and not employees of the Buyer. Seller shall pay all wages, salaries and other amounts due to its employees in connection with this agreement and shall be responsible for all applicable state, federal, and local reports and obligations respecting them such as labor wages, social security, income tax withholding, unemployment compensation and similar matters.

ARTICLE 10 - CONTRACT DOCUMENTS

10.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement for Procurement Contracts.
 - 2. Performance Bond for Procurement Contracts.
 - 3. Payment Bond for Procurement Contracts.
 - 4. General Conditions for Procurement Contracts.
 - 5. Supplementary Conditions for Procurement Contracts.
 - 6. Specifications as listed in table of contents.
 - 7. Drawings as listed in table of contents.
 - 8. Addenda (Numbers _____ to _____, inclusive).
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. Documentation submitted by Seller prior to Notice of Award;
 - 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed.
 - b. Written Amendment(s).

- c. Change Order(s).
 - d. Field Order(s).
 - e. Engineer's Written Interpretation(s).
- B. The documents listed in Paragraph 10.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 10.
- D. The Contract Documents may only be amended, or supplemented as provided in Paragraph 3.04 of the GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS.

ARTICLE 11 - MISCELLANEOUS

11.01 Defined Terms

- A. Terms used in this Agreement will have the meanings indicated in the GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS and the SUPPLEMENTARY CONDITIONS FOR PROCUREMENT CONTRACTS.

11.02 Successors and Assigns

- A. Buyer and Seller each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

11.03 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Buyer and Seller. The Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

11.04 Limitations of Liability

- A. Notwithstanding any other provisions of the Contract Documents, the Supplier's total liability for direct, indirect, incidental, special, punitive or other damages arising at any time under any of the Contract Documents or otherwise in connection with completing the Contract (whether arising under breach of contract, tort, strict liability, or any other theory of law) shall not exceed the amount of the Contract Price.

11.05 Performance and Payment Bond

- A. For the faithful performance of this Agreement Between Buyer and Seller in accordance with the Contract Documents and payment for all labor and materials as specified in Section 00 41 13 – Procurement Bid Form, the Seller shall execute good and sufficient performance bond and payment bond each in the amount of one hundred percent (100%) of the total amount of the price stated, said bonds to be executed by a surety company authorized to do business in the State of Idaho.

11.06 Sales Tax

- A. The Buyer will provide to the Seller a copy of Idaho State Tax Commission Sales Tax Resale or Exemption Certificate (ST-101) for the Seller's records. The Equipment is Sales Tax Exempt by both item 3. Exempt Buyer (Federal/Idaho Government Entity) and item 5. Other Exempt Goods and Buyers (Pollution Control items). If the State of Idaho determines the equipment is not Tax Exempt, Buyer will reimburse Seller by Change Order for the Sales Tax paid to the State (actual paid amount only, receipt required).

IN WITNESS WHEREOF, Buyer and Seller have signed this Agreement in duplicate. One counterpart each has been delivered to Buyer and Seller. All portions of the Contract Documents have been signed or identified by Buyer and Seller or on their behalf.

_____.

Buyer: _____ Seller: _____

By: _____ By: _____

Title _____ Attest: _____

Executed on ____/____, 2017 Address for giving notice:

ATTEST BY: _____

Title _____

APPROVED AS TO FORM: _____

_____ Agent for service of process:

(If Seller is a corporation or a partnership, attach evidence of authority to sign.)

END OF SECTION

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SECTION 00 51 16
NOTICE OF AWARD FOR PROCUREMENT CONTRACTS
For
Woodside WRF Equipment Procurement – UV Disinfection
For
City of Hailey, Idaho

Dated:

TO:

(Successful BIDDER - SELLER)

ADDRESS:

CONTRACT FOR: **Woodside WRF Equipment Procurement – UV Disinfection**
 City of Hailey, Idaho

You are notified that the Contract Time under the above contract will commence to run on as of the date of the Notice of Proceed for Procurement Contracts. By that date, you are to start performing your obligations under the Contract Documents.

Within fifteen (15) days of this Notice of Award for Procurement Contracts, you must deliver to the Buyer:

- Certificates of insurance are required to be purchased and maintained in accordance with the Contract Documents.
- Signed Copy of the Agreement Between Buyer and Seller.
- Bonds are required to be purchased and maintained in accordance with the Contract Documents.
- All applicable licenses required by the contract documents.

City of Hailey, Idaho
(Buyer)

By: _____
(Buyer's Authorized Signatory)

(printed name and title)

(Use Certified Mail,
Return Receipt Requested)

END OF SECTION

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SECTION 00 55 19

NOTICE TO PROCEED WITH FABRICATION FOR PROCUREMENT CONTRACTS

Dated _____, 20__

TO: _____
(SELLER)

ADDRESS: _____

PROJECT NO.: _____

CONTRACT FOR: **Woodside WRF Equipment Procurement - UV Disinfection**

You are notified to proceed with Fabrication of Equipment that satisfies Seller's requirements for meeting the delivery schedule listed in the Agreement. Seller shall commence fabrication of equipment so as to meet these dates. The place of delivery and conditions shall be as specified in the Agreement. You are to continue performing your obligations under the Contract Documents.

Buyer

By: _____
(Authorized Signatory of Buyer)

END OF SECTION

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SECTION 00 61 13
PERFORMANCE BOND

Any singular reference to Seller, Surety, Buyer, or other party shall be considered plural where applicable.

SELLER (Name and Address):

SURETY (Name and Address of Principal
Place of Business):

BUYER:

Woodside Water Reclamation Facility
115 Main Street South
Suite H
Hailey, Idaho 83333

CONTRACT

Date:
Amount:
Description (Name and Location):

BOND

Date (Not earlier than Contract Date):
Bond Number:
Amount:
Modifications to this Bond Form:

Surety and Seller, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

Seller as Principal

Company: (Corp. Seal)

Signature:
Name and Title:

Surety

Company: (Corp. Seal)

Signature:
Name and Title:
(Attach Power of Attorney)
Address:

Telephone Number:

(Space is provided below for signatures of additional parties, if required.)

Seller as Principal

Company: (Corp. Seal)

Signature:
Name and Title:

Surety

Company: (Corp. Seal)

Signature:
Name and Title:
Address:
Telephone Number:

1. Seller and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Buyer for the performance of the Contract, which is incorporated herein by reference. For purposes of this bond, Buyer means Buyer's assigns, if and when Buyer has assigned the Contract.
2. If Seller performs the Contract, Surety and Seller have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.
3. If there is no Buyer Default, Surety's obligation under this Bond shall arise after:
 - 3.1. Buyer has notified Seller and Surety pursuant to Paragraph 10 that Buyer is considering declaring a Seller Default and has requested and attempted to arrange a conference with Seller and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. (If Buyer, Seller, and Surety agree, Seller shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Buyer's right, if any, subsequently to declare a Seller Default); and
 - 3.2. Buyer has declared a Seller Default and formally terminated Seller's right to complete the Contract. Such Seller Default shall not be declared earlier than 20 days after Seller and Surety have received notice as provided in Paragraph 3.1; and
 - 3.3. Buyer has agreed to pay the Balance of the Contract Price to:
 - a. Surety in accordance with the terms of the Contract;
 - b. Another seller selected pursuant to Paragraph 4.3 to perform the Contract.
4. When Buyer has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
 - 4.1. Arrange for Seller, with consent of Buyer, to perform and complete the Contract; or
 - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified sellers acceptable to Buyer for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Buyer and a seller selected with Buyer's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to Buyer the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Buyer resulting from Seller Default; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new seller, and with reasonable promptness under the circumstances, either:
 - a. determine the amount for which it may be liable to Buyer and, as soon as practicable after the amount is determined, tender payment therefor to Buyer; or
 - b. deny liability in whole or in part and notify Buyer citing reasons therefor.
5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Buyer to Surety demanding that Surety perform its obligations under this Bond, and Buyer shall be entitled to enforce any remedy available to Buyer. If Surety proceeds as provided in paragraph 4.4, and Buyer refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Buyer shall be entitled to enforce any remedy available to Buyer.

6. After Buyer has terminated Seller's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3, then the responsibilities of Surety to Buyer shall not be greater than those of Seller under the Contract, and the responsibilities of Buyer to Surety shall not be greater than those of Buyer under the Contract. To a limit of the amount of this Bond, but subject to commitment by Buyer of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
 - 6.1. The responsibilities of Seller for correction or replacement of defective Goods and Special Services and completion of the Contract;
 - 6.2. Additional legal, design professional, and delay costs resulting from Seller's Default, and resulting from the actions of or failure to act of Surety under Paragraph 4; and
 - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Seller.
7. Surety shall not be liable to Buyer or others for obligations of Seller that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Buyer or its heirs, executors, administrators, successors, or assigns.
8. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location of the Point of Destination and shall be instituted within two years after Seller Default or within two years after Seller ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to Surety, Buyer or Seller shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Point of Destination, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
 - 12.1. *Balance of the Contract Price:* The total amount payable by Buyer to Seller under the Contract after all proper adjustments have been made, including allowance to Seller of any amounts received or to be received by Buyer in settlement of insurance or other Claims for damages to which Seller is entitled, reduced by all valid and proper payments made to or on behalf of Seller under the Contract.
 - 12.2. *Contract:* The agreement between Buyer and Seller identified on the signature page, including all Contract Documents and changes thereto.
 - 12.3. *Seller Default:* Failure of Seller, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
 - 12.4. *Buyer Default:* Failure of Buyer, which has neither been remedied nor waived, to pay Seller as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF SECTION

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS

Prepared by



and

Issued and Published Jointly by



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These Standard General Conditions for Procurement Contracts have been prepared for use with the Suggested Instructions to Bidders for Procurement Contracts (EJCDC P-200, 2010 Edition), the Agreement Between Buyer and Seller for Procurement Contracts (EJCDC P-520, 2010 Edition), and the Guide to Preparation of Supplementary Conditions for Procurement Contracts (EJCDC P-800, 2010 Edition). Their provisions are interrelated and a change in one may necessitate a change in the others. Additional information concerning the use of the EJCDC Procurement Documents may be found in the Commentary on Procurement Documents (EJCDC P-001, 2010 Edition).

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
<http://www.nspe.org>

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
<http://www.acec.org>

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
<http://www.asce.org>

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
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STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Whenever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to the singular or plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument signed by both Buyer and Seller covering the Goods and Special Services and which lists the Contract Documents in existence on the Effective Date of the Agreement.
 3. *Application for Payment*—The form acceptable to Buyer which is used by Seller in requesting progress and final payments and which is accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*— The offer or proposal of a Seller submitted on the prescribed form setting forth the prices for the Goods and Special Services to be provided.
 5. *Bidder*—The individual or entity that submits a Bid directly to Buyer.
 6. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and Bid Form with any supplements.
 8. *Buyer*—The individual or entity purchasing the Goods and Special Services.
 9. *Change Order*—A document which is signed by Seller and Buyer and authorizes an addition, deletion, or revision to the Contract Documents or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement. Change Orders may be the result of mutual agreement by Buyer and Seller, or of resolution of a Claim.

10. *Claim*—A demand or assertion by Buyer or Seller seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
11. *Contract*—The entire and integrated written agreement between Buyer and Seller concerning the Goods and Special Services. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
12. *Contract Documents*—Those items so designated in the Agreement. Shop Drawings and other Seller submittals are not Contract Documents, even if accepted, reviewed, or approved by Engineer or Buyer.
13. *Contract Price*—The moneys payable by Buyer to Seller for furnishing the Goods and Special Services in accordance with the Contract Documents as stated in the Agreement.
14. *Contract Times*—The times stated in the Agreement by which the Goods must be delivered and Special Services must be furnished.
15. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Goods and Special Services to be furnished by Seller. Shop Drawings and other Seller submittals are not Drawings as so defined.
16. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
17. *Engineer*—The individual or entity designated as such in the Agreement.
18. *Field Order*—A written order issued by Engineer which requires minor changes in the Goods or Special Services but which does not involve a change in the Contract Price or Contract Times.
19. *General Requirements*—Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
20. *Goods*—The tangible and movable personal property that is described in the Contract Documents, regardless of whether the property is to be later attached to realty.
21. *Goods and Special Services*—The full scope of materials, equipment, other items, and services to be furnished by Seller, including Goods, as defined herein, and Special Services, if any, as defined herein. This term refers to both the Goods and the Special Services, or to either the Goods or the Special Services, and to any portion of the Goods or the Special Services, as the context requires.

22. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
23. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to the Contract Times.
24. *Notice of Award*—The written notice by Buyer to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Buyer will sign and deliver the Agreement.
25. *Notice to Proceed*—A written notice given by Buyer to Seller fixing the date on which the Contract Times commence to run and on which Seller shall start to perform under the Contract.
26. *Point of Destination*—The specific address of the location where delivery of the Goods shall be made, as stated in the Agreement.
27. *Project*—The total undertaking of which the Goods and Special Services may be the whole, or only a part.
28. *Project Manual*—The documentary information prepared for bidding and furnishing the Goods and Special Services. A listing of the contents of the Project Manual is contained in its table of contents.
29. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Goods and Special Services and which establish the standards by which such portion of the Goods and Special Services will be judged.
30. *Seller*—The individual or entity furnishing the Goods and Special Services.
31. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Seller and submitted by Seller to illustrate some portion of the Goods and Special Services.
32. *Special Services*—Services associated with the Goods to be furnished by Seller as required by the Contract Documents.
33. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the furnishing of the Goods and Special Services, and certain administrative requirements and procedural matters applicable thereto.
34. *Successful Bidder*—The Bidder submitting a responsive Bid, to whom Buyer makes an award.

35. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
36. *Work Change Directive*—A written statement to Seller issued on or after the Effective Date of the Agreement and signed by Buyer ordering an addition, deletion, or other revision in the Contract Documents with respect to the Goods and Special Services. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B and 1.02.C are not defined, but have the indicated meanings when used in the Bidding Requirements or Contract Documents.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Goods and Special Services. It is intended that such exercise of professional judgment, action, or determination will be commercially reasonable and will be solely to evaluate, in general, the Goods and Special Services for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing of Goods or Special Services or any duty or authority to undertake responsibility contrary to any other provision of the Contract Documents.
2. The word “non-conforming” when modifying the words “Goods and Special Services,” “Goods,” or “Special Services,” refers to Goods and Special Services that fail to conform to the Contract Documents.
3. The word “receipt” when referring to the Goods, shall mean the physical taking and possession by the Buyer under the conditions specified in Paragraph 8.01.B.3.
4. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
5. The word “furnish,” when used in connection with the Goods and Special Services shall mean to supply and deliver said Goods to the Point of Destination (or some other

specified location) and to perform said Special Services fully, all in accordance with the Contract Documents.

- C. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds*

- A. When Seller delivers the executed counterparts of the Agreement to Buyer, Seller also shall deliver such bonds as Seller may be required to furnish.

2.02 *Evidence of Insurance*

- A. When Seller delivers the executed counterparts of the Agreement to Buyer, Seller shall deliver to Buyer, with copies to each additional insured identified by name in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Seller is required to purchase and maintain in accordance with Article 4.

2.03 *Copies of Documents*

- A. Buyer shall furnish Seller up to five printed or hard copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.04 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.05 *Designated Representatives*

- A. Buyer and Seller shall each designate its representative at the time the Agreement is signed. Each representative shall have full authority to act on behalf of and make binding decisions in any matter arising out of or relating to the Contract.

2.06 *Progress Schedule*

- A. Within 15 days after the Contract Times start to run, Seller shall submit to Buyer and Engineer an acceptable progress schedule of activities, including at a minimum, Shop Drawing and Sample submittals, tests, and deliveries as required by the Contract Documents. No progress payment will be made to Seller until an acceptable schedule is submitted to Buyer and Engineer.

- B. The progress schedule will be acceptable to Buyer and Engineer if it provides an orderly progression of the submittals, tests, and deliveries to completion within the specified Milestones and the Contract Times. Such acceptance will not impose on Buyer or Engineer responsibility for the progress schedule, for sequencing, scheduling, or progress of the work nor interfere with or relieve Seller from Seller's full responsibility therefor. Such acceptance shall not be deemed to acknowledge the reasonableness and attainability of the schedule.

2.07 *Preliminary Conference*

- A. Within 20 days after the Contract Times start to run, a conference attended by Seller, Buyer, Engineer and others as appropriate will be held to establish a working understanding among the parties as to the Goods and Special Services and to discuss the schedule referred to in Paragraph 2.06.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.08 *Safety*

- A. Buyer and Seller shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss. When Seller's personnel, or the personnel of any subcontractor to Seller, are present at the Point of Destination or any work area or site controlled by Buyer, the Seller shall be responsible for the compliance by such personnel with any applicable requirements of Buyer's safety programs that are made known to Seller.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT AND AMENDING

3.01 *Intent*

- A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- B. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce or furnish the indicated Goods and Special Services will be provided, whether or not specifically called for, at no additional cost to Buyer.
- C. Clarifications and interpretations of, or notifications of minor variations and deviations in, the Contract Documents, will be issued by Engineer as provided in Article 9.

3.02 *Standards, Specifications, Codes, Laws and Regulations*

- A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws and Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws and Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

- B. No provision of any such standard, specification, manual or code, or any instruction of a supplier shall be effective to change the duties or responsibilities of Buyer or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to Buyer or Engineer, or any of their consultants, agents, or employees any duty or authority to supervise or direct the performance of Seller's obligations or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Seller's Review of Contract Documents Before the Performance of the Contract:* Before performance of the Contract, Seller shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Seller shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Seller discovers or has actual knowledge of and shall obtain a written interpretation or clarification from Engineer before proceeding with the furnishing of any Goods and Special Services affected thereby.
2. *Seller's Review of Contract Documents During the Performance of the Contract:* If, during the performance of the Contract, Seller discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Contract, any standard, specification, manual or code, or of any instruction of any Supplier, Seller shall promptly report it to Engineer in writing. Seller shall not proceed with the furnishing of the Goods and Special Services affected thereby until an amendment to or clarification of the Contract Documents has been issued.
3. Seller shall not be liable to Buyer or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Seller had actual knowledge thereof.

- B. *Resolving Discrepancies:* Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

1. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
2. the provisions of any Laws or Regulations applicable to the furnishing of the Goods and Special Services (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Clarifying Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions to the Goods and Special Services or to modify contractual terms and conditions by a Change Order.
- B. Buyer may issue a Work Change Directive providing for additions, deletions, or revisions to the Goods and Special Services, in which case (1) the Contract Price shall be equitably adjusted to account for any reasonable and necessary credits to Buyer for any such deletion, or for costs (including reasonable overhead and profit) incurred by Seller to accommodate such an addition or revision and (2) the Contract Times shall be equitably adjusted to account for any impact on progress and completion of performance. Such adjustments subsequently shall be duly set forth in a Change Order.
- C. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Goods and Special Services may be authorized, by one or more of the following ways:
 - 1. A Field Order;
 - 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 5.06.D.3); or
 - 3. Engineer's written interpretation or clarification.

ARTICLE 4 - BONDS AND INSURANCE

4.01 *Bonds*

- A. Seller shall furnish to Buyer performance and payment bonds, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Seller's obligations under the Contract Documents. These bonds shall remain in effect until 1) one year after the date when final payment becomes due or 2) completion of the correction period specified in Paragraph 8.03, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Seller shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Seller is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases

to meet the requirements of Paragraph 4.01.B, Seller shall promptly notify Buyer and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 4.01.B and 4.02.

4.02 *Insurance*

- A. Seller shall provide insurance of the types and coverages and in the amounts stipulated in the Supplementary Conditions.
- B. Failure of Buyer to demand certificates of insurance or other evidence of Seller's full compliance with these insurance requirements or failure of Buyer to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Seller's obligation to maintain such insurance.
- C. Upon assignment of this Contract, Seller shall comply with the written request of assignee to provide certificates of insurance to assignee.
- D. Buyer does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Seller.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Seller's liability under the indemnities granted to Buyer in the Contract Documents.

4.03 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Buyer or Seller shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

ARTICLE 5 - SELLER'S RESPONSIBILITIES

5.01 *Supervision and Superintendence*

- A. Seller shall supervise, inspect, and direct the furnishing of the Goods and Special Services competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform its obligations in accordance with the Contract Documents. Seller shall be solely responsible for the means, methods, techniques, sequences, and procedures necessary to perform its obligations in accordance with the Contract Documents. Seller shall not be responsible for the negligence of Buyer or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure that is shown or indicated in and expressly required by the Contract Documents.

5.02 *Labor, Materials and Equipment*

- A. Seller shall provide competent, qualified and trained personnel in all aspects of its performance of the Contract.

- B. All Goods, and all equipment and material incorporated into the Goods, shall be as specified, and unless specified otherwise in the Contract Documents, shall be:
1. new, and of good quality;
 2. protected, assembled, connected, cleaned, and conditioned in accordance with the original manufacturer's instructions; and
 3. shop assembled to the greatest extent practicable.

5.03 *Laws and Regulations*

- A. Seller shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of its obligations in accordance with the Contract Documents. Except where otherwise expressly required by such Laws and Regulations, neither Buyer nor Engineer shall be responsible for monitoring Seller's compliance with any Laws or Regulations.
- B. If Seller furnishes Goods and Special Services knowing or having reason to know that such furnishing is contrary to Laws or Regulations, Seller shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such performance. It shall not be Seller's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this provision shall not relieve Seller of Seller's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance shall be the subject of an adjustment in Contract Price or Contract Times. If Buyer and Seller are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 9.06.

5.04 *Or Equals*

- A. Whenever the Goods, or an item of material or equipment to be incorporated into the Goods, are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier or manufacturer, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item is permitted, other items of material or equipment or material or equipment of other suppliers or manufacturers may be submitted to Buyer for Engineer's review.
1. If in Engineer's sole discretion, such an item of material or equipment proposed by Seller is functionally equal to that named and sufficiently similar so that no change in related work will be required, it may be considered by Engineer as an "or-equal" item.
 2. For the purposes of this paragraph, a proposed item of material or equipment may be considered functionally equal to an item so named only if:

- a. in the exercise of reasonable judgment, Engineer determines that: 1) it is at least equal in quality, durability, appearance, strength, and design characteristics; 2) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; 3) it has an acceptable record of performance and availability of responsive service; and
 - b. Seller certifies that if approved: 1) there will be no increase in any cost, including capital, installation or operating costs, to Buyer; and 2) the proposed item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraph 5.04.A. Engineer will be the sole judge of whether to accept or reject such a proposal or submittal. No "or-equal" will be ordered, manufactured or utilized until Engineer's review is complete, which will be evidenced by an approved Shop Drawing. Engineer will advise Buyer and Seller in writing of any negative determination. Notwithstanding Engineer's approval of an "or-equal" item, Seller shall remain obligated to comply with the requirements of the Contract Documents.
- C. *Special Guarantee:* Buyer may require Seller to furnish at Seller's expense a special performance guarantee or other surety with respect to any such proposed "or-equal."
- D. *Data:* Seller shall provide all data in support of any such proposed "or-equal" at Seller's expense.

5.05 Taxes

- A. Seller shall be responsible for all taxes and duties arising out of the sale of the Goods and the furnishing of Special Services. All taxes are included in the Contract Price, except as noted in the Supplementary Conditions.

5.06 Shop Drawings and Samples

- A. Seller shall submit Shop Drawings and Samples to Buyer for Engineer's review and approval in accordance with the schedule required in Paragraph 2.06.A. All submittals will be identified as required and furnished in the number of copies specified in the Contract Documents. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Seller proposes to provide.
- B. Where a Shop Drawing or Sample is required by the Contract Documents, any related work performed prior to Engineer's approval of the pertinent submittal will be at the sole expense and responsibility of Seller.

C. Submittal Procedures:

1. Before submitting each Shop Drawing or Sample, Seller shall have determined and verified:
 - a. all field measurements (if required), quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto; and
 - b. that all materials are suitable with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the furnishing of Goods and Special Services.
2. Seller shall also have reviewed and coordinated each Shop Drawing or Sample with the Contract Documents.
3. Each submittal shall bear a stamp or include a written certification from Seller that Seller has reviewed the subject submittal and confirmed that it is in compliance with the requirements of the Contract Documents. Both Buyer and Engineer shall be entitled to rely on such certification from Seller.
4. With each submittal, Seller shall give Buyer and Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both in a written communication separate from the submittal and by specific notation on each Shop Drawing or Sample.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples.
2. Engineer's review and approval will be only to determine if the Goods and Special Services covered by the submittals will, after installation or incorporation in the Project, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole.
3. Engineer's review and approval shall not relieve Seller from responsibility for any variation from the requirements of the Contract Documents unless Seller has complied with the requirements of Paragraph 5.06.C.4 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Seller from responsibility for complying with the requirements of Paragraph 5.06.C.1.

E. Resubmittal Procedures:

1. Seller shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Seller shall direct specific attention in writing to any revisions other than the corrections called for by Engineer on previous submittals.

5.07 *Continuing Performance*

- A. Seller shall adhere to the progress schedule established in accordance with Paragraph 2.06.A., and the Goods shall be delivered and the Special Services furnished within the Contract Times specified in the Agreement.
- B. Seller shall carry on furnishing of the Goods and Special Services and adhere to the progress schedule during all disputes or disagreements with Buyer. No furnishing of Goods and Special Services shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraphs 11.03 or 11.04, or as Buyer and Seller may otherwise agree in writing.

5.08 *Seller's Warranties and Guarantees*

- A. Seller warrants and guarantees to Buyer that the title to the Goods conveyed shall be proper, its transfer rightful, and free from any security interest, lien, or other encumbrance. Seller shall defend, indemnify, and hold Buyer harmless against any liens, claims, or demands contesting or affecting title of the Goods conveyed.
- B. Seller warrants and guarantees to Buyer that all Goods and Special Services will conform with the Contract Documents, and with the standards established by any Samples approved by Engineer. Engineer shall be entitled to rely on Seller's warranty and guarantee. If the Contract Documents do not otherwise specify the characteristics or the quality of the Goods, the Goods shall comply with the requirements of Paragraph 5.02.B.
- C. Seller's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, improper modification, improper maintenance, or improper operation by persons other than Seller; or
 - 2. corrosion or chemical attack, unless corrosive or chemically-damaging conditions were disclosed by Buyer in the Contract Documents and the Contract Documents required the Goods to withstand such conditions;
 - 3. use in a manner contrary to Seller's written instructions for installation, operation, and maintenance; or
 - 4. normal wear and tear under normal usage.
- D. Seller's obligation to furnish the Goods and Special Services in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Goods and Special Services that are non-conforming, or a release of Seller's obligation to furnish the Goods and Special Services in accordance with the Contract Documents:
 - 1. observations by Buyer or Engineer;
 - 2. recommendation by Engineer or payment by Buyer of any progress or final payment;

3. use of the Goods by Buyer;
 4. any acceptance by Buyer (subject to the provisions of Paragraph 8.02.D.1) or any failure to do so;
 5. the issuance of a notice of acceptance by Buyer pursuant to the provisions of Article 8;
 6. any inspection, test or approval by others; or
 7. any correction of non-conforming Goods and Special Services by Buyer.
- E. Buyer shall promptly notify Seller of any breach of Seller's warranties or guarantees.
- F. Seller makes no implied warranties under this Contract.

5.09 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Seller shall indemnify and hold harmless Buyer and Engineer, and the officers, directors, members, partners, employees, agents, consultants, contractors, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of Seller's obligations under the Contract Documents, provided that any such claim, cost, loss, or damages attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Goods themselves), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Seller, or any individual or entity directly or indirectly employed by Seller or anyone for whose acts Seller may be liable.
- B. In any and all claims against Buyer or Engineer or any of their respective assignees, consultants, agents, officers, directors, members, partners, employees, agents, consultants, contractors, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Seller, any subcontractor, any supplier, or any individual or entity directly or indirectly employed by any of them to furnish any of the Goods and Special Services, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 5.09.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for seller or any such subcontractor, supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Seller under Paragraph 5.09.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, and consultants arising out of:
1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

5.10 *Delegation of Professional Design Services*

- A. Seller will not be required to provide professional design services unless such services are specifically required by the Contract Documents or unless such services are required to carry out Seller's responsibilities for furnishing the Goods and Special Services. Seller shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to the Goods and Special Services are specifically required of Seller by the Contract Documents, Buyer and Engineer will specify all performance and design criteria that such services must satisfy. Seller shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Goods and Special Services designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Buyer and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Buyer and Engineer have specified to Seller all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 5.10, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 5.06.D.2.
- E. Seller shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 6 - SHIPPING AND DELIVERY

6.01 *Shipping*

- A. Seller shall select the carrier and bear all costs of packaging, transportation, insurance, special handling and any other costs associated with shipment and delivery.

6.02 *Delivery*

- A. Seller shall deliver the Goods F.O.B. the Point of Destination in accordance with the Contract Times set forth in the Agreement, or other date agreed to by Buyer and Seller.
- B. Seller shall provide written notice to Buyer at least 10 days before shipment of the manner of shipment and the anticipated delivery date. The notice shall also include any instructions concerning special equipment or services required at the Point of Destination to unload and care

for the Goods. Seller shall also require the carrier to give Buyer at least 24 hours notice by telephone prior to the anticipated time of delivery.

- C. Buyer will be responsible and bear all costs for unloading the Goods from carrier.
- D. Buyer will assure that adequate facilities are available to receive delivery of the Goods during the Contract Times for delivery set forth in the Agreement, or another date agreed by Buyer and Seller.
- E. No partial deliveries shall be allowed, unless permitted or required by the Contract Documents or agreed to in writing by Buyer.

6.03 *Risk of Loss*

- A. Risk of loss and insurable interests transfer from Seller to Buyer upon Buyer's receipt of the Goods.
- B. Notwithstanding the provisions of Paragraph 6.03.A, if Buyer rejects the Goods as non-conforming, the risk of loss on such Goods shall remain with Seller until Seller corrects the non-conformity or Buyer accepts the Goods. If rejected Goods remain at the Point of Destination pending modification and acceptance, then Seller shall be responsible for arranging adequate protection and maintenance of the Goods at Seller's expense.

6.04 *Progress Schedule*

- A. Seller shall adhere to the progress schedule established in accordance with Paragraph 2.06 as it may be adjusted from time to time as provided below.
 - 1. Seller shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.06) proposed adjustments in the progress schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the progress schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 7. Adjustments in Contract Times may only be made by a Change Order.

ARTICLE 7 - CHANGES: SCHEDULE AND DELAY

7.01 *Changes in the Goods and Special Services*

- A. Buyer may at any time, without notice to any surety, make an addition, deletion, or other revision to the Contract Documents with respect to the Goods and Services, within the general scope of the Contract, by a Change Order or Work Change Directive. Upon receipt of any such document, Seller shall promptly proceed with performance pursuant to the revised Contract Documents (except as otherwise specifically provided).
- B. If Seller concludes that a Work Change Directive issued by Buyer affects the Contract Price or Contract Times, then Seller shall notify Buyer within 15 days after Seller has received the Work

Change Directive, and submit written supporting data to Buyer within 45 days after such receipt. If Seller fails to notify Buyer within 15 days, Seller waives any Claim for such adjustment. If Buyer and Seller are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 9.06.

- C. Seller shall not suspend performance while Buyer and Seller are in the process of making such changes and any related adjustments to Contract Price or Contract Times.

7.02 *Changing Contract Price or Contract Times*

- A. The Contract Price or Contract Times may only be changed by a Change Order.
- B. Any Claim for an adjustment in the Contract Price or Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 9.06.
- C. If Seller is prevented from delivering the Goods or performing the Special Services within the Contract Times for any unforeseen reason beyond its control and not attributable to its actions or inactions, then Seller shall be entitled to an adjustment of the Contract Times to the extent attributable to such reason. Such reasons include but are not limited to acts or neglect by Buyer, inspection delays, fires, floods, epidemics, abnormal weather conditions, acts of God, and other like matters. If such an event occurs and delays Seller's performance, Seller shall notify Buyer in writing within 15 days of knowing or having reason to know of the beginning of the event causing the delay, stating the reason therefor.
- D. Seller shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Seller. Delays attributable to and within the control of Seller's subcontractors or suppliers shall be deemed to be delays within the control of Seller.
- E. If Seller is prevented from delivering the Goods or furnishing the Special Services within the Contract Times due to the actions or inactions of Buyer, Seller shall be entitled to any reasonable and necessary additional costs arising out of such delay to the extent directly attributable to Buyer.
- F. Neither Buyer nor Seller shall be entitled to any damages arising from delays which are beyond the control of both Buyer and Seller, including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, and other like matters.

ARTICLE 8 - BUYER'S RIGHTS

8.01 *Inspections and Testing*

A. General:

1. The Contract Documents specify required inspections and tests. Buyer shall have the right to perform, or cause to be performed, reasonable inspections and require reasonable

tests of the Goods at Seller's facility, and at the Point of Destination. Seller shall allow Buyer a reasonable time to perform such inspections or tests.

2. Seller shall reimburse Buyer for all expenses, except for travel, lodging, and subsistence expenses of Buyer's and Engineer's representatives, for inspections and tests specified in the Contract Documents. If as the result of any such specified testing the Goods are determined to be non-conforming, then Seller shall also bear the travel, lodging, and subsistence expenses of Buyer's and Engineer's representatives, and all expenses of re-inspection or retesting.
3. Buyer shall bear all expenses of inspections and tests that are not specified in the Contract Documents (other than any re-inspection or retesting resulting from a determination of non-conformity, as set forth in Paragraph 8.01.A.2 immediately above); provided, however, that if as the result of any such non-specified inspections or testing the Goods are determined to be non-conforming, then Seller shall bear all expenses of such inspections and testing, and of any necessary re-inspection and retesting.
4. Seller shall provide Buyer timely written notice of the readiness of the Goods for all inspections, tests, or approvals which the Contract Documents specify are to be observed by Buyer prior to shipment.
5. Buyer will give Seller timely notice of all specified tests, inspections, and approvals of the Goods which are to be conducted at the Point of Destination.
6. If, on the basis of any inspections or testing, the Goods appear to be conforming, Buyer will give Seller prompt notice thereof. If on the basis of said inspections or testing, the Goods appear to be non-conforming, Buyer will give Seller prompt notice thereof and will advise Seller of the remedy Buyer elects under the provisions of Paragraph 8.02.
7. Neither payments made by Buyer to Seller prior to any tests or inspections, nor any tests or inspections shall constitute acceptance of non-conforming Goods, or prejudice Buyer's rights under the Contract.

B. Inspection on Delivery:

1. Buyer or Engineer will visually inspect the Goods upon delivery solely for purposes of identifying the Goods and general verification of quantities and observation of apparent condition in order to provide a basis for a progress payment. Such visual inspection will not be construed as final or as receipt of any Goods and Special Services that, as a result of subsequent inspections and tests, are determined to be non-conforming.
2. Within ten days of such visual inspection, Buyer shall provide Seller with written notice of Buyer's determination regarding conformity of the Goods. In the event Buyer does not provide such notice, it will be presumed that the Goods appear to be conforming and that Buyer has acknowledged their receipt upon delivery.
3. If, on the basis of the visual inspection specified in Paragraph 8.01.B.1, the Goods appear to be conforming, Buyer's notice thereof to Seller will acknowledge receipt of the Goods.

C. Final Inspection:

1. After all of the Goods have been incorporated into the Project, tested in accordance with such testing requirements as are specified, and are functioning as indicated, Buyer or Engineer will make a final inspection.
2. If, on the basis of the final inspection, the Goods are conforming, Buyer's notice thereof will constitute Buyer's acceptance of the Goods.
3. If, on the basis of the final inspection, the Goods are non-conforming, Buyer will identify the non-conformity in writing.

8.02 *Non-Conforming Goods and Special Services*

- A. If, on the basis of inspections and testing prior to delivery, the Goods and Special Services are found to be non-conforming, or if at any time after Buyer has acknowledged receipt of delivery and before the expiration of the correction period described in Paragraph 8.03, Buyer determines that the Goods and Special Services are non-conforming, then Seller shall promptly, without cost to Buyer and in response to written instructions from Buyer, either correct such non-conforming Goods and Special Services, or, if Goods are rejected by Buyer, remove and replace the non-conforming Goods with conforming Goods, including all work required for reinstallation.

B. Buyer's Rejection of Non-Conforming Goods:

1. If Buyer elects to reject the Goods in whole or in part, Buyer's notice to Seller will describe in sufficient detail the non-conforming aspect of the Goods. If Goods have been delivered to Buyer, Seller shall promptly, and within the Contract Times, remove and replace the rejected Goods.
2. Seller shall bear all costs, losses and damages attributable to the removal and replacement of the non-conforming Goods as provided in Paragraph 8.02.E.
3. Upon rejection of the Goods, Buyer retains a security interest in the Goods to the extent of any payments made and expenses incurred in their testing and inspection.

C. Remedying Non-Conforming Goods and Special Services:

1. If Buyer elects to permit the Seller to modify the Goods to correct the non-conformance, then Seller shall promptly provide a schedule for such modifications and shall make the Goods conforming within a reasonable time.
2. If Buyer notifies Seller in writing that any of the Special Services are non-conforming, Seller shall promptly provide conforming services acceptable to Buyer. If Seller fails to do so, Buyer may delete the Special Services and reduce the Contract Price a commensurate amount.

D. Buyer's Acceptance of Non-Conforming Goods:

Instead of requiring correction or removal and replacement of non-conforming Goods discovered either before or after final payment, Buyer may accept the non-conforming Goods. Seller shall bear all reasonable costs, losses, and damages attributable to Buyer's evaluation of and determination to accept such non-conforming Goods as provided in Paragraph 8.02.E.

- E. Seller shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, retesting and for any engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs arising out of or relating to the non-conforming Goods and Special Services. Seller's obligations shall include the costs of the correction or removal and replacement of the non-conforming Goods and the replacement of property of Buyer and others destroyed by the correction or removal and replacement of the non-conforming Goods, and obtaining conforming Special Services from others.

F. *Buyer's Rejection of Conforming Goods:*

If Buyer asserts that Goods and Special Services are non-conforming and such Goods and Special Services are determined to be conforming, or if Buyer rejects as non-conforming Goods and Special Services that are later determined to be conforming, then Seller shall be entitled to reimbursement from Buyer of costs incurred by Seller in inspecting, testing, correcting, removing, or replacing the conforming Goods and Special Services, including but not limited to fees and charges of engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs associated with the incorrect assertion of non-conformance or rejection of conforming Goods and Special Services.

8.03 *Correction Period*

- A. Seller's responsibility for correcting all non-conformities in the Goods and Special Services will extend for a period of one year after the earlier of the date on which Buyer has placed the Goods in continuous service or the date of final payment, or for such longer period of time as may be prescribed by Laws or Regulations or by the terms of any specific provisions of the Contract Documents.

ARTICLE 9 - ROLE OF ENGINEER

9.01 *Duties and Responsibilities*

- A. The duties and responsibilities and the limitations of authority of Engineer are set forth in the Contract Documents.

9.02 *Clarifications and Interpretations*

- A. Engineer will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents as Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Such written

clarifications and interpretations will be binding on Buyer and Seller. If either Buyer or Seller believes that a written clarification or interpretation justifies an adjustment in the Contract Price or Contract Times, either may make a Claim therefor.

9.03 Authorized Variations

- A. Engineer may authorize minor deviations or variations in the Contract Documents by: 1) written approval of specific variations set forth in Shop Drawings when Seller has duly noted such variations as required in Paragraph 5.06.C.4, or 2) a Field Order.

9.04 Rejecting Non-Conforming Goods and Special Services

- A. Engineer will have the authority to disapprove or reject Goods and Special Services that Engineer believes to be non-conforming. Engineer will also have authority to require special inspection or testing of the Goods or Special Services as provided in Paragraph 8.01 whether or not the Goods are fabricated or installed, or the Special Services are completed.

9.05 Decisions on Requirements of Contract Documents

- A. Engineer will be the initial interpreter of the Contract Documents and judge of the acceptability of the Goods and Special Services. Claims, disputes and other matters relating to the acceptability of the Goods and Special Services or the interpretation of the requirements of the Contract Documents pertaining to Seller's performance will be referred initially to Engineer in writing with a request for a formal decision in accordance with this paragraph.
- B. When functioning as interpreter and judge under this Paragraph 9.05, Engineer will not show partiality to Buyer or Seller and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by Engineer pursuant to this Paragraph 9.05 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 10.07) will be a condition precedent to any exercise by Buyer or Seller of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.06 Claims and Disputes

- A. *Notice:* Written notice of each Claim relating to the acceptability of the Goods and Special Services or the interpretation of the requirements of the Contract Documents pertaining to either party's performance shall be delivered by the claimant to Engineer and the other party to the Agreement within 15 days after the occurrence of the event giving rise thereto, and written supporting data shall be submitted to Engineer and the other party within 45 days after such occurrence unless Engineer allows an additional period of time to ascertain more accurate data.
- B. *Engineer's Decision:* Engineer will review each such Claim and render a decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

- C. If Engineer does not render a formal written decision on a Claim within the time stated in Paragraph 9.06.B., Engineer shall be deemed to have issued a decision denying the Claim in its entirety 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.
- D. Engineer's written decision on such Claim or a decision denying the Claim in its entirety that is deemed to have been issued pursuant to Paragraph 9.06.C, will be final and binding upon Buyer and Seller 30 days after it is issued unless within 30 days of issuance Buyer or Seller appeals Engineer's decision by initiating the mediation of such Claim in accordance with the dispute resolution procedures set forth in Article 13.
- E. If Article 13 has been amended to delete the mediation requirement, then Buyer or Seller may appeal Engineer's decision within 30 days of issuance by following the alternative dispute resolution process set forth in Article 13, as amended; or if no such alternative dispute resolution process has been set forth, Buyer or Seller may appeal Engineer's decision by 1) delivering to the other party within 30 days of the date of such decision a written notice of intent to submit the Claim to a court of competent jurisdiction, and 2) within 60 days after the date of such decision instituting a formal proceeding in a court of competent jurisdiction.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 9.06.
- G. The parties agree to endeavor to avoid or resolve Claims through direct, good faith discussions and negotiations whenever practicable. Such discussions and negotiations should at the outset address whether the parties mutually agree to suspend the time periods established in this Paragraph 9.06; if so, a written record of such mutual agreement should be made and jointly executed.

ARTICLE 10 - PAYMENT

10.01 *Applications for Progress Payments*

- A. Seller shall submit to Buyer for Engineer's review Applications for Payment filled out and signed by Seller and accompanied by such supporting documentation as is required by the Contract Documents and also as Buyer or Engineer may reasonably require. The timing and amounts of progress payments shall be as stipulated in the Agreement.
 - 1. The first application for Payment will be submitted after review and approval by Engineer of all Shop Drawings and of all Samples required by the Contract Documents.
 - 2. The second Application for Payment will be submitted after receipt of the Goods has been acknowledged in accordance with Paragraph 8.01.B and will be accompanied by a bill of sale, invoice, or other documentation reasonably satisfactory to Buyer warranting that Buyer has rightfully received good title to the Goods from Seller and that, upon payment, the Goods will be free and clear of all liens. Such documentation will include releases and waivers from all parties with viable lien rights. In the case of multiple deliveries of Goods, additional Applications for Payment accompanied by the required

documentation will be submitted as Buyer acknowledges receipt of additional items of the Goods.

10.02 *Review of Applications for Progress Payments*

- A. Engineer will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Buyer, or return the Application to Seller indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Seller may make the necessary corrections and resubmit the Application.
1. Engineer's recommendation of payment requested in the first Application for Payment will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data, that the Shop Drawings and Samples have been reviewed and approved as required by the Contract Documents and Seller is entitled to payment of the amount recommended.
 2. Engineer's recommendation of payment requested in the Application for Payment submitted upon Buyer's acknowledgment of receipt of the Goods will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data Seller is entitled to payment of the amount recommended. Such recommendation will not constitute a representation that Engineer has made a final inspection of the Goods, that the Goods are free from non-conformities, acceptable or in conformance with the Contract Documents, that Engineer has made any investigation as to Buyer's title to the Goods, that exhaustive or continuous inspections have been made to check the quality or the quantity of the Goods beyond the responsibilities specifically assigned to Engineer in the Contract Documents or that there may not be other matters or issues between the parties that might entitle Seller to additional payments by Buyer or Buyer to withhold payment to Seller.
 3. Engineer may refuse to recommend that all or any part of a progress payment be made, or Engineer may nullify all or any part of any payment previously recommended if, in Engineer's opinion, such recommendation would be incorrect or if on the basis of subsequently discovered evidence or subsequent inspections or tests Engineer considers such refusal or nullification necessary to protect Buyer from loss because the Contract Price has been reduced, Goods are found to be non-conforming, or Seller has failed to furnish acceptable Special Services.

10.03 *Amount and Timing of Progress Payments*

- A. Subject to Paragraph 10.02.A., the amounts of the progress payments will be as provided in the Agreement. Buyer shall within 30 days after receipt of each Application for Payment with Engineer's recommendation pay Seller the amount recommended; but, in the case of the Application for Payment upon Buyer's acknowledgment of receipt of the Goods, said 30-day period may be extended for so long as is necessary (but in no event more than 60 days) for Buyer to examine the bill of sale and other documentation submitted therewith. Buyer shall notify Seller promptly of any deficiency in the documentation and shall not unreasonably withhold payment.

10.04 *Suspension of or Reduction in Payment*

- A. Buyer may suspend or reduce the amount of progress payments, even though recommended for payment by Engineer, under the following circumstances:
 - 1. Buyer has reasonable grounds to conclude that Seller will not furnish the Goods or the Special Services in accordance with the Contract Documents, and
 - 2. Buyer has requested in writing assurances from Seller that the Goods and Special Services will be delivered or furnished in accordance with the Contract Documents, and Seller has failed to provide adequate assurances within ten days of Buyer's written request.
- B. If Buyer refuses to make payment of the full amount recommended by Engineer, Buyer will provide Seller and Engineer immediate written notice stating the reason for such action and promptly pay Seller any amount remaining after deduction of the amount withheld. Buyer shall promptly pay Seller the amount withheld when Seller corrects the reason for such action to Buyer's satisfaction.

10.05 *Final Application for Payment*

- A. After Seller has corrected all non-conformities to the reasonable satisfaction of Buyer and Engineer, furnished all Special Services, and delivered all documents required by the Contract Documents, Engineer will issue to Buyer and Seller a notice of acceptance. Seller may then make application for final payment following the procedure for progress payments. The final Application for Payment will be accompanied by all documentation called for in the Contract Documents, a list of all unsettled Claims, and such other data and information as Buyer or Engineer may reasonably require.

10.06 *Final Payment*

- A. If, on the basis of final inspection and the review of the final Application for Payment and accompanying documentation, Engineer is reasonably satisfied that Seller has furnished the Goods and Special Services in accordance with the Contract Documents, and that Seller's has fulfilled all other obligations under the Contract Documents, then Engineer will, within ten days after receipt of the final Application for Payment, recommend in writing final payment subject to the provisions of Paragraph 10.07 and present the Application to Buyer. Otherwise, Engineer will return the Application to Seller, indicating the reasons for refusing to recommend final payment, in which case Seller shall make the necessary corrections and resubmit the Application for payment. If the Application and accompanying documentation are appropriate as to form and substance, Buyer shall, within 30 days after receipt thereof, pay Seller the amount recommended by Engineer, less any sum Buyer is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages to which Buyer is entitled.

10.07 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Buyer against Seller, except Claims arising from unsettled liens from non-conformities in the Goods or Special Services appearing after final payment, from Seller's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Seller's continuing obligations under the Contract Documents; and
2. a waiver of all Claims by Seller against Buyer (other than those previously made in accordance with the requirements herein and listed by Seller as unsettled as required in Paragraph 10.05.A, and not resolved in writing).

ARTICLE 11 - CANCELLATION, SUSPENSION, AND TERMINATION

11.01 *Cancellation*

A. Buyer has the right to cancel the Contract, without cause, at any time prior to delivery of the Goods by written notice. Cancellation pursuant to the terms of this paragraph shall not constitute a breach of contract by Buyer. Upon cancellation:

1. Buyer shall pay Seller for the direct costs incurred in producing any Goods that Seller has specially manufactured for the Project, plus a fair and reasonable amount for overhead and profit.
2. For Goods that are not specially manufactured for the Project, Seller shall be entitled to a restocking charge of 10 percent of the unpaid Contract Price of such Goods.

11.02 *Suspension of Performance by Buyer*

A. Buyer has the right to suspend performance of the Contract for up to a maximum of ninety days, without cause, by written notice. Upon suspension under this paragraph, Seller shall be entitled to an increase in the Contract Times and Contract Price caused by the suspension, provided that performance would not have been suspended or delayed for causes attributable to Seller.

11.03 *Suspension of Performance by Seller*

A. Subject to the provisions of Paragraph 5.07.B, Seller may suspend the furnishing of the Goods and Special Services only under the following circumstance:

1. Seller has reasonable grounds to conclude that Buyer will not perform its future payment obligations under the Contract; and,
2. Seller has requested in writing assurances from Buyer that future payments will be made in accordance with the Contract, and Buyer has failed to provide such assurances within ten days of Seller's written request.

11.04 *Breach and Termination*

A. Buyer's Breach:

1. Buyer shall be deemed in breach of the Contract if it fails to comply with any material provision of the Contract Documents, including but not limited to:
 - a. wrongful rejection or revocation of Buyer's acceptance of the Goods,
 - b. failure to make payments in accordance with the Contract Documents, or
 - c. wrongful repudiation of the Contract.
2. Seller shall have the right to terminate the Contract for cause by declaring a breach should Buyer fail to comply with any material provisions of the Contract. Upon termination, Seller shall be entitled to all remedies provided by Laws and Regulations.
 - a. In the event Seller believes Buyer is in breach of its obligations under the Contract, Seller shall provide Buyer with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach has occurred. Buyer shall have seven days from receipt of the written notice declaring the breach (or such longer period of time as Seller may grant in writing) within which to cure or to proceed diligently to cure such alleged breach.

B. Seller's Breach:

1. Seller shall be deemed in breach of the Contract if it fails to comply with any material provision of the Contract Documents, including, but not limited to:
 - a. failure to deliver the Goods or perform the Special Services in accordance with the Contract Documents,
 - b. wrongful repudiation of the Contract, or
 - c. delivery or furnishing of non-conforming Goods and Special Services.
2. Buyer may terminate Seller's right to perform the Contract for cause by declaring a breach should Seller fail to comply with any material provision of the Contract Documents. Upon termination, Buyer shall be entitled to all remedies provided by Laws and Regulations.
 - a. In the event Buyer believes Seller is in breach of its obligations under the Contract, and except as provided in Paragraph 11.04.B.2.b, Buyer shall provide Seller with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach has occurred. Seller shall have seven days from receipt of the written notice declaring the breach (or such longer period of time as Buyer may grant in writing) within which to cure or to proceed diligently to cure such alleged breach.

- b. If and to the extent that Seller has provided a performance bond under the provisions of Paragraph 4.01, the notice and cure procedures of that bond, if any, shall supersede the notice and cure procedures of Paragraph 11.04.B.2.a.

ARTICLE 12 - LICENSES AND FEES

12.01 *Intellectual Property and License Fees*

- A. Unless specifically stated elsewhere in the Contract Documents, Seller is not transferring any intellectual property rights, patent rights, or licenses for the Goods delivered. However, in the event the Seller is manufacturing to Buyer's design, Buyer retains all intellectual property rights in such design.
- B. Seller shall pay all license fees and royalties and assume all costs incident to the use or the furnishing of the Goods, unless specified otherwise by the Contract Documents.

12.02 *Seller's Infringement*

- A. Subject to Paragraph 12.01.A, Seller shall indemnify and hold harmless Buyer, Engineer and their officers, directors, members, partners, employees, agents, consultants, contractors, and subcontractors from and against all claims, costs, losses, damages, and judgments (including but not limited to all reasonable fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement or alleged infringement of any United States or foreign patent or copyright by any of the Goods as delivered hereunder.
- B. In the event of suit or threat of suit for intellectual property infringement, Buyer will promptly notify Seller of receiving notice thereof.
- C. Seller shall promptly defend the claim or suit, including negotiating a settlement. Seller shall have control over such claim or suit, provided that Seller agrees to bear all expenses and to satisfy any adverse judgment thereof.
 - 1. If Seller fails to defend such suit or claim after written notice by Buyer, Seller will be bound in any subsequent suit or claim against Seller by Buyer by any factual determination in the prior suit or claim.
 - 2. If Buyer fails to provide Seller the opportunity to defend such suit or claim after written notice by Seller, Buyer shall be barred from any remedy against Seller for such suit or claim.
- D. If a determination is made that Seller has infringed upon intellectual property rights of another, Seller may obtain the necessary licenses for Buyer's benefit, or replace the Goods and provide related design and construction as necessary to avoid the infringement at Seller's own expense.

12.03 *Buyer's Infringement*

- A. Buyer shall indemnify and hold harmless Seller, and its officers, directors, partners, employees, agents, consultants, contractors, and subcontractors from and against all claims, costs, losses, damages, and judgments (including but not limited to all reasonable fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement or alleged infringement of any United States or foreign patent or copyright caused by Seller's compliance with Buyer's design of the Goods or Buyer's use of the Goods in combination with other materials or equipment in any process (unless intent of such use was known to Seller and Seller had reason to know such infringement would result).
- B. In the event of suit or threat of suit for intellectual property infringement, Seller must after receiving notice thereof promptly notify Buyer.
- C. Upon written notice from Seller, Buyer shall be given the opportunity to defend the claim or suit, including negotiating a settlement. Buyer shall have control over such claim or suit, provided that Buyer agrees to bear all expenses and to satisfy any adverse judgment thereof.
 - 1. If Buyer fails to defend such suit or claim after written notice by Seller, Buyer will be bound in any subsequent suit or claim against Buyer by Seller by any factual determination in the prior suit or claim.
 - 2. If Seller fails to provide Buyer the opportunity to defend such suit or claim after written notice by Buyer, Seller shall be barred from any remedy against Buyer for such suit or claim.

12.04 *Reuse of Documents*

- A. Neither Seller nor any other person furnishing any of the Goods and Special Services under a direct or indirect contract with Seller shall: (1) acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions; or (2) reuse any of such Drawings, Specifications, other documents, or copies thereof on any other project without written consent of Buyer and Engineer and specific written verification or adaptation by Engineer. This prohibition will survive termination or completion of the Contract. Nothing herein shall preclude Seller from retaining copies of the Contract Documents for record purposes.

12.05 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, copies of data furnished by Buyer or Engineer to Seller, or by Seller to Buyer or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. The transferring party will correct any errors detected within the 60-day acceptance period.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 13 - DISPUTE RESOLUTION

13.01 *Dispute Resolution Method*

- A. Either Buyer or Seller may initiate the mediation of any Claim decided in writing by Engineer under Paragraph 9.06.B or 9.06.C before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the Engineer's decision from becoming final and binding.
- B. Buyer and Seller shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the mediation process does not result in resolution of the Claim, then Engineer's written decision under Paragraph 9.06.B or a denial pursuant to Paragraph 9.06.C shall become final and binding 30 days after termination of the mediation unless, within that time period, Buyer or Seller:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process, or
 - 3. if no dispute resolution process has been provided for in the Supplementary Conditions, delivers to the other party written notice of the intent to submit the Claim to a court of competent jurisdiction, and within 60 days of the termination of the mediation institutes such formal proceeding.

ARTICLE 14 - MISCELLANEOUS

14.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if: 1) delivered in person to the individual or to a member

of the firm or to an officer of the corporation for whom it is intended, or 2) if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

14.02 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Point of Destination is located.
- B. In the case of any conflict between the express terms of this Contract and the Uniform Commercial Code, as adopted in the state whose law governs, it is the intent of the parties that the express terms of this Contract shall apply.

14.03 *Computation of Time*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

14.04 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

14.05 *Survival of Obligations*

- A. All representations, indemnifications, warranties and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Goods and Special Services and termination or completion of the Agreement.

14.06 *Entire Agreement*

- A. Buyer and Seller agree that this Agreement is the complete and final agreement between them, and supersedes all prior negotiations, representations, or agreements, either written or oral. This Agreement may not be altered, modified, or amended except in writing signed by an authorized representative of both parties.

SECTION 00 73 09
SUPPLEMENTARY CONDITIONS TO EJCDC STANDARD GENERAL CONDITIONS FOR
PROCUREMENT CONTRACTS, P-700 (2010) EDITION

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

These Supplementary Conditions amend and supplement Section 00 73 09 - Standard General Conditions for Procurement Contracts (General Conditions), and other provisions of the Procurement Documents as indicated below. All provisions of the General Conditions that are amended or supplemented remain in full force and effect as so amended or supplemented. All provisions which are not so amended or supplemented remain in full force and effect.

Defined Terms

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meaning assigned to them in the General Conditions.

Amendments and Supplements

The following are instructions that amend or supplement specific paragraphs in the General Conditions and other Contract Documents.

1.1 SC-1.01A.

Delete paragraph 1.01.A in its entirety (excluding terms numbered below the paragraph) and insert the following in its place:

“A. Whenever used in these General Conditions or in other Contract Documents, the terms listed below have the meanings indicated which are applicable to both the singular and plural thereof. Said terms are generally capitalized or written in italics, but not always. When used in a context consistent with the definition of a listed-defined term, the term shall have a meaning as defined below whether capitalized or italicized or otherwise.”

1.2 SC-1.01A.5.

At the end of paragraph 1.01.A.5., add the following sentences:

“The term Bidder shall mean an original equipment manufacturer. The terms Bidder, Seller, and Proposer shall be used interchangeably.”

1.3 SC-1.01A.7.

Delete paragraph 1.01A.7. in its entirety and insert the following in its place:

“7. *Bidding Requirements* -- The Advertisement or Invitation to Bid, Instructions to Bidders, Price Proposal and Price Schedule with any supplements, as identified in the Procurement Bid Form.”

1.4 SC-1.01A.8.

Delete the definition of Buyer and insert the following:

“Woodside Water Reclamation Facility,
115 Main Street South
Suite H
Hailey, Idaho 83333”

The terms Buyer and Owner shall be used interchangeably.”

1.5 SC-1.01.A.9.

At the end of paragraph 1.01.A.9., add the following sentence:

“A sample Change Order Form is attached.”

1.6 SC-1.01.A.17.

Delete the definition of Engineer and insert information naming:

“HDR Engineering, Inc.
412 East Parkcenter Blvd, Suite 100
Boise, ID 83706-6659
(208) 387-7000”

1.7 SC-1.01.A.18.

At the end of paragraph 1.01.A.18., add the following sentence:

“A sample Field Order Form is attached.”

1.8 SC-1.01.A.30.

At the end of paragraph 1.01.A.30., add the following sentence:

“The term Seller shall mean an original equipment manufacturer.”

1.9 SC-1.01.A.36.

At the end of paragraph 1.01.A.36., add the following sentence:

“A sample Work Change Directive Form is attached.”

1.10 SC-1.01.A.37.

Add a new paragraph 1.01.A.37. immediately after paragraph 1.01.A.36., which is to read as follows:

“37. Request for Information—A written request for information, requiring a written response, to Buyer, Engineer, or Seller, initiated by Buyer, Engineer, or Seller. A sample Request for Information Form is attached.”

1.11 SC-1.01.A.38.

Add a new paragraph 1.01.A.38. immediately after paragraph 1.01.A.37., which is to read as follows:

“38. Contractor or Buyer’s Installation Contractor: The person, firm or corporation with whom the Buyer will enter into a Contract for the general construction of and the installation of the Seller’s equipment.”

1.12 SC-1.01.A.39.

Add a new paragraph 1.01.A.39. immediately after paragraph 1.01.A.38., which is to read as follows:

“3.9. Substantial Completion: The time at which the Work progresses to the point where, in the opinion of the Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Work can be safely and conveniently utilized for the purpose for which it is intended. The Work will be considered Substantially Complete after successful completion of the performance demonstration period.”

ARTICLE 2 – PRELIMINARY MATTERS

1.13 SC-2.04.A.

Replace Paragraph 2.04.A. in its entirety with the following:

“A. The Contract Times will commence to run on the day indicated in the Notice to Proceed for Procurement Contract.”

1.14 SC-2.04.B.

Add new paragraph 2.04.B. which reads as follows:

“B. Within fifteen (15) calendar days after the Seller receives Notice of Award, the Seller to whom the award is made, shall execute and return the Agreement Between Buyer and Seller in the required number of copies, shall furnish the required Performance and Payment bonds, and shall provide certificates of insurance (and other evidence of insurance which the Buyer and any additional insured may reasonably request) with copies to each additional insured identified in the Supplementary Conditions regarding insurance which Seller is required to purchase and maintain in accordance with paragraph 4.03.”

1.15 SC-2.07.

Delete paragraph 2.07 in its entirety.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT AND AMENDING

1.16 SC-3.01.

Add three new paragraphs after paragraph 3.01.C. which are to read as follows:

- "D. The Specifications may vary in form, format and style. Some specification sections are written in varying degrees of streamlined or declarative style and some sections may be relatively narrative by comparison. Omissions of such words and phrases as "the Seller shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined specification sections. Omitted words and phrases shall be supplied by inference. Similar types of provisions may appear in various parts of a specification section or articles within a part depending on the format of the specification section. The Seller shall not take advantage of any variation of form, format or style in making claims for extra Work.
- E. The cross referencing of specification sections under the subparagraph heading "Related Specification Sections include but are not necessarily limited to:" and elsewhere within each specification section is provided as an aid and convenience to the Seller. The Seller shall not rely on the cross referencing provided as a complete listing of all specification sections that may impact the Work of a particular specification section. The Seller shall be responsible to coordinate the entire Work under the Procurement Documents and provide a complete Project whether or not the cross referencing is provided in each specification section or whether or not the cross referencing is complete or correct.
- F. It is the intent of the Procurement Documents that the equipment be compatible and coordinated to produce a fully integrated and operational system. It is the responsibility of the Seller furnishing any one item of equipment, or all equipment included in the Procurement Documents, to assure complete compatibility and coordination of the equipment they are furnishing.”

SC-3.04.C.3.

Add a new paragraph after Paragraph 3.04.C.3. which reads:

“RFI form attached to this specification section is the proper instrument to be used for Engineer’s written interpretations or clarifications to the contract documents.”

ARTICLE 4 – BONDS AND INSURANCE

1.17 SC-4.01.A

Replace Paragraph 4.0.1.A. in its entirety with the following:

- “A. Seller shall furnish performance bond, each in an amount equal to the Contract Price, to Buyer. The bonds shall be delivered in accordance with Paragraph 2.01. and shall remain in effect one year after the date final payment is due to Seller, except as provided otherwise by Laws or Regulations.”

1.18 SC-4.02.

Replace Paragraph 4.02. in its entirety with the following:

“4.02. Insurance

- A. Seller shall provide insurance of the types and coverages and in the amounts stipulated in the SUPPLEMENTARY CONDITIONS FOR PROCUREMENT CONTRACTS in Appendix A, Insurance Specifications for Seller.
- B. Seller agrees to extend its existing general liability insurance coverage to Buyer and Engineer, but only in respect of work performed by or on behalf of Seller, and only to the extent that the Additional Insured is held liable for the negligence or other culpability of Seller. Coverage under Sellers’ policy does not extend to liability arising out of the Additional Insured’s own negligence.”

ARTICLE 5 – SELLERS RESPONSIBILITIES

1.19 SC-5.05.

Add a new paragraph immediately after Paragraph 5.05.A:

- “B. Buyer is exempt from payment of sales and compensating use taxes of the State of Idaho and of cities and counties thereof on all materials and equipment to be considered as tangible personal property in wastewater treatment plants.”

1. Buyer will furnish the required certificates of tax exemption to Seller with respect to materials and equipment to be considered as tangible personal property in wastewater treatment plants.
2. Buyer's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Seller, or to supplies or materials not considered as tangible personal property in wastewater treatment plants.
3. The Contract Price does not include the cost of sales or compensating use taxes to the extent such are exempted by this paragraph.
4. Seller is encouraged to contact the Idaho State Tax Commission at (800) 972-7660 regarding public works taxes exemptions.

1.20 SC-5.06.A.

Modify Paragraph 5.06.A. to read:

Replace wording "review and approval" in all Paragraphs of 5.06.A. of the GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS with "review for compliance."

Add new paragraphs after Paragraph 5.06.A. which read:

- "1. Shop Drawings submitted as herein provided by Seller and reviewed by Engineer for conformance with the design concepts shall be executed in conformity with the Contract Documents unless otherwise required by Buyer.

2. When Shop Drawings are submitted of the purpose of showing the installation in greater detail, their review shall not excuse Seller from requirements included in the Contract Documents."

1.21 SC-5.06.C.

Add new paragraphs after Paragraph 5.06.C.4. which read:

- "5. Seller shall submit all Shop Drawings and Samples sufficiently in advance of Fabrication requirements to allow ample time for checking, correcting, resubmitting and rechecking and to avoid any delay in progress of the Work. The Engineer shall strive to respond within 30 days.
6. See Specification Section 01 33 00 – SUBMITTALS.
7. Shop Drawings and Sample submittals not conforming to requirements of this Paragraph 5.06. and Specification Section 01 33 00 – SUBMITTALS will be returned to Seller without action for resubmittal and the resulting delay shall be entirely the responsibility of Seller."

1.22 SC-5.06.D.

Add new paragraphs after Paragraph 5.06.D.3. which read:

- "4. Engineer's check and review of Shop Drawings and Samples, Standard Specifications and descriptive literature submitted by Seller will be only for general conformance with design concept, except as otherwise provided, and shall not be construed as:
 - a. permitting any departure from the Contract Requirements;
 - b. relieving Seller of the responsibility for any error in details dimensions or otherwise that may exist in such submittals;
 - c. constituting a blanket approval of dimensions, quantities, or details of the material or equipment shown; or
 - d. approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Seller of the full responsibility of meeting all of the requirements of the Contract Document."

1.23 SC-5.06.E.

Add a new paragraph after Paragraph 5.06.E.1. which reads:

- "2. Engineer will review an initial shop drawing submittal and one resubmittal for any particular item requiring a shop drawing. Items requiring more than two reviews the additional review time will be at the sole expense of the Seller. Engineer will log his time and expenses which will be used by the Buyer to calculate the cost of a deductive change order for the additional review time. Buyer will deduct these costs from the amounts due Seller on the next application for payment."

1.24 SC-5.07.B.

Replace Paragraph 5.07.B. in its entirety with the following:

- "B. Seller shall carry on the work and adhere to the progress schedule during all disputes or disagreements with Buyer with the exception of disputes over payments approved by Engineer that remain overdue."

1.25 SC- 5.08.B.

Replace Paragraph 5.08.B. in its entirety with the following:

- "B. Any claim for breach of these warranties must be promptly notified in writing, and Buyer shall make a reasonable effort to make the defective Goods available to the Seller without jeopardizing the operation or production of the Buyer's facility, or the claim will be void.
1. Seller's sole responsibility and Buyer's exclusive remedy arising out of or relating to the Equipment or Services or any breach of these warranties is limited to repair or (at Seller's option) replacement of defective items of Equipment, and re-performance of defective Services. Buyer shall make maintenance and operation records available to the Seller upon request during the warranty period."

1.26 SC-5.08.C.

Replace Paragraph 5.08.C.1. in its entirety with the following:

- "1. abuse, vandalism, improper modification, maintenance or operation by persons other than Seller, or "

Replace the period at the end of Paragraph 5.08.C.4. with a comma and add the word "or."

Add a new paragraph after Paragraph 5.08.C.4. which reads:

- "5. improper handling, storage, installation, or commissioning of the Equipment by Buyer or third parties or repairs or alterations made by Buyer without Seller's written consent."

1.27 SC-5.08.D.

Replace the first sentence of Paragraph 5.08.D. with the following:

- "D. Seller shall furnish the Goods and Special Services in accordance with the Contract Documents."

1.28 SC-5.08.E.

Add a new paragraph after Paragraph 5.08.F. which reads:

- "G. The warranties set forth in paragraphs 5.08.A. And 5.08.B. Of the standard general conditions for procurement contracts, are seller's sole and exclusive warranties."

1.29 SC-5.09.A.

Replace Paragraphs 5.09.A., 5.09.A.1. and 5.09.A.2. in their entirety with the following:

- "A. To the fullest extent permitted by Laws and Regulations, Seller shall indemnify and hold harmless Buyer from any and all claims, costs, losses, and demands or judgments for damages for claims (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) to the extent caused by a negligent act or omission by Seller, or its officers, directors, employees, agents, contractors or subcontractors, provided that any such claim, cost, loss, or damage;
 1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property of third parties (other than the Goods or Special Services themselves); and
 2. is caused in whole or in part by any negligent act or omission of Seller or its officers, directors, employees, agents, contractors or subcontractors."

1.30 SC-5.09.B.

Add a new paragraph after Paragraph 5.09.C.2. which reads:

- "D. Seller's indemnification is subject to the limitations set forth in the General Conditions and conditioned upon Buyer (i) promptly notifying Seller of any claimed breach within the Warranty Period, as defined in Article 5.08.E., and (ii) providing reasonable cooperation in the defense of any claim, and (iii) Seller having sole authority to direct the defense of and settle any indemnified claim."

ARTICLE 6-SHIPPING AND DELIVERY

1.31 SC-6.02.A.

Replace Paragraph 6.02.A. in its entirety with the following:

- "A. Unless otherwise specified in the Contract, Seller shall deliver all Equipment to Buyer F.O.B. the Point of Destination. The time for delivery of the Equipment to Buyer shall be specified in the Contract. Seller's sole liability for any delay in delivery of the Equipment shall be as expressly set out in the Contract. The place of delivery specified herein shall be firm and fixed, provided that Buyer may notify Seller no later than 45 days prior to the scheduled shipment date of the Equipment of an alternate point of delivery. Provided the parties agree to a change order to take into account any additional cost or delay incurred by Seller in implementing this change, the alternate place of delivery shall become the agreed place of delivery for all purposes under the Contract. Off-loading shall be provided by Buyer after inspection for transit damage. Seller shall provide information in advance of delivery on details for off-loading, including but not limited to: number of packaged items, proper off-loading method considering the packaging, and weight of each package. Also define if package can be stored outside at the Point of Destination."

1.32 SC-6.03.A.

Replace Paragraph 6.03.A. in its entirety with the following:

- "A. Risk of loss and insurable interests transfer from Seller to Buyer upon delivery of the Goods to the Buyer's Point of Destination."

ARTICLE 7 – CHANGES: SCHEDULE AND DELAY

1.33 SC-7.03.A.

Add a new paragraph after Paragraph 7.03.A.3. which reads:

- "4. CPR form attached to this Specification Section is the instrument to be used to track and document individual changes in contract time or price which will then be used as detailed documentation for a Change Order."

1.34 SC-7.04.

Add a new Article and paragraph after Paragraph 7.03.E. which reads:

"7.04 *Emergencies*

- A. If the safety of Seller's personnel is threatened or likely to be threatened by circumstances outside the reasonable control of Seller, including but not limited to war, armed conflict, civil unrest, riots, terrorism, kidnapping, presence of or exposure to hazardous materials, unsafe working conditions, or by the threat of such circumstances or a lack of adequate protections against such circumstances, Seller shall be entitled to take all necessary steps to ensure the security and safety of its personnel including the evacuation of personnel until such circumstances no longer apply."

ARTICLE 8-BUYER'S RIGHTS

1.35 SC-8.01.A.1.

Replace Paragraph 8.01.A.1. in its entirety with the following:

- "1. Buyer shall have the right, on scheduled on Milestones, to perform or cause to be performed, reasonable tests of the Goods at Seller's facility, and at the Point of Destination. Seller shall allow Buyer a reasonable time to perform such inspections or test."

1.36 SC-8.02.B.2.

Replace Paragraph 8.02.B.2. in its entirety with the following:

- "2. Seller shall bear all costs for direct damages attributable to the removal and replacement of the non-conforming Goods as provided in Paragraph 8.02.E."

1.37 SC-8.02.E.

Replace Paragraph 8.02.E. in its entirety with the following:

- "E. Seller shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, re-testing and for any engineers, architects, attorneys and other professionals, or other dispute resolution costs arising out of or relating to the non-conforming Goods or Special Services, including the correction or removal and replacement of the nonconforming Goods and the replacement of property of Buyer and others destroyed by the correction or removal and replacement of the non-conforming Goods, or the obtaining of conforming Special Services from others."

1.38 SC-8.03.A.

Replace Paragraph 8.03.A. in its entirety with the following:

- "A. Seller's responsibility for correcting all nonconformities in the Goods will extend for a period of one year after the date the Goods are Substantially Complete."

ARTICLE 9-ROLE OF ENGINEER

1.39 SC-9.04.A.

Add a new paragraph after Paragraph 9.04.A. which reads:

- "B. The acceptance at any time of materials or equipment by or on behalf of Buyer shall not be a bar to future rejection if they are subsequently found to be defective, inferior in quality, or not equal to the material or equipment specified or are not as represented to Engineer or Buyer."

ARTICLE 10-PAYMENT

1.40 SC-10.01.A.1.

Replace Paragraph 10.01.A.1. in its entirety with the following:

- "1. Applications for Progress Payments shall be submitted in accordance with the schedule provided in the Agreement Between Buyer and Seller."

1.41 SC-10.01.A.2.

Delete Paragraph 10.01.A.2. in its entirety:

1.42 SC-10.02.A.1

Replace Paragraph 10.02.A.1. in its entirety with the following:

- "1. Engineer's recommendation of payment requested in Applications for Payment for Shop Drawings will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data that the Shop Drawings have been

reviewed as required by the Contract Documents and Seller is entitled to payment of the amount recommended."

ARTICLE 11-CANCELLATION, SUSPENSION, AND TERMINATION

1.43 SC-11.01.A.2.

Add a new paragraph after Paragraph 11.01.A.2. which reads:

- "3. Seller shall be entitled to a reasonable allowance for overhead and profit with respect to all work on the Project completed in accordance with the Contract Documents prior to cancellation by the Buyer pursuant to this Paragraph 11.01."

1.44 SC-11.02.A.

Replace Paragraph 11.02.A. in its entirety with the following:

- "A. Buyer has the right to suspend performance of the Contract for up to 90 calendar days, without cause, by written notice. Upon suspension under this paragraph, Seller shall be entitled to an increase in the Contract Times and Contract Price caused by the suspension, provided that performance would not have been suspended or delayed for caused attributable to Seller. Any suspension of the Contract that exceeds 180 calendar days, in aggregate, shall, without a written change order, at the Seller's sole discretion, constitute termination of the Contract for Buyer's convenience in accordance with Paragraph 11.01. of the STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS."

1.45 SC-11.04.B.1.c

Replace Paragraph 11.04.B.1.c. in its entirety with the following:

- "c. Seller's failure to fulfill its repair, replacement or re-performance obligations under Article 8.03.B. relating to Seller's delivery or furnishing of non-conforming Goods or Special Services".

1.46 SC-11.04.B.2.

Replace Paragraph 11.04.B.2. in its entirety with the following:

- "2. Subject to Seller's failure to cure its breach of the Agreement pursuant to Section 11.04.B.2.a., Buyer may terminate the Agreement for cause by declaring a breach should Seller fail to comply with any material provision of the Contract Documents."

ARTICLE 12-LICENSES AND FEES

1.47 SC-12.01.A.

Replace Paragraph 12.01.A. in its entirety with the following:

- "A. Buyer and Engineer shall keep confidential all information of Seller identified by Seller as confidential which they may receive and/or become aware of in connection with Seller's provision of the Goods and/or Special Services, except where State or Federal Laws require dissemination."

1.48 SC-12.01.B.

Add new paragraphs after Paragraph 12.01.B. which read:

- "C. Seller grants Buyer a non-exclusive royalty free license to use any process or apparatus claimed in any patent owned by Seller but only to the extent that this license is required by Buyer to build and operate the Project described in this contract using membranes supplied by Seller. All other rights are reserved.

- D. Any software Seller owns and provides pursuant to this Contract shall remain Seller's property. Seller provides to Buyer a limited, non-exclusive and terminable royalty free project-specific license to such software for the term of this Contract. Buyer agrees not to copy, sub-license, translate, transfer, reverse engineer, or decode the software. Unless otherwise expressly agreed by Seller, this license shall terminate and the software shall be returned to Seller upon termination of this Contract, or the material breach of the terms in this section.
- E. Both parties agree to keep confidential the other party's proprietary non-public information, if any, which may be acquired in connection with this Contract. Seller retains all intellectual property rights including copyright which it has in all drawings and data or other deliverables supplied or developed under this Contract. Buyer acknowledges that Seller is in the business of selling the Equipment subject to this Contract and agrees that it will not file patent applications on the Equipment, or processes and methods of using the Equipment, without Seller's express written permission. Buyer further agrees that in any event any such patents will not be asserted against Seller or its other Buyers based upon purchase and use of such Equipment."

1.49 SC-12.02.A.

Replace Paragraph 12.02.A. in its entirety with the following:

- "A. Seller shall indemnify and hold harmless Buyer and Engineer from any rightful claim of any third party that any Goods or Service infringe a patent in effect in the USA, an EU member state or country of delivery (provided there is a corresponding patent issued by the USA or an EU member state), or U.S. copyright or copyright registered in the country of delivery. If the Buyer notifies the Seller promptly of the receipt of any such claim, does not take any position adverse to the Seller regarding such claim and gives the Seller information, assistance and exclusive authority to settle and defend the claim, the Seller shall, at its own expense, either (i) settle or defend the claim and pay all damages and costs awarded in it against the Buyer, or (ii) procure for the Buyer the right to continue using the Goods or Service, or (iii) modify or replace the Goods or Service so that it becomes non-infringing, or (iv) remove the infringing Goods and refund the price. The above paragraph shall not apply to any Goods which are manufactured to the Buyer's design, or to alleged infringement arising from the combination, operation, or use of any Goods or Services with other Goods or services when such combination is part of any allegedly infringing subject matter. The foregoing states the entire liability of the Seller for patent infringement of any Goods or Service."

1.50 SC-12.02.B.

Delete Paragraph 12.02.B. in its entirety.

1.51 SC-12.02.C.

Replace Paragraph 12.02.C. in its entirety with the following:

- "C. If Seller fails to defend such suit or claim after written demand by Buyer; Seller will be bound in any subsequent suit or claim against Seller by Buyer by any factual determination in the prior suit or claim."

Delete Paragraphs 12.02.C.1. and 2. in their entirety.

1.52 SC12.02.D.

Replace Paragraph 12.02.D.in its entirety with the following:

- "D. If determination is made that Seller has infringed upon intellectual property rights of another, Seller may, at its election, and as Buyer's sole and exclusive remedy under this indemnification provision, (i) obtain the necessary licenses for Buyer's benefit, or (ii) replace the Goods and provide related design and construction as necessary to avoid the infringement at Seller's own expense or, (iii) refund to the Buyer the purchase price paid for the infringing product or service."

1.53 SC-12.06.

Add new Paragraph 12.06.which read:

"12.06. Buyer's Permits and Licenses

- A. All permits and licenses which are required, by an Authority Having Jurisdiction of Buyer's facility, to install and/or operate the facility or Seller's Good shall not be the responsibility of the Seller.
- B. Seller is not responsible for compliance with all laws and regulations applicable to the use, handling, installation, maintenance, removal, registration and labeling of all Goods after delivery of the Goods unless provisions of the contract require Seller to be responsible for the handling, installation and labeling of the Goods."

APPENDIX A

INSURANCE SPECIFICATIONS FOR SELLER

GENERAL LIABILITY

- ISO Commercial General Liability Policy form, 2002 Edition or equivalent.
- \$1,000,000 Per Occurrence limit.
- \$2,000,000 Products/Completed Operations Aggregate limit.
- \$2,000,000 General Aggregate limit.
- Per Project or Job Site Aggregate.
- Buyer, Architect/Engineer, and their employees, subsidiaries, subconsultants and assigns must be designated as Additional Insureds for both Ongoing and Completed Operations.
- Seller's policy must be Primary, with no contribution from Buyer's coverage.
- Seller's insurance carrier must waive subrogation against Buyer.

~~COMMERCIAL AUTO (NA)~~

- \$1,000,000 Combined Single Limit of coverage.
- Coverage must be provided for all owned, non-owned, and hired vehicles.
- Seller's insurance carrier must waive subrogation against Buyer.

~~WORKER'S COMPENSATION (NA)~~

- Statutory coverage provided for the state in which operations are undertaken, **whether or not required by law (includes sole proprietors and partners)**. (Sole proprietors may substitute a minimum premium/zero payroll policy obtainable from their agent.)
- Employer's Liability limits of \$500,000/\$500,000/\$500,000.
- Seller's insurance carrier shall waive subrogation against Buyer.
- If leased workers are used, an Alternate Employer Endorsement shall be added.
- U S Government extension endorsements as appropriate (U.S.L.&H., etc.).

UMBRELLA OR EXCESS LIABILITY (OPTIONAL)

- \$1,000,000 limit minimum.
- Must follow form with all primary policies.

OTHER

- Insurance carrier(s) providing coverage shall be rated at least A-VII by A. M. Best.
- Seller shall provide Property Insurance (Builder's Risk) for the project. Property Insurance shall cover all Seller's-supplied materials and equipment.
- Seller shall be responsible for any Property Insurance deductibles.
- Seller shall bear all responsibility for loss to owned tools and equipment.
- Certificate of Insurance shall provide for thirty (30) days' prior written notice in cancellation clause.
- Certificate of Insurance must indicate above coverage elements.
- Buyer reserves right to require certified copies of policies and/or endorsements.
- Project Management Protective and Boiler & Machinery coverage is not required.

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Woodside WRF Equipment Procurement - UV Disinfection	HDR Project No.: 10162649
	Buyer's Project No.:
Project SELLER:	Date of Contract:
This Certificate of Substantial Completion Applies to:	
<input type="checkbox"/> All work under the Contract Documents:	<input type="checkbox"/> The following specific portions:

Date of Substantial Completion

The Work performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Seller to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list will be the date of final payment unless otherwise agreed to in writing.

<input type="checkbox"/> Amended Responsibilities	<input type="checkbox"/> Not Amended
Buyer's Responsibilities:	

Seller's Responsibilities:	

The following documents are attached to and made part of this certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Seller's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Seller	Date
Accepted by Buyer	Date

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CHANGE ORDER NO. ____

BUYER: City of Hailey, ID

DATE:

SELLER:

HDR PROJECT NO.: 10162649

PROJECT: Woodside WRF Equipment Procurement – UV Disinfection
_____ to _____

CONTRACT

PERIOD:

CONTRACT DATE: _____

It is agreed to modify the Contract referred to above as follows:

Provide all labor and materials necessary for installation of the work outlined in CPR Nos. ____, ____, ____, ____, and ____.

The cost of this Contract modification is as follows:

<u>CPR</u>	<u>Description</u>	<u>Cost</u>
1.1	1.	
1.2	CHANGE ORDER NO. TOTAL AMOUNT	\$

CHANGE ORDER SUMMARY

Contract Price:	
Contract Price prior to this Change Order	\$
Net Increase/Decrease of this Change Order	\$
Revised Contract Price with all approved Change Orders	\$
Contract Time:	
Contract Time prior to this Change Order	____ calendar days
Net increase of this Change Order	____ calendar days
Revised Contract Time with all approved Change Orders	____ calendar days

This Change Order, when executed by the parties to the Contract, amends the Contract and, as so amended, all terms and conditions of the Contract remain unchanged and in full force and effect. Payment and any time extension provided in this Change Order are full and complete compensation to the Seller for the change(s) to the work, deleted work, modified work, direct or indirect impact on the Seller's schedule, and for any equitable adjustment or time extension existing at the time of the execution of this Change Order to which the Seller may be entitled, pursuant to the Contract between the Buyer and Seller or any other basis whatsoever. The changes included in this Change Order are to be accomplished in accordance with the terms, stipulations and conditions of the original contract as though included therein.

Accepted for Seller By: _____ Date: _____

Approved for HDR Engineering, Inc. By: _____ Date: _____

Approved for Buyer By: _____ Date: _____

Attest: _____ Date: _____

Distribution: Buyer, Seller, Office, Field, Other:

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CHANGE PROPOSAL REQUEST

(Not a Change Order)

HDR ENGINEERING, INC.

Project: City of Hailey
Woodside WRF Equipment Procurement – UV Disinfection
10162649

CPR No.: _____

CPR Date: _____

Date Sent to Seller: _____

Date Rec'd from Seller: _____

TO: _____

Please furnish your proposal for executing the following changes(s):

HDR _____ Date: _____

TO: HDR Engineering, Inc.

Proposal:

Cost _____ Credit _____

(A time extension is not required for this modification unless otherwise detailed and justified:)

Seller _____ Date _____

TO: _____

Accepted/Not Accepted _____

HDR: Date _____

Accepted/Not Accepted _____

Buyer: Date _____

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FIELD ORDER FORM

PROJECT: City of Hailey
Woodside WRF Equipment Procurement – UV Disinfection

HDR PROJECT NO.: 10162649

SELLER:

FIELD ORDER NO.:

DATE:

You are hereby directed to execute promptly this Field Order which orders minor changes in the Work without change in Contract Sum or Contract Time.

If you consider that a change in Contract Sum or Contract Time is required, please submit your itemized proposal immediately and before proceeding with this Work. If your proposal is found to be satisfactory and in proper order, this Field Order will in that event be superseded by a Change Order.

Description:

cc:

HDR Engineering, Inc.

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Project Name: Woodside WRF Equipment Procurement - UV Disinfection	HDR Project No.: 10162649
Project Buyer:	Buyer's Project No.:
	Date of Issuance:
Project Seller: (Name, Address)	Date of Contract:

You are directed to proceed with the following change(s):

Item No.	Description

Attachments: (list documents supporting change)

--

Purpose for Work Change Directive:

☐ Authorization for Work described herein to proceed on Time and Material basis or other mutually acceptable negotiated basis due to:

☐ Nonagreement on pricing of Change Proposal Request No.

☐ Necessity to expedite Work described herein prior to agreeing on price and time changes

☐ Authorization for Work described herein to proceed and be charged against Miscellaneous Work Allowance.

Estimated increase or decrease in Contract Price and Contract Time

Contract Price \$_____ (increase/decrease) Contract Time _____ (increase/decrease) Days

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Accepted for Seller by:	Date
Recommended for Approval By (HDR Engineering, Inc.)	Date
Approved for Buyer by:	Date
Approved: (Other - when required)	Date
Distribution: <input type="checkbox"/> Buyer <input type="checkbox"/> Seller <input type="checkbox"/> Office <input type="checkbox"/> Field <input type="checkbox"/> Other	

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REQUEST FOR INFORMATION (RFI)

PROJECT: City of Hailey
Woodside WRF Equipment Procurement – UV Disinfection
HDR PROJECT NO.: 10126249

RFI NO.:

DATE:

REQUEST:

Inc.
Signature

____ Buyer _____ Seller _____ HDR Engineering,

REPLY:

DATE:

Inc.
Signature

____ Buyer _____ Seller _____ HDR Engineering,

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DIVISION 01

GENERAL REQUIREMENTS



SECTION 01 11 00
SUMMARY OF GOODS AND SPECIAL SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Project Summary
 - 1. This project provides one (1) open-channel ultraviolet disinfection system equipment for the UV Building at the Woodside Water Reclamation Facility. The existing concrete structure consists of two open channels, one with UV equipment, one empty. The existing Trojan UV equipment is over 20 years old. The installation (by Others) shall be phased to maintain continuous disinfection without interruption.
- B. Related sections include but are not necessarily limited to:
 - 1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 – General Requirements.

1.2 GOODS AND SPECIAL SERVICES COVERED BY CONTRACT

- A. The Procurement Bid Form, Section 00 41 13, includes the Bid Items for the project. The Goods and Special Services to be furnished include:
 - 1. Bid Item No. A: Open-Channel Ultraviolet Disinfection System.**
 - a. All labor, equipment, materials, and appurtenances for furnishing the system as specified in these Contract Documents.
 - b. The equipment shall be delivered to the Woodside Water Reclamation Facility.
 - c. Special Services shall include, but are not limited to:
 - 1) Shop Drawings.
 - 2) Operations and Maintenance Manuals
 - 3) Manufacturer's Field Services such as all the necessary installation certification, startup, testing, and training of Buyer's operations and maintenance personnel as quality control and quality assurance of the delivered equipment.
 - d. Conduct performance testing of equipment to show compliance with performance requirements.
 - e. The completion of all the furnishing of Goods and Special Services shall be on or before the dates or within the number of calendar days indicated in the Agreement.

1.3 WORK BY OTHERS

- A. Buyer or Buyer's Installation Contractor will unload equipment in accordance with Section 01 65 50, Product Delivery, Storage, and Handling.
- B. Buyer's Installation Contractor under separate contract will install the water level control gates, install the UV equipment, install the UV electrical equipment, and other ancillary systems purchased under this contract. In addition to construction of any provisions required for; electrical, instrumentation, and/or structural work required for a complete operational disinfection system. The installation is expected to be completed within 6 months of equipment delivery.

1.4 FABRICATION SCHEDULE

- A. Within ten (10) days of Notice to Proceed, the Seller shall submit their fabrication schedule to meet the scheduled sequence, milestones, and limitations. The schedule shall be a bar chart showing, as a minimum, the schedule for the following activities:
 - 1. Shop Drawings Submittals.
 - 2. Final Shop Drawings
 - 3. Fabrication of equipment.

4. Equipment delivery.

1.5 OTHERS WORKING AT PROJECT SITE

- A. The Seller shall coordinate the delivery of the equipment and appurtenances with the Buyer and the Buyer's Installation Contractor.

1.6 FINAL COMPLETION

- A. For the purposes of establishing when the Project is complete and suitable for its intended purpose, the following functional components and work elements shall be completed:
 1. Final shop drawings submitted and approved.
 2. Goods delivered to the site.
 3. Final operations and maintenance manuals submitted and approved.
 4. Manufacturer's Field Services are complete.
 5. Satisfactory completion of performance testing.

1.7 REGULATORY REQUIREMENTS

- A. Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to furnishing the Goods and Special Services.
- B. References in the Contract Documents to local codes shall mean City of Hailey, Idaho.
- C. Other standards and codes that apply to furnishing the Goods and Special Services are designated in the Specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mechanics and administration of the submittal process for:
 - a. Shop Drawings.
 - b. Informational submittals.
 - 2. General content requirements for Shop Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Operations and Maintenance Manual submittal requirements are specified in Specification Section 01 33 04.
 - 4. Specification Sections in Division 02 through Division 46 identifying required submittals.

1.2 DEFINITIONS

- A. Shop Drawings:
 - 1. See STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS.
 - 2. Product data is Shop Drawing information.
- B. Informational Submittals:
 - 1. Submittals other than Shop Drawings and samples required by the Contract Documents that do not require approval.
 - 2. Representative types of informational submittal items include but are not limited to:
 - a. Equipment delivery schedule.
 - b. Installed equipment and systems performance test reports.
 - c. Manufacturer's installation certification letters.
 - d. Instrumentation and control commissioning reports.
 - e. Warranties.
 - 3. For-Information-Only submittals upon which the Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.

1.3 TRANSMITTAL OF SUBMITTALS

- A. Shop Drawings and Product Data:
 - 1. Transmit paper copy submittals to:

HDR Engineering, Inc.
412 E. Parkcenter Blvd., Suite 100
Boise, ID 83706
Attn: Brad Bjerke, PE
 - 2. Electronic Transmission of Submittals:
 - a. Via email:

brad.bjerke@hdrinc.com
 - 3. Utilize one (1) copy of attached Exhibit "A" to transmit all Shop Drawings and samples.
 - a. An electronic version (Microsoft Word .doc format) of Exhibit "A" will be given to Seller upon request.
 - 4. All submittals must be from Seller and bear his approval stamp.
 - a. Shop Drawing submittal stamp shall read "(Seller's Name) has satisfied Seller's obligations under the Contract Documents with respect to Seller's review and approval

as stipulated under STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS Paragraph 5.06C".

5. Provide submittal information defining specific equipment or materials utilized on the project.
 - a. Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
 6. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been performed by individuals meeting specified qualifications and will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
 7. Submittal schedule:
 - a. Schedule of Shop Drawings:
 - 1) Submitted and approved in accordance with timeframes listed in Contract.
 - 2) Account for multiple transmittals under any Specification Section where partial submittals will be transmitted.
- B. Informational Submittals:
1. Transmit under Seller's standard letter of transmittal or letterhead.
 2. Submit in triplicate or as specified in individual Specification Section.
 3. Transmit paper copy submittals to:

HDR Engineering, Inc.
412 E. Parkcenter Blvd., Suite 100
Boise, ID 83709
Attn: Brad Bjerke, PE
 4. Electronic Transmission of Submittals:
 - a. Via email:

brad.bjerke@hdrinc.com

1.4 PREPARATION OF SUBMITTALS

- A. Legibility:
1. All submittals and all pages of all copies of a submittal shall be completely legible.
 2. Submittals which, in the Engineer's sole opinion, are illegible will be returned without review.
- B. Shop Drawings:
1. Scope of any submittal and letter of transmittal:
 - a. Limited to one (1) Specification Section.
 - b. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified, in total, in a "Basic Requirements" Specification Section.
 2. Numbering letter of transmittal:
 - a. Use the Specification Section number followed by a series number ("-xx" and beginning with "01"); increase the series number sequentially with each additional transmittal for that Specification Section.
 3. Describing transmittal contents:
 - a. Provide listing of each component or item in submittal capable of receiving an independent review action.
 - b. Identify for each item:
 - 1) Manufacturer and Manufacturer's Drawing or data number.
 - 2) Contract Document tag number(s).
 - 3) Specification Article/Paragraph number if appropriate.
 - 4) Unique page numbers for each page of each separate item.
 - c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.
 4. Seller stamping:

- a. General:
 - 1) Seller's review and approval stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.
 - a) Seller's signature and date shall be original ink signature.
 - 2) Letters of transmittal may be stamped only when the scope of the submittal is one (1) item.
 - 3) Submittals containing multiple independent items shall be prepared with an index sheet for each item listing the discrete page numbers for each page of that item, which shall be stamped with the Seller's review and approval stamp.
 - a) Individual pages or sheets of independent items shall be numbered in a manner that permits Seller's review and approval stamp to be associated with the entire contents of a particular item and vice-versa.
 - 4) In the event submittals are transmitted as a single item and found to include multiple independent items, the Buyer and Engineer reserve the right to limit review to the single item listed, remove the other items from the submittal and return them not reviewed to the Seller for coordination, stamping and submittal under a new transmittal number that is not a re-submittal number.
 - a) The items not listed in the transmittal letter will not be logged as received, or in any other manner acknowledged as submitted.
 - b. Electronic stamps:
 - 1) Seller may electronically embed Seller's review and approval stamp to either the letter of transmittal or a separate index sheet preceding each independent item in the submittal.
 - 2) Seller's signature and date on electronically applied stamps shall be original ink signature.
5. Resubmittals:
 - a. Number with original Specification Section and series number with a suffix letter starting with "A" on a (new) duplicate transmittal form.
 - b. Do not increase the scope of any prior transmittal.
 - c. Account for all components of prior transmittal.
 - 1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.
 - a) Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.
 - 2) Indicate "Outstanding-To Be Resubmitted At a Later Date" for any prior "C" or "D" Action item not included in resubmittal.
 - a) Obtain Engineer's approval to exclude items.
 6. Seller shall not use red color for marks on transmittals.
 - a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
 - b. Engineer will use red marks or enclose marks in a cloud.
 7. Transmittal contents:
 - a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Engineer.
 - b. Provide submittal information or marks defining specific equipment or materials utilized on the Project.
 - 1) Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
 - c. Identify equipment or material project application, tag number, Drawing detail reference, weight, and other Project specific information.
 - d. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
 - e. Do not modify the manufacturer's documentation or data except as specified herein.
 - f. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 IN pages.

- 1) Indicate exact item or model and all options proposed.
 - g. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the Specification Section.
 - 1) Arrange data and performance information in format similar to that provided in Contract Documents.
 - 2) Provide, at minimum, the detail specified in the Contract Documents.
 - h. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.
 8. Provide one (1) electronic copy of each submittal until submittal has received either an "A" or "B" action.
 - a. Submittal may be transmitted via e-mail or on a CD-ROM disc.
 - b. The Engineer will mark comments directly on the electronic copy of each submittal or provide review comment in an electronic comment sheet attached to the Shop Drawing Transmittal sheet included in Exhibit A.
 - c. Engineer will return the submittals with the review comments via e-mail.
 9. If "B" action, incorporate response addressing the "Furnish as Noted" items and then provide one (1) electronic copy via e-mail or on compact disc (CD-ROM) of each submittal.
- C. Informational Submittals:
1. Prepare in the format and detail specified in Specification requiring the informational submittal.
- D. Paper copy submittals:
1. Provide 8-1/2 x 11 IN, 8-1/2 x 14 IN, and 11 x 17 IN size sheets on heavy first quality paper with standard three-hole punching and bound in appropriately sized three-ring (or post) binders with clear overlays front, spine and back.
 2. Reduce Drawings or diagrams bound in manuals to an 8-1/2 x 11 IN or 11 x 17 IN size.
 - a. Where reduction is not practical to ensure readability, fold larger Drawings separately and place in vinyl envelopes which are bound into the binder.
 - b. Identify vinyl envelopes with Drawing numbers.
 3. Provide a Cover Page for each binders with the following information:
 - a. Seller's Name.
 - b. Date.
 - c. Buyer's Name.
 - d. Project Name.
 - e. Specification Section.
 - f. Project Equipment Tag Numbers, if applicable.
 - g. Model Numbers, if applicable.
 - h. Engineer.
 4. Provide a Table of Contents or Index for each binder.
 - a. Use plastic-coated dividers to tab each section per the Table of Contents/Index for easy reference.
- E. Electronic copy submittals:
1. Electronic copies are to be produced in Adobe Acrobat's Portable Document Format (PDF) Version 5.0 or higher.
 2. Do not password protect and/or lock the PDF document.
 3. Create one (1) PDF document (PDF file) for each submittal.
 4. Drawings shall be provided in AutoCAD 2020.dwg and PDF formats. The equipment shall also be provided in a 3D model.
 5. Rotate pages that must be viewed in landscape to the appropriate position for easy reading.
 6. Images only shall be scanned at a resolution of 300 dpi or greater.

- a. Perform Optical Character Recognition (OCR) capture on all images.
- b. Word searches of the PDF document must operate successfully to demonstrate OCR compliance.
- 7. Create bookmarks in the navigation frame, for each entry in the Table of Contents/Index.
- 8. File naming conventions:
 - a. File names shall use a "ten dot three" convention (XX XX XX-YY-Z.PDF) where XX XX XX is the Specification Section number, YY is the Shop Drawing Root number and Z is an ID number used to designate the associated volume.
 - 1) Example 1:
 - a) Two (2) pumps submitted as separate Shop Drawings under the same Specification Section:
 - (1) Pump 1 = 43 23 50-01-1.pdf.
 - (2) Pump 2 = 43 23 50-02-1.pdf.
 - 2) Example 2:
 - a) Control system submitted as one (1) Shop Drawing but separated into two (2) O&M volumes:
 - (1) Volume 1 = 40 90 00-01-1.pdf.
 - (2) Volume 2 = 40 90 00-01-2.pdf.
- 9. Label CD-ROM discs and jewel cases with same information required for Cover Pages.
 - a. Include labeled CD(s) in labeled jewel case(s).

1.5 ENGINEER'S REVIEW ACTION

- A. Shop Drawings and Samples:
 - 1. Items within transmittals will be reviewed for overall design intent and will receive one (1) of the following actions:
 - a. A - FURNISH AS SUBMITTED.
 - b. B - FURNISH AS NOTED (BY ENGINEER).
 - c. C - REVISE AND RESUBMIT.
 - d. D - REJECTED.
 - e. E - ENGINEER'S REVIEW NOT REQUIRED.
 - 2. Submittals received will be initially reviewed to ascertain inclusion of Seller's approval stamp.
 - a. Drawings not stamped by the Seller or stamped with a stamp containing language other than that specified in Paragraph 1.3A.4.a., will not be reviewed for technical content and will be returned without any action.
 - 3. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
 - a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
 - b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
 - 4. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
 - a. The portion of the submittal given "C" or "D" will not be distributed.
 - 1) Correct and resubmit items so marked.
 - b. Items marked "A" or "B" will be fully distributed.
 - c. If a portion of the items or system proposed are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
 - 1) This is at the sole discretion of the Engineer. In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
 - 2) Distribution to the Buyer and field will not be made (unless previously agreed to otherwise).

5. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Seller with "C" or "D" Action.
 6. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been performed by individuals meeting specified qualifications and will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
 7. Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior submittal, will be returned with Action "E. Engineer's Review Not Required."
- B. Engineer will review two versions, initial submittal and one resubmittal, of each Shop Drawing, Installation Manual, and Operations and Maintenance Manual at no cost to the Seller.
1. Should additional reviews beyond the root and one resubmittal be required due to no fault of the Buyer or Engineer, Engineer will tack the review hours and expenses associated with these extra reviews.
 2. Buyer will issue a deductive change order to the Seller for the extra review expenses of the Engineer and/or Buyer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



EXHIBIT A

Shop Drawing Transmittal No. _____ - _____

(Spec Section) (Series)

Project Name:		Date Received:			
Project Owner:		Checked By:			
Contractor:	HDR Engineering, Inc.		Log Page:		
Address:	Address:	HDR No.:			
		Spec Section:			
		Drawing/Detail No.:			
Attn:	Attn:	1st. Sub	ReSub.		
Date Transmitted:		Previous Transmittal Date:			
Item No.	No. Copies	Description	Manufacturer	Mfr/Vendor Dwg or Data No.	Action Taken*
Remarks:					
* The Action designated above is in accordance with the following legend:					

A - Furnish as Submitted

B - Furnish as Noted

C - Revise and Submit

1. Not enough information for review.
2. No reproducibles submitted.
3. Copies illegible.
4. Not enough copies submitted.
5. Wrong sequence number.
6. Wrong resubmittal number.
7. Wrong spec. section.
8. Wrong form used.
9. See comments.

D - Rejected

E - Engineer's review not required

1. Submittal not required.
2. Supplemental Information. Submittal retained for informational purposes only.
3. Information reviewed and approved on prior submittal.
4. See comments.
5. Delegated Design - Submittal received as requested by the Contract Documents. The Engineer did not review the engineering or technical content of the submittal.

Engineer's review and approval is limited to determine whether items covered by this submittal will, after installation or incorporation in the Work, conform in general to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole. Any deviation from plans or specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.

Comments:

By		Date	
----	--	------	--

Distribution: Contractor | File | Field | Owner | Other |

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HDR Project No. 10162649

City of Hailey
Woodside WRF Equipment Procurement - UV Disinfection
SUBMITTALS
01 33 00 - 1

January 13, 2022
Issued for Bid

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SECTION 01 33 04
OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Administration of the submittal process for Operation and Maintenance Manuals.
 - 2. Content requirements for Operation and Maintenance Manuals.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. General submittal requirements are specified in Specification Section 01 33 00 - Submittals.
 - 4. Sections in Division 02 through Division 46 identifying required Operation and Maintenance Manual submittals.

1.2 DEFINITIONS

- A. Equipment Operation and Maintenance Manuals:
 - 1. Contain the technical information required for proper installation, operation and maintenance of process, electrical and mechanical equipment and systems.
- B. Building Materials and Finishes Operation and Maintenance Manuals:
 - 1. Contain the information required for proper installation and maintenance of building materials and finishes.

1.3 SUBMITTALS

- A. List of all the Operation and Maintenance Manuals required by the Contract as identified in Division 02 through Division 46.
- B. Operation and Maintenance Manuals:
 - 1. Draft and final electronic copies.
 - 2. Final paper copies: One (1).

1.4 SUBMITTAL SCHEDULE

- A. List of Required Operation and Maintenance Manuals:
 - 1. Submit list with Specification Section number and title within 21 days after Notice to Proceed.
- B. Draft Operation and Maintenance Manuals:
 - 1. Submit approvable draft manuals in electronic format (PDF) within 90 days after Notice to Proceed.
 - a. Include placeholders or fly sheet pages where information is not final or is missing from the draft manual.
- C. Final Operation and Maintenance Manuals:
 - 1. Final approval of Operation and Maintenance Manuals in electronic format (PDF) must be obtained 45 days prior to equipment start-up.
 - 2. Provide paper copies and CD-ROMs of approved final Operation and Maintenance Manuals in electronic format (PDF), a minimum of 30 days prior to equipment start-up.
 - 3. Issue addenda to Final Approved Operation and Maintenance Manual to include:
 - a. Equipment data that requires collection after start-up, for example but not limited to electrical switchgear, automatic transfer switch, and circuit breaker settings.
 - b. Equipment field testing data.
 - c. Equipment start-up reports.
 - d. Revisions made to the drawings that are included in the manual during the field testing.

1.5 PREPARATION OF SUBMITTALS

A. General:

1. All pages of the Operation and Maintenance Manual submittal shall be legible.
 - a. Submittals which, in the Engineer's sole opinion, are illegible will be rejected without review.
2. Identify each equipment item in a manner consistent with names and identification numbers used in the Contract Documents, not the manufacturer's catalog numbers.
3. Neatly type any data not furnished in printed form.
4. Operation and Maintenance Manuals are provided for Owner's use, to be reproduced and distributed as training and reference materials within Owner's organization.
 - a. This requirement is:
 - 1) Applicable to both paper copy and electronic files.
 - 2) Applicable to materials containing copyright notice as well as those with no copyright notice.
5. Notify supplier and/or manufacturer of the intended use of Operations and Maintenance Manuals provided under the Contract.

B. Operation and Maintenance Manual Format and Delivery:

1. Draft electronic submittals:
 - a. Provide manual in Adobe Acrobat Portable Document Format (PDF), latest version.
 - b. Create one (1) PDF file for each equipment Operation and Maintenance Manual.
 - c. Do not password protect or lock the PDF document.
 - d. Drawings or other graphics must be converted to PDF file format from the original drawing file format and made part of the PDF document.
 - e. Scanning of drawings is to be used only where actual file conversion is not possible and drawings must be scanned at a resolution of 300 dpi or greater.
 - f. Rotate sheets that are normally viewed in landscape mode so that when the PDF file is opened the sheet is in the appropriate position for viewing.
 - g. Create bookmarks in the bookmarks panel for the Operation and Maintenance Manual cover, the Table of Contents and each major section of the Table of Contents.
 - h. Using Adobe Acrobat Standard or Adobe Acrobat Professional, set the PDF document properties, initial view as follows:
 - 1) Select File → Properties → Initial View.
 - 2) Select the Navigation tab: Bookmarks Panel and Page.
 - 3) Select the Page layout: Single Page.
 - 4) Select the Magnification: Fit Page.
 - 5) Select Open to page: 1.
 - 6) Set the file to open to the cover page of the manual with bookmarks to the left, and the first bookmark linked to the cover page.
 - i. Set the PDF file "Fast Web View" option to open the first several pages of the document while the rest of the document continues to load.
 - 1) To do this:
 - a) Select Edit → Preferences → Documents → Save Settings.
 - b) Check the Save As optimizes for Fast Web View box.
 - j. PDF file naming convention:
 - 1) Use the Specification Section number, the manufacturer's name and the equipment description, separated by underscores.
 - 2) Example: 46 51 21_Sanitaire_Coarse_Bubble_Diffusers.pdf.
 - 3) Do not put spaces in the file name.
2. Final electronic submittals:
 - a. Submit two (2) copies in PDF file format on two (2) CD-ROM discs (one (1) copy per CD-ROM), each secured in a jewel case.
 - b. CD-ROM Labeling:
 - 1) Provide the following printed labeling on all CD-ROM discs:
 - a) Project name.
 - b) Specification Section.

- c) Equipment names and summary of tag(s) covered.
 - d) Manufacturer name.
 - e) Date (month, year).
 - c. CD-ROM Jewel Case Holder:
 - 1) Insert jewel cases containing labeled CD-ROM discs in three-ring binder holder (C-Line Products, www.c-lineproducts.com stock number CLI-61968 or equivalent) at the front of each final paper copy.
- 3. Final paper copy submittals:
 - a. Quantity: Provide one (1) copies.
 - b. Paper: 8.5 x 11 IN or 11 x 17 IN bright white, 20 pound paper with standard three-hole punching.
 - c. 3-Ring Binder:
 - 1) Provide D-ring binder with clear vinyl sleeves (i.e. view binder) on front and spine.
 - 2) Insert binder title sheet with the following information under the front and spine sleeves:
 - a) Project name.
 - b) Specification Section.
 - c) Equipment names and summary of tag(s) covered.
 - d) Manufacturer name.
 - e) Date (month, year).
 - 3) Provide plastic sheet lifters prior to first page and following last page.
 - d. Drawings:
 - 1) Provide all drawings at 11 x 17 IN size, triple folded and three-hole punched for insertion into manual.
 - 2) Where reduction is not practical to ensure readability, fold larger drawings separately and place in three-hole punched vinyl envelopes inserted into the binder.
 - 3) Identify vinyl envelopes with drawing numbers.
 - e. Use plastic coated dividers to tab each section of each manual in accordance with the Table of Contents.
- C. Equipment Operation and Maintenance Manual Content:
 - 1. Provide a cover page as the first page of each manual with the following information:
 - a. Manufacturer(s) Name and Contact Information.
 - b. Vendor's Name and Contact Information.
 - c. Date (month, year).
 - d. Project Owner and Project Name.
 - e. Specification Section.
 - f. Project Equipment Tag Numbers.
 - g. Model Numbers.
 - h. Engineer's Name.
 - i. Seller's Name.
 - 2. Provide a Table of Contents for each manual.
 - 3. Provide Equipment Record sheets as follows:
 - a. Printed copies of the Equipment Record (Exhibits B1, B2 and B3), as the first tab following the Table of Contents.
 - b. Exhibits B1-B3 are available as Fillable PDF Form documents from the Engineer.
 - c. Each section of the Equipment Record must be completed in detail; simply referencing the related equipment Operation and Maintenance Manual sections for nameplate, maintenance, spare parts or lubricant information is not acceptable.
 - d. For equipment involving separate components (for example, a motor and gearbox), a fully completed Equipment Record is required for each component.
 - e. Submittals that do not include the Equipment Record(s) will be rejected without further content review.
 - 4. Provide a printed copy of the Manufacturer's Field Services report as required by Specification Section 01 75 00 following the Equipment Record sheets.
 - 5. Provide the following detailed information, as applicable:

- a. Use equipment tag numbers from the Contract Documents to identify equipment and system components.
 - b. Equipment function, normal and limiting operating characteristics.
 - c. Instructions for assembly, disassembly, installation, alignment, adjustment, and inspection.
 - d. Operating instructions for start-up, normal operation, control, shutdown, and emergency conditions.
 - e. Lubrication and maintenance instructions.
 - f. Troubleshooting guide.
 - g. Mark each sheet to clearly identify specific products and component parts and data applicable to the installation for the Project; delete or cross out information that does not specifically apply to the Project.
 - h. Parts lists:
 - 1) A parts list and identification number of each component part of the equipment.
 - 2) Exploded view or plan and section views of the equipment with a detailed parts callout matching the parts list.
 - 3) A list of recommended spare parts.
 - 4) List of spare parts provided as specified in the associated Specification Section.
 - 5) A list of any special storage precautions which may be required for all spare parts.
 - i. General arrangement, cross-section, and assembly drawings.
 - j. Electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, and interconnection diagrams.
 - k. Test data and performance curves.
 - l. As-constructed fabrication or layout drawings and wiring diagrams.
 - m. Copy of the equipment manufacturer's warranty meeting the requirements of the Contract.
 - n. Copy of any service contracts provided for the specific piece of equipment as part of the Contract.
6. Additional information as required in the associated equipment or system Specification Section.
- D. Building Materials and Finishes Operation and Maintenance Manual Content:
- 1. Building products, applied materials and finishes:
 - a. Include product data, with catalog number, size, composition and color and texture designations.
 - b. Provide information for ordering custom manufactured products.
 - 2. Necessary precautions:
 - a. Include product MSDS for each approved product.
 - b. Include any precautionary application and storage guidelines.
 - 3. Instructions for care and maintenance:
 - a. Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
 - 4. Moisture protection and weather exposed products:
 - a. Include product data listing, applicable reference standards, chemical composition, and details of installation.
 - b. Provide recommendations for inspections, maintenance and repair.
 - 5. Additional requirements as specified in individual product specifications.

1.6 TRANSMITTAL OF SUBMITTALS

- A. Operation and Maintenance Manuals.
 - 1. Transmit paper copy submittals to:

HDR Engineering, Inc.
 412 E. Parkcenter Blvd., Suite 100
 Boise, ID 83706

Attn: Brad Bjerke, PE

2. Utilize one (1) copy of attached Exhibit "A" to transmit all Operation and Maintenance Manuals.
 - a. An electronic version (Microsoft Word .doc format) of Exhibit "A" will be given to Seller upon request.
 3. Transmittal numbering:
 - a. Number each submittal with the Specification Section number followed by a series number beginning with "-01" and increasing sequentially with each additional transmittal, followed by "-OM" (for example: 11061-01-OM).
 4. Submit draft and final Operation and Maintenance Manual in electronic format (PDF) to Engineer, until manual is approved.
 5. All submittals must be from Seller and bear his approval stamp.
 - a. Operation and Maintenance Manual submittal stamp may be Seller's standard approval stamp.
- B. Expedited Return Delivery:
1. Include prepaid express envelope or air bill in submittal transmittal package for any submittals Seller expects or requires express return mail.
 2. Inclusion of prepaid express envelope or air bill does not obligate Engineer to conduct expedited review of submittal.

1.7 ENGINEER'S REVIEW ACTION

- A. Draft Electronic (PDF) Submittals:
1. Engineer will review and indicate one of the following review actions:
 - a. A - ACCEPTABLE
 - b. B - FURNISH AS NOTED
 - c. C - REVISE AND RESUBMIT
 - d. D - REJECTED
 2. Submittals marked as Acceptable or Furnish As Noted will be retained; however, the transmittal form will be returned with a request for the final paper and electronic documents to be submitted.
 3. Copies of submittals marked as Revise and Resubmit or Rejected will be returned with the transmittal form marked to indicate deficient areas.
 4. Resubmit until approved.
- B. Final Paper Copy Submittals:
1. Engineer will review and indicate one (1) of the following review actions:
 - a. A - ACCEPTABLE
 - b. D - REJECTED
 2. Submittals marked as Acceptable will be retained with the transmittal form returned as noted.
 3. Submittals marked as Rejected will be returned with the transmittal form marked to indicate deficient areas.
 4. Resubmit until approved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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EXHIBIT A **Operation and Maintenance Manual**
Transmittal _____ - _____ - OM
(Spec Section) (Series)

Project Name:		Date Received:
Project Owner:		Checked By:
Contractor:	Owner:	Log Page:
Address:	Address:	HDR No.:
Attn:	Attn:	1st. Sub. ReSub.

Date Transmitted:	Previous Transmittal Date:
-------------------	----------------------------

No. Copies	Description of Item	Manufacturer	Dwg. or Data No.	Action Taken*

Remarks:

To:	From: <i>HDR Engineering, Inc.</i>
Date:	

* The Action designated above is in accordance with the following legend:

A - Acceptable

B - Furnish as Noted

C - Revise and Resubmit

D - Rejected

Comments:

Distribution:		Contractor		File		Field		Owner		Other	
Copyright 1991-2013 HDR Engineering, Inc.		By		Date							

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EXHIBIT B1

Equipment Record

Equipment Data and Spare Parts Summary

Project Name					Specification Section:				
Equipment Name					Year Installed:				
Project Equipment Tag No(s).									
Equipment Manufacturer					Project/Order No.				
Address					Phone				
Fax			Web Site			E-mail			
Local Vendor/Service Center									
Address					Phone				
Fax			Web Site			E-mail			
MECHANICAL NAMEPLATE DATA									
Equip.					Serial No.				
Make					Model No.				
ID No.	Frame No.	HP			RPM			Cap.	
Size	TDH	Imp. Sz.			CFM			PSI	
Other:									
ELECTRICAL NAMEPLATE DATA									
Equip.					Serial No.				
Make					Model No.				
ID No.	Frame No.	HP	V.	Amp.	HZ	PH	RPM	SF	
Duty	Code	Ins. Cl.	Type	NEMA	C Amb.	Temp. Rise	Rating		
Other:									
SPARE PARTS PROVIDED PER CONTRACT									
Part No.		Part Name						Quantity	
RECOMMENDED SPARE PARTS									
Part No.		Part Name						Quantity	

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EXHIBIT B2

Equipment Record

Recommended Maintenance Summary

Equipment Description	Project Equip. Tag No(s).							
RECOMMENDED BREAK-IN MAINTENANCE (FIRST OIL CHANGES, ETC.)	INITIAL COMPLETION * FOLLOWING START-UP							
	D	W	M	Q	S	A	RT	Hours
RECOMMENDED PREVENTIVE MAINTENANCE	PM TASK INTERVAL *							
	D	W	M	Q	S	A	RT	Hours
* D = Daily W = Weekly M = Monthly Q = Quarterly S = Semiannual A = Annual Hours = Run Time Interval								
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EXHIBIT B3

Equipment Record

Lubrication Summary

Equipment Description		Project Equip. Tag No(s).				
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

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SECTION 01 61 03
EQUIPMENT: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Requirements of this Specification Section apply to all equipment provided on the Project including those found in other Divisions even if not specifically referenced in individual "Equipment" Articles of those Specification Sections.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Section 05 50 00 - Metal Fabrications.
 - 4. Section 46 66 56 – Open-Channel Ultraviolet Disinfection System

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Bearing Manufacturers Association (ABMA).
 - 2. American Gear Manufacturers Association (AGMA).
 - 3. ASTM International (ASTM):
 - a. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 4. Institute of Electrical and Electronics Engineers, Inc. (IEEE).
 - 5. Instrumentation, Systems, and Automation Society (ISA).
 - 6. International Organization for Standardization (ISO):
 - a. 1940, Mechanical Vibration - Balance Quality Requirements for Rotors in a Constant (Rigid) State - Part 1: Specification and Verification of Balance Tolerances.
 - 7. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. ICS 6, Enclosures for Industrial Control and System.
 - c. MG 1, Motors and Generators.
 - 8. InterNational Electrical Testing Association (NETA):
 - a. ATS, Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems.
 - 9. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC):
 - 1) Article 430, Motors, Motor Circuits, and Controllers.
 - 10. National Institute for Certification in Engineering Technologies (NICET).
 - 11. National Institute of Standards and Technology (NIST).
 - 12. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.
 - 13. Underwriters Laboratories, Inc. (UL).
 - a. 508, Standard for Safety Industrial Control Equipment.
 - b. 508A, Standard for Safety Industrial Control Panels.
- B. Electrical Equipment and Connections Testing Program:
 - 1. Testing firm:
 - a. An independent firm performing, as the sole or principal part of its business for a minimum of 10 years, the inspection, testing, calibration, and adjusting of systems.
 - b. Must have an established monitoring and testing equipment calibration program with accuracy traceable in an unbroken chain, according to NIST.

2. Field personnel:
 - a. Minimum of one (1) year field experience covering all phases of electrical equipment inspection, testing, and calibration.
 - b. Relay test technician having previous experience with testing and calibration of relays of the same manufacturer and type used on project and proficient in setting and testing the types of protection elements used.
 - c. Supervisor certified by NETA or NICET.
3. Analysis personnel:
 - a. Minimum three (3) years combined field testing and data analysis experience.
 - b. Supervisor certified by NETA or NICET.
- C. Miscellaneous:
 1. A single manufacturer of a "product" to be selected and utilized uniformly throughout Project even though:
 - a. More than one (1) manufacturer is listed for a given "product" in Specifications.
 - b. No manufacturer is listed.
 2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls, and system components shall fully comply with specific NEC requirements related to area classification and to NEMA 250 and NEMA ICS 6 designations .
 3. Variable speed equipment applications: The driven equipment manufacturer shall have single source responsibility for coordination of the equipment and VFD system and sure their compatibility.

1.3 DEFINITIONS

- A. Product: Manufactured materials and equipment.
- B. Major Equipment Supports - Supports for Equipment:
 1. Located on or suspended from elevated slabs with supported equipment weighing 2000 LBS or greater, or;
 2. Located on slab-on-grade or earth with supported equipment weighing 5000 LBS or more.
- C. Equipment:
 1. One (1) or more assemblies capable of performing a complete function.
 2. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic or hydraulic connection.
 3. Not limited to items specifically referenced in "Equipment" articles within individual Specifications.
- D. Installer or Applicator:
 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 2. Installer and applicator are synonymous.

1.4 SUBMITTALS

- A. Shop Drawings:
 1. General for all equipment:
 - a. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - b. Data sheets that include manufacturer's name and complete product model number.
 - 1) Clearly identify all optional accessories that are included.
 - c. Acknowledgement that products submitted comply with the requirements of the standards referenced.
 - d. Manufacturer's delivery, storage, handling, and installation instructions.
 - e. Equipment identification utilizing numbering system and name utilized in Drawings.
 - f. Equipment installation details:
 - 1) Location of anchorage.
 - 2) Type, size, and materials of construction of anchorage.

- 3) Anchorage setting templates.
 - 4) Manufacturer's installation instructions.
- g. Equipment area classification rating.
- h. Shipping and operating weight.
- i. Equipment physical characteristics:
 - 1) Dimensions (both horizontal and vertical).
 - 2) Materials of construction and construction details.
- j. Equipment factory primer and paint data.
- k. Manufacturer's recommended spare parts list.
- l. Equipment lining and coatings.
- m. Equipment utility requirements include air, natural gas, electricity, and water.
- n. Ladders and platforms provided with equipment:
 - 1) Certification that all components comply fully with OSHA requirements.
 - 2) Full details of construction/fabrication.
 - 3) Scaled plan and sections showing relationship to equipment.
- 2. Mechanical and process equipment:
 - a. Operating characteristics:
 - 1) Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
 - 2) Brake horsepower requirements.
 - 3) Copies of equipment data plates.
 - b. Piping and duct connection size, type and location.
 - c. Equipment bearing life certification.
 - d. Equipment foundation data:
 - 1) Equipment center of gravity.
 - 2) Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.
- 3. Electric motor:
 - a. Motor manufacturer and model number.
 - b. Complete motor nameplate data.
 - c. Weight.
 - d. NEMA design type.
 - e. Enclosure type.
 - f. Frame size.
 - g. Winding insulation class and temperature rise.
 - h. Starts per hour.
 - i. Performance data:
 - 1) Motor speed-torque curve superimposed over driven machine speed-torque curve during start-up acceleration and at rated terminal voltage a minimum permissible or specified terminal voltage for all motors over 100 HP.
 - 2) Time-current plots with acceleration versus current and thermal damage curves at the operating and ambient temperatures and at rated terminal voltage and minimum permissible or specified terminal voltage for all motors over 100 HP.
 - 3) Guaranteed minimum efficiencies at 100 percent, 75 percent, and 50 percent of full load
 - 4) Guaranteed minimum power factor at 100 percent, 75 percent, and 50 percent of full load.
 - 5) Locked rotor and full load current at rated terminal voltage and minimum permissible or specified terminal voltage.
 - 6) Starting, full load, and breakdown torque at rated terminal voltage and minimum permissible or specified terminal voltage.
 - j. Bearing data and lubrication system.
 - k. Fabrication and/or layout drawings:
 - 1) Dimensioned outlined drawing.
 - 2) Connection diagrams including accessories (strip heaters, thermal protection, etc.).

- l. Certifications:
 - 1) When utilized with a variable frequency controller, certify motor is inverter duty and the controller and motor are compatible.
 - a) Include minimum speed at which the motor may be operated for the driven machinery.
- m. Electrical gear:
 - 1) Unless specified in a narrow-scope Specification Section, provide the following:
 - a) Equipment ratings: Voltage, continuous current, kVa, watts, short circuit with stand, etc., as applicable.
 - 2) Control panels:
 - a) Panel construction.
 - b) Point-to-point ladder diagrams.
 - c) Scaled panel face and subpanel layout.
 - d) Technical product data on panel components.
 - e) Panel and subpanel dimensions and weights.
 - f) Panel access openings.
 - g) Nameplate schedule.
 - h) Panel anchorage.
4. Systems schematics and data:
 - a. Provide system schematics where required in system specifications.
 - 1) Acknowledge all system components being supplied as part of the system.
 - 2) Utilize equipment, instrument and valving tag numbers defined in the Contract Documents for all components.
 - 3) Provide technical data for each system component showing compliance with the Contract Document requirements.
 - 4) For piping components, identify all utility connections, vents and drains which will be included as part of the system.
5. Qualifications for :
 - a. Vibration testing firm and personnel.
 - b. Infrared thermography testing firm and personnel.
 - c. Electrical equipment and connections testing firm and personnel.
6. Testing plans, in accordance with PART 3 of this Specification Section:
 - a. Vibration testing.
 - b. Thermography testing.
 - c. Electrical equipment and connection testing.
- B. Operation and Maintenance Manuals:
 1. See Specification Section 01 33 04 for requirements for:
 - a. The mechanics and administration of the submittal process.
 - b. The content of Operation and Maintenance Manuals.
- C. Informational Submittals:
 1. Sample form letter for equipment field certification.
 2. Certification that equipment has been installed properly, has been initially started up, has been calibrated and/or adjusted as required, and is ready for operation.
 3. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.
 4. Field noise testing reports if such testing is specified in narrow-scope Specification Sections.
 5. Notification, at least one (1) week in advance, that motor testing will be conducted at factory.
 6. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the supplier/installer of those interfacing systems.
 7. Motor test reports.

8. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.
9. Provide three (3) bound final written reports documenting vibration monitoring and testing for specified equipment.
 - a. Include the acceptance criteria of all equipment tested.
 - b. Provide individual tabbed sections for information associated with each piece of tested equipment.
10. Preliminary field quality control testing format to be used as a basis for final field quality control reporting.
11. Testing and monitoring reports in accordance with PART 3 of this Specification Section.
12. Certification that driven equipment and VFD are compatible.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Motors:
 - a. Baldor.
 - b. General Electric.
 - c. Marathon Electric.
 - d. Reliance Electric.
 - e. Siemens.
 - f. Teco-Westinghouse.
 - g. U.S. Motors.
 - h. WEG.
 2. Variable speed drives:
 - a. Allen Bradley.
 - b. Eaton.
 - c. General Electric Company.
 - d. Square D Company.

2.2 MANUFACTURED UNITS

- A. General:
 1. Furnished equipment manufacturer's field quality control services and testing as specified in the individual equipment Specification Sections.
 2. Perform and report on all tests required by the equipment manufacturer's Operation and Maintenance Manual.
 3. Provide testing of electrical equipment and connections in accordance with Division 26.
 4. Equip testing and analysis personnel with all appropriate project related reference material required to perform tests, analyze results, and provide documentation including, but not limited to:
 - a. Contract Drawings and Specifications.
 - b. Related construction change documentation.
 - c. Approved Shop Drawings.
 - d. Approved Operation and Maintenance Manuals.
 - e. Other pertinent information as required.
- B. Equipment Monitoring and Testing Plans:
 1. Approved in accordance with Shop Drawing submittal schedule.
 2. Included as a minimum:
 - a. Qualifications of firm, field personnel, and analysis personnel doing the Work.
 - b. List and description of testing and analysis equipment to be utilized.

- c. List of all equipment to be testing, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification,
- C. Instruments Used in Equipment and Connections Quality Control Testing:
 - 1. Minimum calibration frequency:
 - a. Field analog instruments: Not more than 6 months.
 - b. Field digital instruments: Not more than 12 months.
 - c. Laboratory instruments: Not more than 12 months.
 - d. If instrument manufacturer's calibration requirements are more stringent, those requirements shall govern.
 - 2. Carry current calibration status and labels on all testing instruments.
 - 3. See individual testing programs for additional instrumentation compliance requirements.
- D. Testing and Monitoring Program Documentation:
 - 1. Provide reports with tabbed sections for each piece of equipment tested.
 - 2. Include all testing results associated with each piece of equipment under that equipment's tabbed section.
 - a. Include legible copies of all forms used to record field test information.
 - 3. Prior to start of testing, submit one (1) copy of preliminary report format for Engineer review and comment
 - a. Include data gathering and sample test report forms that will be utilized.
 - 4. In the final report, include as a minimum, the following information for all equipment tested:
 - a. Equipment identification, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification,
 - b. Date and time of each test.
 - c. Ambient conditions including temperature, humidity, and precipitation.
 - d. Visual inspection report.
 - e. Description of test and referenced standards, if any, followed while conducting tests.
 - f. Results of initial and all retesting.
 - g. Acceptance criteria.
 - h. "As found" and "as left" conditions.
 - i. Corrective action, if required, taken to meet acceptance.
 - j. Verification of corrective action signed by the Contractor, equipment supplier, and Owner's representative.
 - k. Instrument calibration dates of all instruments used in testing.
 - 5. Provide three (3) bound final reports prior to Project final completion.
- E. Vibration Monitoring and Testing Program:
 - 1. Perform vibration monitoring and testing for equipment specified in other Divisions during the Equipment Demonstration Period.
 - 2. Provide vibration testing on all rotating and reciprocating equipment having driver 25 HP and greater.
 - 3. Additional requirements for vibration monitoring and testing equipment:
 - a. Frequency response: 0.18 Hz to 25 kHz.
 - b. Resolution: 6400 lines.
 - c. Amplitude range: 18 bit for 96 dB dynamic range.
 - d. Supports measurements of acceleration, velocity, displacement, envelope demodulation for bearing defect detection.
 - e. Capable of two-place computer balancing.
 - f. Requirements for vibration sensor:
 - 1) Sensitivity: +/- 5 percent at 25 DegC= 100 mV/g.
 - 2) Acceleration range: 80 g peak.

- 3) Amplitude nonlinearity: 1 percent.
- 4) Frequency response:
 - a) +/- 5 percent = 3-5000 Hz.
 - b) +/- 10 percent = 1-9000 Hz.
- 5) Permanently attach vibration test and monitoring mounting pads to mechanical equipment at location recommended by the equipment manufacturer or as recommended by the testing firm.
- 6) Acceptability of equipment conditions, except pumps, based on ISO 1940-1 Balance Quality Grade G2.5 criteria.
- 7) Acceptability of pumping equipment to be based on HI 9.6.4 criteria.
- 8) Repair or replace equipment shown to be out of range of the acceptable tolerance until the equipment meets or exceeds acceptability standards.

F. Infrared Thermography Testing Program:

1. Perform infrared thermography testing for equipment specified in other Divisions during the Equipment Demonstration Period.
 - a. Perform on all rotating and reciprocating equipment having drivers 25 HP or greater.
 - b. Perform on electrical equipment and connections: See Specification Section 26 08 13.
2. Additional requirements for infrared thermography monitoring and testing equipment:
 - a. Temperature range: -10 to 350 DegC.
 - b. Accuracy: +/-2 percent or 2 DegC, whichever is greater.
 - c. Repeatability: +/-1 percent or 1 DegC, whichever is greater.
 - d. Temperature indication resolution: 0.1 DegC.
 - e. Minimum focus distance: 0.3 meters.
 - f. Output in color palettes: JPEG, BMP, or other digital format compatible with Windows.
3. Perform inspection per ASTM E1934.
 - a. Operate VFD driven equipment at 100 percent speed during thermographic inspection.
4. Acceptability of electrical connections and components based on temperature comparison between components and ambient air temperatures not greater than 10 DegC per ASTM E1934.
5. Acceptability of motors and equipment bearings based on temperature rise not greater than 5 DegC above the equipment and/or bearing manufacturers published criteria.
6. Repair or replace equipment shown to be out of range of the acceptable tolerance until the equipment meets or exceeds acceptability standards.

G. Electrical Equipment and Connections Testing Program:

1. Perform testing on Division 26 equipment and connections in accordance with Division 26 requirements.
2. Testing of motors:
 - a. After installation and prior to energizing the motor, perform inspections and tests per NETA ATS 7.15 for all motors 100 HP or above.
 - b. Bump motor to check for correct rotation.
3. Repair or replace equipment shown to be out of range of the acceptable tolerance until the equipment meets or exceeds acceptability standards.

H. Other Testing:

1. Perform tests and inspections not specifically listed but required to assure equipment is safe to energize and operate.
2. Subbase that supports the equipment base and that is made in the form of a cast iron or steel structure that has supporting beams, legs, and cross members that are cast, welded, or bolted shall be tested for a natural frequency of vibration after equipment is mounted.
 - a. The ratio of the natural frequency of the structure to the frequency of the disturbing force shall not be between 0.5 and 1.5.

- I. Electric Motors:
 1. Where used in conjunction with adjustable speed AC or DC drives, provide motors that are fully compatible with the speed controllers.
 2. Design for frequent starting duty equivalent to duty service required by driven equipment.
 3. Design for full voltage starting.
 4. Design bearing life based upon actual operating load conditions imposed by driven equipment.
 5. Size for altitude of Project.
 6. Furnish with stainless steel nameplates which include all data required by NEC Article 430.
 7. Use of manufacturer's standard motor will be permitted on integrally constructed motor driven equipment specified by model number in which a redesign of the complete unit would be required in order to provide a motor with features specified.
 8. AC electric motors less than 1/3 HP:
 - a. Single phase, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - c. Built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element with stainless steel enclosure.
 9. AC electric motors 1/3 to 1 HP:
 - a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - 1) For single phase motors, provide built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element.
 10. AC electric motors 1-1/2 to 10 HP:
 - a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.
 11. AC electric motors greater than 10 HP:
 - a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Oil or grease lubricated antifriction bearings conforming to ABMA standards.
 - 1) Design bearing life for 90 percent survival rating at 50,000 HRS of operation for motors up to and including 100 HP.
 - c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.
 12. Severe duty motor to have the following minimum features:
 - a. All cast iron construction.
 - b. Gasketed conduit box.
 - c. Epoxy finish for corrosion protection.
 - d. Hydrosopic varnish on windings for corrosion protection.
 - e. Drain plug and breather.
- J. NEMA Design Squirrel Cage Induction Motors:
 1. Provide motors designed and applied in compliance with NEMA and IEEE for the specific duty imposed by the driven equipment.
 2. Motors to meet NEMA MG 1 (NEMA Premium) efficiencies.
 3. Do not provide motors having a locked rotor kVA per HP exceeding the NEMA standard for the assigned NEMA code letter.
 4. For use on variable frequency type adjustable speed drives, provide:
 - a. Induction motors that are in compliance with NEMA MG 1, Part 31.
 - b. Nameplate identification meeting NEMA MG 1 Part 31 requirements.
 - c. Insulated drive end bearing on all motors.
 - d. Shaft grounding ring on all motors:
 - 1) Factory installed, maintenance free, circumferential, bearing protection ring with conductive microfiber shaft contacting material.
 - 2) Electro Static Technology AEGIS SGR Bearing Protection Ring or approved equal.

5. Design motor insulation in accordance with NEMA standards for Class F insulation with Class B temperature rise above a 40 DegC ambient.
6. Design motors for continuous duty.
7. Size motors having a 1.0 service factor so that nameplate HP is a minimum of 15 percent greater than the maximum HP requirements of the driven equipment over its entire operating range.
 - a. As an alternative, furnish motors with a 1.15 service factor and size so that nameplate HP is at least equal to the maximum HP requirements of the driven equipment over its entire operating range.
8. Motor enclosure and winding insulation application:
 - a. The following shall apply unless modified by specific Specification Sections:

MOTOR LOCATION	MOTOR ENCLOSURE / WINDING INSULATION
Wet indoor Areas	TEFC, Encapsulated Windings
Corrosive Areas	TEFC, Severe/ Chemical Duty
Class I, Division 1 Areas	Explosion Proof, Approved for Class I Division 1 Locations

NOTE: Provide TENV motors in the smaller horsepower ratings where TEFC is not available.

9. Provide oversize conduit box complete with clamp type grounding terminals inside the conduit box.

2.3 COMPONENTS

- A. Gear Drives and Drive Components:
 1. Size drive equipment capable of supporting full load including losses in speed reducers and power transmission.
 2. Provide nominal input horsepower rating of each gear or speed reducer at least equal to nameplate horsepower of drive motor.
 3. Design drive units for 24 HR continuous service, constructed so oil leakage around shafts is precluded.
 4. Utilize gears, gear lubrication systems, gear drives, speed reducers, speed increasers and flexible couplings meeting applicable standards of AGMA.
 5. Gear reducers:
 - a. Provide gear reducer totally enclosed and oil lubricated.
 - b. Utilize antifriction bearings throughout.
 - c. Provide worm gear reducers having a service factor of at least 1.20.
 - d. Furnish other helical, spiral bevel, and combination bevel-helical gear reducers with a service factor of at least 1.50.

2.4 ACCESSORIES

- A. Guards:
 1. Provide each piece of equipment having exposed moving parts with full length, easily removable guards, meeting OSHA requirements.
 2. Interior applications:
 - a. Construct from expanded galvanized steel rolled to conform to shaft or coupling surface.
 - b. Utilize non-flattened type 16 GA galvanized steel with nominal 1/2 IN spacing.
 - c. Connect to equipment frame with hot-dip galvanized bolts and wing nuts.
 3. Exterior applications:
 - a. Construct from 16 GA stainless steel or aluminum.
 - b. Construct to preclude entrance of rain, snow, or moisture.
 - c. Roll to conform to shaft or coupling surface.
 - d. Connect to equipment frame with stainless steel bolts and wing nuts.

- B. Anchorage:
 - 1. Cast-in-place anchorage:
 - a. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment.
 - b. Configuration and number of anchor bolts shall be per manufacturer's recommendations.
 - c. Provide two (2) nuts for each bolt.
 - 2. Drilled anchorage:
 - a. Adhesive anchors per Specification Section 05 50 00 with epoxy grout.
 - b. Threaded rods same as cast-in-place.
- C. Data Plate:
 - 1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.
 - 2. Permanently stamp information on data plate including manufacturer's name, equipment operating parameters, serial number and speed.
- D. Lifting Eye Bolts or Lugs:
 - 1. Provide on all equipment 50 LBS or greater.
 - 2. Provide on other equipment or products as specified in the narrow-scope Specification Sections.

2.5 FABRICATION

- A. Design, fabricate, and assemble equipment in accordance with modern engineering and shop practices.
- B. Manufacture individual parts to standard sizes and gages so that repair parts, furnished at any time, can be installed in field.
- C. Furnish like parts of duplicate units to be interchangeable.
- D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.
- E. Furnish equipment which requires periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping or equipment or similar major efforts.
 - 1. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.
- F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option.
 - 1. Provide drain connection for 3/4 IN PVC tubing.
- G. Machine the mounting feet of rotating equipment.
- H. Fabricate equipment which will be subject to Corrosive Environment in such a way as to avoid back to back placement of surfaces that can not be properly prepared and painted.
 - 1. When such back to back fabrication can not be avoided, provide continuous welds to seal such surfaces from contact with corrosive environment.
- I. Critical Speed:
 - 1. All rotating parts accurately machined and in as near perfect rotational balance as practicable.
 - 2. Excessive vibration is sufficient cause for equipment rejection.
 - 3. Ratio of all rotative speeds to critical speed of a unit or components: Greater than 1.2.
- J. Control Panels Engineered and Provided with the Equipment by the Manufacturer:
 - 1. Manufacturer's standard design for components and control logic unless specific requirements are specified in the specific equipment Specification Section.
 - 2. NEMA rated components are used in the manufacturer's standard engineered design, unless specific requirements are required in the specific equipment Specification Section.

3. Affix entire assembly with a UL 508A label "Listed Enclosed Industrial Control Panel" prior to delivery.
 - a. Control panels without an affixed UL 508A label shall be rejected.

2.6 SHOP OR FACTORY PAINT FINISHES

A. Electrical Equipment:

2.7 SOURCE QUALITY CONTROL

A. Motor Tests:

1. Test motors in accordance with NEMA and IEEE standards.
2. Provide routine test for all motors.
3. The Owner reserves the right to select and have tested, either routine or complete, any motor included in the project.
 - a. The Owner will pay all costs, including shipping and handling, for all motors successfully passing the tests.
 - b. The Contractor shall pay all costs, including shipping and handling, for all motors failing the tests.
 - c. If two (2) successive motors of the same manufacturer fail testing, the Owner has the right to reject all motors from that manufacturer.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 65 50
PRODUCT DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.1 SUMMARY

- A. General work included in this section:
 - 1. Scheduling of product delivery.
 - 2. Packaging of products for delivery.
 - 3. Protection of products against damage from:
 - a. Handling.
 - b. Exposure to elements or harsh environments.
- B. Related sections include but are not necessarily limited to:
 - 1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 – General Requirements.

1.2 DELIVERY

- A. Scheduling:
 - 1. Arrange deliveries of products in accordance with the schedule in the Agreement.
 - 2. Immediately on delivery, Seller or Seller's duly authorized representative, and Buyer or Buyer's duly authorized representative shall inspect shipments to assure compliance with the Contract Documents and accepted submittals, and that products are properly protected and undamaged.
 - 3. Seller or his representative and Buyer or his representative shall agree in writing to conditions of delivery.
 - 4. Equipment shall be packaged for outdoor all-weather storage at the Buyer's facility, except electrical control panels which are not rated NEMA 3, 4, 7, or 9.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROTECTION, STORAGE, AND HANDLING

- A. Preparation for shipment:
 - 1. Package materials and equipment to facilitate handling and protect against damage during transit, handling or storage.
 - 2. Box, crate, or otherwise completely enclose and protect all equipment.
 - 3. Protect equipment from exposure to the elements and keep thoroughly dry and dust free at all times.
 - 4. Protect painted surfaces against impact, abrasion, discoloration, or other damage.
 - 5. Grease or oil all bearings and similar items.
 - 6. Tag or mark each item per the delivery schedule or shop drawings.
 - 7. Include complete packing lists and bills of materials with each shipment.
 - 8. Provide permanent, labeled packing of spare parts.
- B. Delivery and unloading:
 - 1. Seller shall deliver all parts and equipment to the Woodside Water Renewal Facility.
 - 2. Seller or his representative shall supervise unloading of equipment and Buyer or Buyer's duly authorized representative will unload equipment.

3. Seller shall give Buyer a minimum of 48 hours notice prior to shipping the goods.
4. Seller shall give Buyer a minimum of 24 hours written notice as to the time and date of delivery.
5. Seller shall inform Buyer of the type of equipment required to unload the goods 30 days prior to shipping.
6. Goods must be delivered between 8:00 am and 3:00 pm, Mondays through Friday:
 - a. No deliveries on weekends accepted.
 - b. No deliveries on holidays accepted.
 - c. Buyer has no obligation to accept products before or after specified times of day.
7. Buyer or Buyer's duly authorized representative shall unload equipment within 24 hours of time of delivery:
 - a. Seller shall pay for all delivery truck and driver's time except that due to Buyer's failing to unload equipment within 24 hours of time of delivery.
 - b. Buyer shall pay for additional delivery truck and driver's time resulting from Buyer's failure to unload equipment within 24 hours of time of delivery.
8. Seller or his representative shall insure equipment is properly stored after off-loading.
9. If equipment is not delivered within 2 hours of the specified time and date in Seller's written notice, Seller shall reimburse Buyer for standby charges for unloading equipment and personnel.

C. Storage:

1. Buyer shall store equipment after delivery.
2. Buyer shall store and protect equipment in accordance with the following requirements:
 - a. Store immediately upon delivery.
 - b. Store products in accordance with Seller's instruction.
 - c. Store electrical equipment in weathertight structures.
 - d. Protect electrical equipment, controls and insulation against moisture, water, and dust damage.
 - e. Store fabricated products above the ground on blocking or skids.
 - f. Arrange storage in a manner to provide easy access for inspecting. Make periodic inspections of stored products to assure that products are maintained under specific conditions, and free from damage or deterioration.

3.2 FIELD QUALITY CONTROL

A. Inspect all Deliveries:

1. Seller or his representative and Buyer or Buyer's duly authorized representative shall inspect all goods upon delivery.
2. All products that are damaged, used, or in any other way unsatisfactory for use on the project shall be rejected.

END OF SECTION

SECTION 01 75 00 SYSTEM START-UP

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Procedures and actions, required of the Seller, which are necessary to achieve and demonstrate Substantial Completion.
 - 2. Requirements for Substantial Completion Submittals.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Section 46 66 56 – Open-Channel Ultraviolet Treatment Equipment

1.2 DEFINITIONS

- A. Pre-Demonstration Period: The period of time, of unspecified duration after initial construction and installation activities during which Seller, with assistance from Construction Contractor, performs in the following sequence:
 - 1. Supervise commissioning of headwork equipment and systems furnished by Seller
 - 2. Assist Construction Contractor with commissioning of the work that directly interfaces with the UV equipment and systems furnished by Seller.
 - 3. Assist Buyer and Contractor initiates process flow through the headwork equipment and systems and starts up and operates the headwork equipment and systems, without exceeding specified downtime limitations, to prove the functional integrity of the mechanical and electrical equipment and components and the control interfaces of the respective equipment and components comprising the UV equipment and systems as evidence of Substantial Completion.
 - 4. Train Buyer's personnel on the operation and maintenance of the UV equipment and systems furnished by Seller.
- B. Performance Demonstration Period: A period of time, of specified duration, following the Pre-Demonstration Period, during which the Seller, with assistance from Construction Contractor, performs:
 - 1. Seller performs field demonstration testing to demonstrate the system meets the design criteria as defined in the Contract Documents and all regulatory requirements have been achieved.
 - 2. Coordinate with other UV associated equipment and system Seller(s) to demonstrate the functional integrity of all the systems.
 - 3. Documentation of demonstration testing.
- C. Substantial Completion: See the General Conditions.

1.3 SUBMITTALS

- A. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
- B. Submit in the chronological order listed below prior to the completion of the Pre-Demonstration Period.
 - 1. Within five (5) days following the completion of any required on-site service, including but not limited to reports field logs, electronic data files etc., the Seller shall submit to the Buyer five (5) copies of all field notes and test data collected during the service visit.
 - a. The data and notes collected shall include but not be limited to:

- 1) Production logs of the UV equipment.
 - 2) Component instrument calibration certificates.
 - 3) Motor amperage readings to verify electrical is properly sized.
 - 4) Tolerance and alignment measurements, where applicable.
 - 5) And all other information collected that demonstrate that the equipment has been properly installed.
2. Master operation and maintenance training schedule:
 - a. Submit 30 days (minimum) prior to first training session for Buyer's personnel.
 - b. Schedule to include:
 - 1) Target date and time for Buyer witnessing of each system initial start-up.
 - 2) Target date and time for Operation and Maintenance training for each system, both field and classroom.
 - 3) Target date for initiation of Demonstration Period.
 - c. Submit for review and approval by Buyer.
 - d. Include holidays observed by Buyer.
 - e. Attend a schedule planning and coordination meeting 90 calendar days prior to first anticipated training session.
 - 1) Provide a status report and schedule-to-complete for requirements prerequisite to manufacturer's training.
 - 2) Identify initial target dates for individual manufacturer's training sessions.
 - f. Buyer reserves the right to insist on a minimum seven (7) days' notice of rescheduled training session not conducted on master schedule target date for any reason.
 - g. Schedule to be resubmitted until approved.
 3. Completion Submittal:
 - a. File Seller's Notice of Completion & Request for Inspection.
 - b. Approved Operation and Maintenance manuals (paper and electronic) received by Engineer minimum 1 week prior to scheduled training.
 - c. Written request for Buyer to witness each system start-up.
 - 1) Request to be received by Buyer minimum one (1) week before scheduled training of Buyer's personnel on that system.
 - d. Equipment installation certifications.
 - e. Letter verifying completion of all Commissioning start-up activities including receipt of all specified items from manufacturers or suppliers as final item prior to initiation of Performance Demonstration Period.
 - f. Written report detailing the results of the field demonstration testing, including a copy of all field notes and test data.
 - 1) Buyer and Engineer will review the written report.
 - g. The start of the equipment warranty will commence on the date of the successful field demonstration testing is completed.

1.4 COST OF START-UP

A. Seller to pay all costs associated with:

1. Seller's labor, travel and other labor-related expenses.
 - a. Seller shall also pay for the services of any manufacturer's representatives required for equipment and systems furnished by Seller.
2. The costs for work specified elsewhere as the Seller's responsibility.

B. Buyer and Buyer's Installation Contractor will pay costs associated with:

1. Construction trades labor for commissioning and testing.
2. Utilities from the time field demonstration testing begins until completion of the Performance Demonstration Period.
3. Supervision of commissioning of the overall project and of the equipment and systems not furnished by Seller.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. The ultraviolet disinfection equipment and systems start-up is divided into two periods:
 - 1. Pre-Demonstration Period including:
 - a. Completion of construction work to bring Project to a state of readiness for performance demonstration.
 - b. Installation certification.
 - c. Start-up of Equipment.
 - d. Training of Personnel.
 - e. Completion of the filing of all required submittals.
 - 2. Demonstration Period including:
 - a. Demonstration of ultraviolet disinfection equipment and systems meets the design criteria as defined in the contract documents and all regulatory requirements
 - b. Demonstration of functional integrity of all the ultraviolet disinfection equipment and systems.
 - c. Filing of Seller's Notice of Completion.

3.2 PRE-DEMONSTRATION PERIOD

- A. Completion of Construction Work:
 - 1. Complete the work to bring the ultraviolet disinfection equipment and systems to a state of readiness for performance Demonstration.
 - 2. The Seller shall instruct the Construction Contractor in the proper installation procedures for the UV equipment.
 - a. The training shall be conducted on-site by an authorized, experienced, and competent representative of the Seller, and shall include both verbal and written instructions, as specified herein.
 - 3. The Seller shall place the Goods into operation and perform tests to determine if equipment is operating properly.
 - a. The purpose of these tests is to verify that both the System and each Unit are:
 - 1) Properly installed.
 - 2) Operational.
 - 3) Capable of completing an operating cycles free of problems.
 - 4) Free from overheating, overloading, vibration, or other operating problems.
 - 4. The Construction Contractor will be responsible for making any adjustments and/or modifications to the installation process that may become necessary to ensure that all equipment is properly installed in accordance with the Seller's written instructions.
 - 5. After the installation is complete, the Seller, Construction Contractor, and Engineer shall jointly inspect the system and list any equipment that has not been properly installed, detailing the problems and noting the party who shall be responsible for each correction.
- B. Equipment Start-up:
 - 1. Requirements for individual items of equipment are included in Division 02 through Division 16 Specification Sections.
 - 2. Prepare the equipment so it will operate properly and safely and be ready to demonstrate functional integrity during the Demonstration Period.
 - 3. Procedures include but are not necessarily limited to the following:
 - a. Test or check and correct deficiencies of:
 - 1) Power, control, and monitoring circuits for continuity prior to connection to power source.
 - 2) Voltage of all circuits.
 - 3) Phase sequence.

- 4) Cleanliness of connecting piping systems.
- 5) Alignment of connected machinery.
- 6) Vacuum and pressure of all closed systems.
- 7) Lubrication.
- 8) Valve orientation and position status for manual operating mode.
- 9) Instrumentation and control signal generation, transmission, reception, and response.
- 10) Tagging and identification systems.
- 11) All equipment: Proper connections, alignment, calibration and adjustment.
- b. Calibrate all components, instruments, and safety equipment.
- c. Manually rotate or move moving parts to assure freedom of movement.
- d. "Bump" start electric motors to verify proper rotation.
- e. Perform other tests, checks, and activities required to make the equipment ready for Demonstration Period.
- f. Documentation:
 - 1) Prepare a log showing each equipment item subject to this paragraph and listing what is to be accomplished during Equipment Start-up.
 - 2) Provide a place for the Seller to record date and person accomplishing required work.
 - 3) Submit completed document before requesting inspection for Substantial Completion certification.
4. Obtain certifications, without restrictions or qualifications, and deliver to Engineer:
 - a. Manufacturer's equipment installation check letters (sometimes referred to as Manufacturer's Field Services report).
 - b. Instrumentation Supplier's Instrumentation Installation Certificate.
5. Perform Equipment Start-up to extent possible without introducing process flow including but not limited to:
 - a. Submittal of check list with verification of equipment functions with manual activation of PLC inputs and outputs.
 - b. Submittal of check list of manual activation of equipment functions from SCADA/HMI Control Panel(s).
 - c. Submittal of check list demonstrating manual SCADA/HMI system activation of equipment functions from SCADA/HMI including demonstration of field faults and instrument readings to SCADA.
 - d. Calibration of all primary elements and transmitters.
 - e. Check list confirming PLC input of all primary elements and transmitters.
 - 1) Transmitter process variable water elevations shall be simulated by using a small bucket of water to simulate different water level elevations.
 - f. Check list confirming equipment and control system restart upon opening of main service entrance breaker.
 - g. Check list describing the system status when power is lost to individual components demonstrated by opening disconnect, circuit breaker and fuses:
 - 1) Main control panel.
 - 2) PLC.
 - 3) SCADA Computer, if included in Contract.
 - 4) Each individual instrument.
 - 5) Each VFD, if included in Contract.
 - 6) Each reduced voltage starter, if included in Contract.
 - 7) UPS system, if included in Contract.
 - 8) Confirm loss of signal response and out of range response for each analog instrument.
 - 9) Checklist will be developed after P&ID Drawings and Control Loop Descriptions are provided by Seller.
 - h. Document and verify point to point as-built drawings.

6. As part of the commissioning, the Seller shall start up and operate all support systems provided by or required by the Seller for operation of the system, including but not limited to water supply system, instrumentation, air compression equipment, and electrical controls.
 - a. This testing shall demonstrate that there are no water or air leaks in the System, that the piping has been installed and connected properly, the electrical system is operating correctly, and that the instrumentation has been properly calibrated.
 7. The Seller shall furnish materials (excluding water and power), instruments, and incidental and expendable equipment required for commissioning/placing the equipment into operation.
 - a. The Seller shall retain the services of any manufacturer's representatives as required in the Contract Documents to assist with the commissioning/placing into operation of the Goods.
 8. When requested by the Seller, the Engineer shall review the operation of the equipment to verify that the commissioning is complete.
 - a. The Engineer shall perform random tests to determine if the equipment is operating properly and witness various operational sequences.
 - b. The Engineer may initiate alarm conditions to determine if the control system is functioning properly.
 - c. The Engineer's review shall include a review of the HMI interface and PLC SCADA system commissioning requirements to determine conformance with Contract Documents.
 - d. The Engineer's review shall identify any equipment that has not been properly installed, or operating, detailing the outstanding installation issues on a punch list and noting the party who shall be responsible for each correction and identify the items that require that correction.
 9. Upon satisfactory completion of the review, the Engineer shall submit to the Seller a written Notice of Completed Commissioning.
 - a. Once the :Notice of Completed Commissioning is issued, Training of Operation and Maintenance Personnel may commence.
- C. Personnel Training:
1. See individual equipment specification sections.
 2. Conduct all personnel training after completion of Equipment Start-up for the equipment for which training is being conducted.
 - a. Personnel training on individual equipment or systems will not be considered completed unless:
 - 1) All pretraining deliverables are received and approved before commencement of training on the individual equipment or system.
 - 2) No system malfunctions occur during training.
 - 3) All provisions of field and classroom training specifications are met.
 - b. Training not in compliance with the above will be performed again in its entirety by the manufacturer at no additional cost to Buyer.
 3. Field and classroom training requirements:
 - a. Hold classroom training on-site.
 - b. Notify each manufacturer specified for on-site training that the Buyer reserves the right to video record any or all training sessions.
 - 1) Organize each training session in a format compatible with video recording.
 - c. Training instructor qualification: Factory trained and familiar with giving both classroom and "hands-on" instructions.
 - d. Training instructors:
 - 1) Be at classes on time.
 - 2) Session beginning and ending times to be coordinated with the Owner and indicated on the master schedule.
 - 3) Normal time lengths for class periods can vary, but brief rest breaks should be scheduled and taken.

- e. Organize training sessions into maintenance versus operation topics and identify on schedule.
 - f. Plan for minimum class attendance of 5 people at each session and provide sufficient classroom materials, samples, and handouts for those in attendance.
 - g. Instructors to have a typed agenda and well-prepared instructional material.
 - 1) The use of visual aids, e.g., films, pictures, and slides is recommended for use during the classroom training programs.
 - 2) Deliver agendas to the Engineer a minimum of seven (7) days prior to the classroom training.
 - 3) Provide equipment required for presentation of films, slides, and other visual aids.
 - 4) Provide copies in electronic format to Buyer for Buyer's subsequent use.
 - h. In the on-site training sessions, cover the information required in the Operation and Maintenance Manuals submitted according to Specification Section 01 33 04 and the following areas as applicable to the UV equipment and systems.
 - 1) Operation of equipment.
 - 2) Lubrication of equipment.
 - 3) Maintenance and repair of equipment.
 - 4) Troubleshooting of equipment.
 - 5) Preventive maintenance procedures.
 - 6) Adjustments to equipment.
 - 7) Inventory of spare parts.
 - 8) Optimizing equipment performance.
 - 9) Capabilities.
 - 10) Operational safety.
 - 11) Emergency situation response.
 - 12) Takedown procedures (disassembly and assembly).
 - i. Address above Paragraphs 1), 2), 8), 9), 10), and 11) in the operation sessions. Address above Paragraphs 3), 4), 5), 6), 7), and 12) in the maintenance sessions.
 - j. Maintain a log of classroom training provided including: Instructors, topics, dates, time, and attendance.
- D. Complete the filing of all required submittals:
- 1. Shop Drawings.
 - 2. Operation and Maintenance Manuals (paper copies and electronic copy).
 - 3. Training material (including electronic presentation materials).
- E. Filing of Seller's Notice of Completion of the Equipment Start-up and Request for Inspection:
- 1. File the notice when the following Commissioning items have been completed:
 - a. Construction work (brought to state of readiness for demonstration testing).
 - 1) Coordinate with Construction Contractor.
 - b. Equipment Start-up.
 - c. Personnel Training.
 - d. Submittal of required documents.
 - 2. Upon notification of completion of the Pre-Demonstration testing by the Seller, the Engineer shall review the operation of the equipment to verify that the testing is complete.
 - a. The Engineer shall perform random tests to determine if the equipment is operating properly and witness various operational sequences.
 - b. The Engineer may initiate alarm conditions to determine if the control system is functioning properly.
 - 3. Engineer will inform Seller in writing of the status of the Work reviewed.
 - a. Work determined not meeting state of readiness:
 - 1) Seller: Correct deficiencies noted or submit plan of action for correction.
 - 2) Engineer: Re-inspect work after Seller's notice of correction of deficiencies.
 - 3) Second reinspection costs incurred by Engineer will be billed to Buyer who will deduct them from final payment due Seller.

3.3 DEMONSTRATION PERIOD

A. General:

1. Demonstrate the functional integrity of the mechanical, electrical, and control interfaces of the respective equipment and components comprising the UV equipment and systems as evidence of Completion.
 - a. During this demonstration period Seller shall perform the following tests and simulations and submit verification checklists:
 - 1) Equipment functions with manual activation of PLC outputs.
 - 2) Manual activation of equipment functions from HMI/SCADA system.
 - 3) Manual HMI/SCADA system activation of equipment functions from HMI/SCADA including demonstration of field faults and instrument readings to HMI/SCADA.
2. Buyer and Engineer may test system and confirm status when power is lost to individual components demonstrated by opening disconnect, circuit breaker and fuses:
 - a. Main control panel(s).
 - b. PLC if provided.
 - c. SCADA Computer if provided.
 - d. Each individual instrument.
 - e. Each VFD.
 - f. Each reduced voltage starter if provided.
 - g. UPS system if provided.
 - h. Confirm loss of signal response and out of range response for each analog instrument
 - i. Loss of Utility Power to system.
3. If, during the Demonstration Period, the aggregate amount of time used for repair, alteration, or unscheduled adjustments to any equipment or system that renders the affected equipment or system inoperative exceed 10 percent of the Demonstration Period, the demonstration of functional integrity will be deemed to have failed.
 - a. In the event of failure not caused by Buyer/Engineer's testing of power failure described above, a new Demonstration Period will recommence after correction of the cause of failure.
 - b. The new Demonstration Period shall have the same requirements and duration as the Demonstration Period previously conducted.
4. Conduct the demonstration of functional integrity under full operational conditions.
5. Buyer will provide operational personnel to provide process decisions affecting facility performance.
 - a. Buyer's assistance will be available only for process decisions.
 - b. Contractor will perform all other functions including but not limited to equipment operation and maintenance until successful completion of the Demonstration Period.
6. Buyer reserves the right to simulate operational variables, equipment failures, routine maintenance scenarios, etc., to verify the functional integrity of automatic and manual backup systems and alternate operating modes.
7. Time of beginning and ending any Demonstration Period shall be agreed upon by Seller, Buyer and Engineer in advance of initiating Demonstration Period.
8. Throughout the Demonstration Period, provide knowledgeable personnel to answer Buyer's questions; provide final field instruction on all mechanical, pumping, electrical and control systems; and respond to any system problems or failures which may occur.
9. Seller to provide all of his labor, supervision, utilities, maintenance, equipment, vehicles or any other item necessary for Seller to operate and demonstrate all systems being demonstrated.
10. The length of time to demonstrate compliance with the contract requirement in no case shall be less than 120 consecutive hours.
11. Upon successful completion of the Performance Demonstration period, Engineer will endorse certificate attesting to the successful demonstration, and citing the hour and date on which Buyer has placed the Goods in continuous service as the effective date of Substantial Completion and the beginning of the warranty period on the equipment.

- 1) Issued subject to completion or correction of items cited in the certificate (punch list).
- 2) Issued with responsibilities of Buyer and Seller cited.
- 3) Executed by Engineer.
- 4) Accepted by Buyer.
- 5) Accepted by Seller.

END OF SECTION



DIVISION 05

METALS



SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Anchor bolts, washers, and nuts.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Division 46 – Water and Wastewater Equipment

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - b. F467, Standard Specification for Nonferrous Nuts for General Use.
 - c. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
 - d. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - e. F835, Standard Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws.
 - f. F879, Standard Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws.
 - g. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
 - h. F1789, Standard Terminology for F16 Mechanical Fasteners.
 - 2. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

1.3 DEFINITIONS

- A. Fasteners: As defined in ASTM F1789.
- B. Hardware: As defined in ASTM A153/A153M.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Provide manufacturer's standard allowable load tables for the following:
 - 1) Expansion anchor bolts.
 - 2) Adhesive anchor bolts.
 - d. Certification that manufactured units meet all design loads specified.
 - e. Shop Drawings and engineering design calculations:
 - 1) Indicate design live loads.
 - 2) Sealed by a professional structural engineer.
 - 3) Engineer will review for general compliance with Contract Documents.

- B. Informational Submittals:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Headed studs and deformed bar anchors:
 - a. Nelson Stud Welding Div., TRW Inc.
 - b. Stud Welding Products, Inc.
 - 2. Expansion anchor bolts:
 - a. Hilti Inc.
 - b. ITW Ramset/Red Head.
 - c. Simpson Strong-Tie.
 - 3. Epoxy adhesive anchor bolts:
 - a. Hilti Inc.
 - b. ITW Ramset/Red Head.
 - c. Simpson Strong-Tie.
 - 4. Self-tapping concrete anchors:
 - a. ITW Buildex.
 - b. Powers Fasteners.

- B. No like, equivalent or "or-equal" item or substitution is permitted.

2.2 MATERIALS

- A. Steel:
 - 1. Bolts, nuts and washers, high strength:
 - a. ASTM A325.
 - b. Provide two (2) washers with all bolts.
 - 2. Bolts and nuts:
 - a. ASTM A307, Grade A.
- B. Stainless Steel:
 - 1. Minimum yield strength of 30,000 psi and minimum tensile strength of 75,000 psi.
 - a. Bolts and nuts: ASTM F593, Type 303, 304 or 316.
- C. Aluminum:
 - 1. ASTM F468, alloy 2024 T4 for bolts.
 - 2. ASTM F467, alloy 2024 T4 for nuts.
- D. Washers: Same material and alloy as found in accompanying bolts and nuts.
- E. Embedded Anchor Bolts:
 - 1. Building anchor bolts:
 - a. ASTM F1554, Grade 55 with weldability supplement S1 or ASTM A36 for threaded rods galvanized.
 - b. ASTM A307, Grade A for headed bolts galvanized.
 - 2. All other anchor bolts: Type 304 or 316 stainless steel with matching nut and washer.
- F. Expansion Anchor Bolts and Adhesive Anchor Bolts:
 - 1. Stainless steel, Type 304, 314 or 316.
 - 2. Provide minimum edge distance cover and spacing as recommended by manufacturer, or as indicated on Drawings whichever is larger.
 - a. Minimum embedment as recommended by manufacturer or eight (8) diameters of bolt, whichever is larger.

- b. Notify Engineer if required depth of embedment cannot be achieved at a particular anchor bolt location.
- c. Follow manufacturer's recommendations for installation and torque.
- 3. Submit manufacturer's load test data to verify at least the anchor bolt capacities at the following embedment depths:
 - a. Data must be based on actual tests performed in unreinforced mass of concrete of not more than 4000 psi compressive strength.
 - b. Capacity must be at a concrete temperature of at least 130 DegF.

ANCHOR BOLT DIAMETER (IN)	EMBEDMENT (IN)	MINIMUM ULTIMATE TENSION CAPACITY (KIP)*, **
3/8	3	4.8
1/2	4	8.1
5/8	5	11.4
3/4	6	15.4
7/8	7	20.0
1	8	24.7
1-1/4	10	34.3

* Data must be based on actual tests performed in unreinforced mass concrete of not more than 4000 psi compressive strength.

** Capacity must be at a concrete temperature of at least 130 DegF.

- 4. Expansion anchor bolts:
 - a. Kwik Bolt by Hilti, Inc.
 - b. Trubolt by ITW Ramset/Red Head.
 - c. Wedge-All by Simpson Strong-Tie.
- 5. Adhesive anchor bolts:
 - a. HVA Adhesive Anchor System by Hilti.
 - b. HIT HY 150 Adhesive Anchor by Hilti.
 - c. HSE 2411 Epoxy Adhesive Anchor by Hilti.
 - d. EPCON Ceramic 6 Epoxy by ITW Ramset/Red Head.
 - e. Acrylic-Tie by Simpson Strong-Tie.
- 6. Self-tapping concrete anchors:
 - a. Tapcon by ITW Buildex.
 - b. 410 stainless steel.
 - c. 1/4 IN DIA with 5/16 IN hex head.
 - 1) Minimum embedment as recommended by manufacturer.
 - d. #3 Phillips flat head.
- G. Headed Studs: ASTM A108 with a minimum yield strength of 50,000 psi and a minimum tensile strength of 60,000 psi.
- H. Deformed Bar Anchors: ASTM A496 or ASTM A1064 with a minimum yield strength of 70,000 psi and a minimum tensile strength of 80,000 psi.
- I. Iron and Steel Hardware: Galvanized in accordance with ASTM A153/A153M when required to be galvanized.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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DIVISION 26

ELECTRICAL



SECTION 26 05 19
WIRE AND CABLE: 600 VOLT AND BELOW

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for:
 - a. Building wire.
 - b. Power cable.
 - c. Control cable.
 - d. Instrumentation cable.
 - e. Wire connectors.
 - f. Insulating tape.
 - g. Pulling lubricant.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 26 05 00 - Electrical: Basic Requirements.
 - 4. Section 26 08 13 - Acceptance Testing.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. 1202, Standard for Flame-Propagation Testing of Wire and Cable.
 - 2. Insulated Cable Engineers Association (ICEA):
 - a. S-58-679, Standard for Control Cable Conductor Identification.
 - 3. National Electrical Manufacturers Association (NEMA):
 - a. ICS 4, Industrial Control and Systems: Terminal Blocks.
 - 4. National Electrical Manufacturers Association/Insulated Cable Engineers Association (NEMA/ICEA):
 - a. WC 57/S-73-532, Standard for Control Cables.
 - b. WC 70/S-95-658, Non-Shielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
 - 5. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - b. 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
 - 6. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
 - a. 568, Commercial Building Telecommunications Cabling Standard.
 - 7. Underwriters Laboratories, Inc. (UL):
 - a. 44, Standard for Safety Thermoset-Insulated Wires and Cables.
 - b. 83, Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - c. 467, Standard for Safety Grounding and Bonding Equipment.
 - d. 486A, Standard for Safety Wire Connectors and Soldering Lugs for use with Copper Conductors.
 - e. 486C, Standard for Safety Splicing Wire Connections.
 - f. 510, Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
 - g. 1277, Standard for Safety Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.
 - h. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.

- i. 2250, Standard for Safety Instrumentation Tray Cable.

1.3 DEFINITIONS

- A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.
- B. Instrumentation Cable:
 - 1. Multiple conductor, insulated, twisted or untwisted, with outer sheath.
 - 2. The following are specific types of instrumentation cables:
 - a. Analog signal cable:
 - 1) Used for the transmission of low current (e.g., 4-20mA DC) or low voltage (e.g., 0-10 VDC) signals, using No. 16 AWG and smaller conductors.
 - 2) Commonly used types are defined in the following:
 - a) TSP: Twisted shielded pair.
 - b) TST: Twisted shielded triad.
 - b. Digital signal cable: Used for the transmission of digital signals between computers, PLC's, RTU's, etc.
- C. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, No. 8 AWG and larger.
- D. Control Cable: Multi-conductor, insulated, with outer sheath containing building wires, No. 14, No. 12 or No. 10 AWG.
- E. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
 - 1) Wire connectors.
 - 2) Insulating tape.
 - 3) Cable lubricant.
 - b. See Specification Section 26 05 00 for additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Building wire, power and control cable:
 - a. Aetna Insulated Wire.
 - b. Alphawire.
 - c. Cerrowire.
 - d. Encore Wire Corporation.
 - e. General Cable.
 - f. Okonite Company.
 - g. Southwire Company.
 - 2. Instrumentation cable:
 - a. Analog cable:
 - 1) Alphawire.

- 2) Belden Inc.
- 3) General Cable.
- 3. Wire connectors:
 - a. Burndy Corporation.
 - b. Buchanan.
 - c. Ideal.
 - d. Ilsco.
 - e. 3M Co.
 - f. Teledyne Penn Union.
 - g. Thomas and Betts.
 - h. Phoenix Contact.
- 4. Insulating and color-coding tape:
 - a. 3M Co.
 - b. Plymouth Bishop Tapes.
 - c. Red Seal Electric Co.

2.2 MANUFACTURED UNITS

- A. Building Wire:
 - 1. Conductor shall be copper with 600 V rated insulation.
 - 2. Conductors shall be stranded, except for conductors used in lighting and receptacle circuits which may be stranded or solid.
 - 3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 - 4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 for type THHN/THWN and THHN/THWN-2 insulation.
 - 5. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 for type XHHW-2 insulation.
- B. Power Cable:
 - 1. Conductor shall be copper with 600 V rated insulation.
 - 2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 - 3. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
 - 4. Number of conductors as required, including a bare ground conductor.
 - 5. Individual conductor color coding:
 - a. ICEA S-58-679, Method 4.
 - b. See PART 3 of this Specification Section for additional requirements.
 - 6. Conform to NFPA 70 Type TC and IEEE 1202 or CSA FT-4.
- C. Control Cable:
 - 1. Conductor shall be copper with 600 V rated insulation.
 - 2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 - 3. Conform to NEMA/ICEA WC 57/S-73-532 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
 - 4. Number of conductors as required, provided with or without bare ground conductor of the same AWG size.
 - a. When a bare ground conductor is not provided, an additional insulated conductor shall be provided and used as the ground conductor (e.g., 6/c No. 14 w/g and 7/c No. 14 are equal).
 - 5. Individual conductor color coding:
 - a. ICEA S-58-679, Method 1, Table E-2.
 - b. See PART 3 of this Specification Section for additional requirements.
 - 6. Conform to NFPA 70 Type TC and IEEE 1202, CSA FT-4 or NFPA 262.
- D. Electrical Equipment Control Wire:
 - 1. Conductor shall be copper with 600 V rated insulation.

2. Conductors shall be stranded.
 3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 4. Conform to UL 44 for Type SIS insulation.
 5. Conform to UL 83 for Type MTW insulation.
- E. Instrumentation Cable:
1. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 2. Analog cable:
 - a. Tinned copper conductors.
 - b. 300 V or 600 V PVC insulation with PVC jacket.
 - c. Twisted with 100 PCT foil shield coverage with drain wire.
 - d. Six (6) twists per foot minimum.
 - e. Individual conductor color coding: ICEA S-58-679, Method 1, Table E-2.
 - f. Conform to IEEE 1202 or CSA FT-4 or NFPA 262, UL 2250, UL 1581 and NFPA 70 Type ITC.
 3. Digital cable:
 - a. As recommended by equipment (e.g., PLC, RTU) manufacturer.
 - b. Horizontal voice and data cable:
 - 1) Category 6 per TIA/EIA/ANSI 568.
 - 2) Cable shall be label-verified.
 - 3) Cable jacket shall be factory marked at regular intervals indicating verifying organization and performance level.
 - 4) Conductors: No. 24 AWG solid untinned copper.
 - 5) Rated CMP per NFPA 70.
 - c. Conform to IEEE 1202 or CSA FT-4 or NFPA 262 and NFPA 70 Type ITC.
- F. Wire Connectors:
1. Twist/screw on type:
 - a. Insulated pressure or spring type solderless connector.
 - b. 600 V rated.
 - c. Ground conductors: Conform to UL 486C and/or UL 467 when required by local codes.
 - d. Phase and neutral conductors: Conform to UL 486C.
 2. Compression and mechanical screw type:
 - a. 600 V rated.
 - b. Ground conductors: Conform to UL 467.
 - c. Phase and neutral conductors: Conform to UL 486A.
 3. Terminal block type:
 - a. High density, screw-post barrier-type with white center marker strip.
 - b. 600 V and ampere rating as required, for power circuits.
 - c. 600 V, 20 ampere rated for control circuits.
 - d. 300 V, 15 ampere rated for instrumentation circuits.
 - e. Conform to NEMA ICS 4 and UL 486A.
- G. Insulating and Color-Coding Tape:
1. Pressure sensitive vinyl.
 2. Premium grade.
 3. Heat, cold, moisture, and sunlight resistant.
 4. Thickness, depending on use conditions: 7, 8.5, or 10 MIL.
 5. For cold weather or outdoor location, tape must also be all-weather.
 6. Color:
 - a. Insulating tape: Black.
 - b. Color coding tape: Fade-resistant color as specified herein.
 7. Comply with UL 510.

- H. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Permitted Usage of Insulation Types:
1. Type XHHW-2:
 - a. Building wire and power and control cable in architectural and non-architectural finished areas.
 - b. Building wire and power and control cable in conduit below grade.
 2. Type THHN/THWN and THHN/THWN-2:
 - a. Building wire and power and control cable No. 8 AWG and smaller in architectural and non-architectural finished areas.
 3. Type SIS and MTW:
 - a. For the wiring of control equipment within control panels and field wiring of control equipment within switchgear, switchboards, motor control centers.
- B. Conductor Size Limitations:
1. Feeder and branch power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the Drawings.
 2. Control conductors shall not be smaller than No. 14 AWG unless otherwise indicated on the Drawings.
 3. Instrumentation conductors shall not be smaller than No. 18 AWG unless otherwise indicated on the Drawings.
- C. Color Code All Wiring as Follows:
1. Building wire:

	240 V, 208 V, 240/120 V, 208/120 V	480 V, 480/277 V
Phase 1	Black	Brown
Phase 2	Red *	Orange
Phase 3	Blue	Yellow
Neutral	White	White or Gray
Ground	Green	Green

* Orange when it is a high leg of a 120/240 V Delta system.

- a. Conductors No. 6 AWG and smaller: Insulated phase, neutral and ground conductors shall be identified by a continuous colored outer finish along its entire length.
- b. Conductors larger than No. 6 AWG:
 - 1) Insulated phase and neutral conductors shall be identified by one (1) of the following methods:
 - a) Continuous colored outer finish along its entire length.
 - b) 3 IN of colored tape applied at the termination.
 - 2) Insulated grounding conductor shall be identified by one (1) of the following methods:
 - a) Continuous green outer finish along its entire length.
 - b) Stripping the insulation from the entire exposed length.
 - c) Using green tape to cover the entire exposed length.
 - 3) The color coding shall be applied at all accessible locations, including but not limited to: Junction and pull boxes, wireways, manholes and handholes.

2. Power cables ICEA S-58-679, Method 4 with:
 - a. Phase and neutral conductors identified with 3 IN of colored tape, per the Table herein, applied at the terminations.
 - b. Ground conductor: Bare.
 3. Control cables ICEA S-58-679, Method 1, Table E-2:
 - a. When a bare ground is not provided, one (1) of the colored insulated conductors shall be re-identified by stripping the insulation from the entire exposed length or using green tape to cover the entire exposed length.
 - b. When used in power applications the colored insulated conductors used as phase and neutral conductors may have to be re-identified with 3 IN of colored tape, per the Table herein, applied at the terminations.
- D. Install all wiring in raceway unless otherwise indicated on the Drawings.
- E. Feeder, branch, control and instrumentation circuits shall not be combined in a raceway, cable tray, junction or pull box, except as permitted in the following:
1. Where specifically indicated on the Drawings.
 2. Where field conditions dictate and written permission is obtained from the Engineer.
 3. Control circuits shall be isolated from feeder and branch power and instrumentation circuits but combining of control circuits is permitted.
 - a. The combinations shall comply with the following:
 - 1) 12 VDC, 24 VDC and 48 VDC may be combined.
 - 2) 125 VDC shall be isolated from all other AC and DC circuits.
 - 3) AC control circuits shall be isolated from all DC circuits.
 4. Instrumentation circuits shall be isolated from feeder and branch power and control circuits but combining of instrumentation circuits is permitted.
 - a. The combinations shall comply with the following:
 - 1) Analog signal circuits may be combined.
 - 2) Digital signal circuits may be combined but isolated from analog signal circuits.
 - b. Multiple branch circuits for similar loads may be combined in a common raceway, such as multiple lighting circuits or multiple receptacle circuits or other 120Vac circuits. Do not combine lighting and receptacle circuits.
 - c. Do not combine control device circuits with lighting or receptacle circuits.
 - d. Contractor is responsible for making the required adjustments in conductor and raceway size, in accordance with all requirements of the NFPA 70, including but not limited to:
 - 1) Up sizing conductor size for required ampacity de-ratings for the number of current carrying conductors in the raceway.
 - 2) The neutral conductors may not be shared.
 - 3) Up sizing raceway size for the size and quantity of conductors.
- F. Ground the drain wire of shielded instrumentation cables at one (1) end only.
1. The preferred grounding location is at the load (e.g., control panel), not at the source (e.g., field mounted instrument).
- G. Splices and terminations for the following circuit types shall be made in the indicated enclosure type using the indicated method.
1. Feeder and branch power circuits:
 - a. Device outlet boxes:
 - 1) Twist/screw on type connectors.
 - b. Junction and pull boxes and wireways:
 - 1) Twist/screw on type connectors for use on No. 8 and smaller wire.
 - 2) Compression, mechanical screw or terminal block or terminal strip type connectors for use on No. 6 AWG and larger wire.
 - c. Motor terminal boxes:
 - 1) Twist/screw on type connectors for use on No. 10 AWG and smaller wire.
 - 2) Insulated mechanical screw type connectors for use on No. 8 AWG and larger wire.

- d. Manholes or handholes:
 - 1) Twist/screw on type connectors pre-filled with epoxy for use on No. 8 AWG and smaller wire.
 - 2) Watertight compression or mechanical screw type connectors for use on No. 6 AWG and larger wire.
 - 2. Control circuits:
 - a. Junction and pull boxes: Terminal block type connector.
 - b. Manholes or handholes: Twist/screw on type connectors pre-filled with epoxy.
 - c. Control panels and motor control centers: Terminal block or strips provided within the equipment or field installed within the equipment by the Contractor.
 - 3. Instrumentation circuits can be spliced where field conditions dictate and written permission is obtained from the Engineer.
 - a. Maintain electrical continuity of the shield when splicing twisted shielded conductors.
 - b. Junction and pull boxes: Terminal block type connector.
 - c. Control panels and motor control centers: Terminal block or strip provided within the equipment or field installed within the equipment by the Contractor.
 - 4. Non-insulated compression and mechanical screw type connectors shall be insulated with tape or hot or cold shrink type insulation to the insulation level of the conductors.
- H. Insulating Tape Usage:
- 1. For insulating connections of No. 8 AWG wire and smaller: 7 MIL vinyl tape.
 - 2. For insulating splices and taps of No. 6 AWG wire or larger: 10 MIL vinyl tape.
 - 3. For insulating connections made in cold weather or in outdoor locations: 8.5 MIL, all weather vinyl tape.
- I. Color Coding Tape Usage: For color coding of conductors.

3.2 FIELD QUALITY CONTROL

- A. Acceptance Testing:
- 1. See Specification Section 26 08 13.

END OF SECTION

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SECTION 26 08 13

ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Basic requirements for acceptance testing.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 01 61 03 - Equipment: Basic Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. 400, Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems.
 - b. 400.3, Guide for Partial Discharge Testing of Power Cable Systems in a Field Environment.
 - 2. InterNational Electrical Testing Association (NETA):
 - a. ATS, Standard for Acceptance Testing Specifications for Electric Power Equipment and Systems.
 - 3. Nationally Recognized Testing Laboratory (NRTL).
 - 4. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
 - a. 455-78-B, Optical Fibres - PART 1-40: Measurement Methods and Test Procedures - Attenuation.
- B. Qualifications:
 - 1. Testing firm qualifications: See Specification Section 01 61 03.
 - 2. Field personnel:
 - a. See Specification Section 01 61 03.
 - b. As an alternative, supervising technician may be certified by the equipment manufacturer.
 - 3. Analysis personnel:
 - a. See Specification Section 01 61 03
As an alternative, supervising technician may be certified by the equipment manufacturer.
- C. Phasing Diagram:
 - 1. Coordinate with Utility Company for phase rotations and Phase A, B and C markings.
 - a. Create a phasing diagram showing the coordinated phase rotations with generators and motors through the transformers.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. See Specification Section 01 61 03 for electrical equipment and connection testing plan submittal requirements.

- B. Informational Submittals:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Prior to energizing equipment:
 - a. Coordinated phasing diagram.
 - 3. Within two (2) weeks after successful completion of Demonstration Period (Commissioning Period):
 - a. Single report containing information including:
 - 1) Summary of Project.
 - 2) Information from pre-energization testing.
 - 3) See testing and monitoring reporting requirements in Specification Section 01 61 03.

PART 2 - PRODUCTS

2.1 FACTORY QUALITY CONTROL

- A. Provide Electrical equipment with all factory tests required by the applicable industry standards or NRTL.
- B. Factory testing will not be accepted in lieu of field acceptance testing requirements specified in this Specification Section and Specification Section 01 61 03.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. General:
 - 1. See Specification Section 01 61 03.
 - 2. Complete electrical testing in three (3) phases:
 - a. Pre-energization testing phase.
 - b. Equipment energized with no load.
 - c. Equipment energized under load.
 - 3. Perform testing in accordance with this Specification Section and NETA ATS.
 - 4. Provide field setting and programming of all adjustable protective devices and meters to settings provided by the Engineer.
- B. Equipment Monitoring and Testing Plan: See Specification Section 01 61 03.
- C. Instruments Used in Equipment and Connections Quality Control Testing: See Specification Section 01 61 03.
- D. Testing and Monitoring Program Documentation: See Specification Section 01 61 03.
- E. Electrical Equipment and Connections Testing Program:
 - 1. See Specification Section 01 61 03.
 - 2. See individual Division 26 Specification Sections for equipment specific testing requirements.
 - 3. Test all electrical equipment.
 - a. Perform all required NETA testing.
 - b. Perform all required NETA testing plus the optional testing identified with each specific type of equipment in Article 3.2 of this Specification Section.

3.2 SPECIFIC EQUIPMENT TESTING REQUIREMENTS

- A. Switchgear and Switchboards:
 - 1. Perform inspections and tests per NETA ATS 7.1.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

- B. Transformers - Small Dry Type:
 - 1. Perform inspections and tests per NETA ATS 7.2.1.1.
 - 2. Perform the following additional tests:
 - a. Record phase-to-phase, phase-to-neutral, and neutral-to-ground voltages at no load after energizing, and at operating load after startup.
 - 3. Adjust tap connections as required to provide secondary voltage within 2-1/2 PCT of nominal under normal load after approval of Engineer.
 - 4. Record as-left tap connections.
- C. Cable - Low Voltage:
 - 1. Perform inspections and tests per NETA ATS 7.3.2.
- D. Cable - Optical Fiber:
 - 1. Perform inspections on tests per TIA/EIA/ANSI 455-78-B, including:
 - a. Optical time domain reflectometer test.
 - b. Power attenuation test.
 - c. Gain margin test.
- E. Low Voltage Power Circuit Breakers:
 - 1. Perform inspections and tests per NETA ATS 7.6.1.2.
 - a. Tests shall include primary current injection testing of all breakers at final settings.
 - b. Where short-time or instantaneous settings on large frame breakers are beyond the current capability of field testing, primary injection tests at reduced currents shall be permitted if combined with secondary injection calibration test of trip unit at final settings.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
 - 3. Perform the following additional tests:
 - a. Shunt trip devices minimum tripping voltage.
 - 4. Record as-left settings.
- F. Low Voltage Molded Case Circuit Breakers:
 - 1. Perform inspections and tests per NETA ATS 7.6.1.1.
 - 2. Components:
 - a. Test all components per applicable paragraphs of this Specification Section and NETA ATS.
 - b. Thermal magnetic breakers: Visual and mechanical inspection per NETA ATS only.
 - c. Solid state trip type: Visual and mechanical inspection and electrical tests per NETA ATS.
 - 3. Record as-left settings.
- G. Grounding:
 - 1. Perform inspections and tests per NETA ATS 7.13.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
- H. Motors:
 - 1. Perform inspections and tests per NETA ATS 7.15.
 - 2. See Specification Section 01 61 03.
- I. Motor Controllers:
 - 1. Perform inspections and tests per NETA ATS 7.16.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

END OF SECTION

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DIVISION 40

PROCESS INTERCONNECTIONS



SECTION 40 90 00

INSTRUMENTATION FOR PROCESS CONTROL: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Basic requirements for complete instrumentation system for process control.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 26 05 19 - Wire and Cable: 600 Volt and Below.
 - 4. Section 40 98 00 - Control Panels and Enclosures.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Canadian Standards Association (CSA).
 - 2. FM Global (FM).
 - 3. The International Society of Automation (ISA):
 - a. 7.0.01, Quality Standard for Instrument Air.
 - b. S5.1, Instrumentation Symbols and Identification.
 - c. S5.3, Graphic Symbols for Distributed Control/Shared Display Instrumentation, Logic and Computer Systems.
 - d. S5.4, Standard Instrument Loop Diagrams.
 - e. S20, Standard Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
 - 4. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 5. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - 6. National Institute of Standards and Technology (NIST).
 - 7. Underwriters Laboratories, Inc. (UL):
 - a. 913, Standard for Safety, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations.
- B. Qualifications:
 - 1. Instrumentation subcontractor:
 - a. Experience:
 - 1) Have satisfactorily provided a control system for a minimum of five (5) projects of similar magnitude and function.
- C. Miscellaneous:
 - 1. Comply with electrical classifications and NEMA enclosure types shown on Drawings.

1.3 DEFINITIONS

- A. Architecturally finished area: Offices, laboratories, conference rooms, restrooms, corridors and other similar occupied spaces.
- B. Non-architecturally Finished Area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
- C. Hazardous Areas: Class I, II or III areas as defined in NFPA 70.
- D. Highly Corrosive and Corrosive Areas: Rooms or areas identified on the Drawings where there is a varying degree of spillage or splashing of corrosive materials such as water, wastewater or

chemical solutions; or chronic exposure to corrosive, caustic or acidic agents, chemicals, chemical fumes or chemical mixtures.

- E. Outdoor Area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
- F. Instrument Air Header: The segment of air supply piping and tubing which transports air from the compressed instrument air source through the branch isolation valve of any takeoff (branch) line.
- G. Branch Line: The segment of air supply piping and tubing which transports air from the outlet of the air header branch isolation valve through an air user's isolation valve.
- H. Intrinsically Safe Circuit: A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under test conditions as prescribed in UL 913.
- I. Calibrate: To standardize a device so that it provides a specified response to known inputs.

1.4 SYSTEM DESCRIPTION

- A. Control System Requirements:
 - 1. This Specification Section provides the general requirements for the instrument and control system.
 - 2. The instrument and control system consists of all primary elements, transmitters, switches, controllers, computers, recorders, indicators, panels, signal converters, signal boosters, amplifiers, special power supplies, special or shielded cable, special grounding or isolation, auxiliaries, software, wiring, and other devices required to provide complete control of the plant as specified in the Contract Documents.
- B. All signals shall be directly linearly proportional to measured variable unless specifically noted otherwise.
- C. Single Instrumentation Subcontractor:
 - 1. Furnish and coordinate instrumentation system through a single instrumentation subcontractor.
 - a. The instrumentation subcontractor shall be responsible for functional operations of all systems, performance of control system engineering, supervision of installation, final connections, calibrations, preparation of Drawings and Operation and Maintenance Manuals, start-up, training, demonstration of substantial completion and all other aspects of the control system.
 - 2. Ensure coordination of instrumentation with other work to ensure that necessary wiring, conduits, contacts, relays, converters, and incidentals are provided in order to transmit, receive, and control necessary signals to other control elements, to control panels, and to receiving stations.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Submittals shall be original printed material or clear unblemished photocopies of original printed material.
 - a. Facsimile information is not acceptable.
 - 3. Limit the scope of each submittal to one (1) Specification Section.
 - a. Each submittal must be submitted under the Specification Section containing requirements of submittal contents.
 - b. Do not provide any submittals for Specification Section 40 90 00.
 - 4. Product technical data including:
 - a. Equipment catalog cut sheets.

- b. Instrument data sheets:
 - 1) ISA S20 or approved equal.
 - 2) Separate data sheet for each instrument.
 - c. Materials of construction.
 - d. Minimum and maximum flow ranges.
 - e. Pressure loss curves.
 - f. Physical limits of components including temperature and pressure limits.
 - g. Size and weight.
 - h. Electrical power requirements and wiring diagrams.
 - i. NEMA rating of housings.
 - j. Submittals shall be marked with arrows to show exact features to be provided.
 - 5. Loop diagrams per ISA S5.4 as specified in Specification Section 40 98 00.
 - 6. Comprehensive set of wiring diagrams as specified in Specification Section 40 98 00.
 - 7. Panel fabrication drawings as specified in Specification Section 40 98 00.
 - 8. PLC/DCS equipment drawings.
 - 9. HMI graphics.
 - 10. Nameplate layout drawings.
 - 11. Drawings, systems, and other elements are represented schematically in accordance with ISA S5.1 and ISA S5.3.
 - a. The nomenclature, tag numbers, equipment numbers, panel numbers, and related series identification contained in the Contract Documents shall be employed exclusively throughout submittals.
 - 12. All Shop Drawings shall be modified with as-built information/corrections.
 - 13. All panel and wiring drawings shall be provided in both hardcopy and softcopy.
 - a. Furnish electronic files on CD-ROM or DVD-ROM media.
 - b. Drawings in AUTO CAD format.
 - 14. Provide a parameter setting summary sheet for each field configurable device.
 - 15. Certifications:
 - a. Documentation verifying that calibration equipment is certified with NIST traceability.
 - b. Approvals from independent testing laboratories or approval agencies, such as UL, FM or CSA.
 - 1) Certification documentation is required for all equipment for which the specifications require independent agency approval.
 - 16. Testing reports: Source quality control reports.
- B. Contract Closeout Information:
- 1. Operation and Maintenance Data:
 - a. See Specification Section 01 33 04 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.
 - 2. Warranties: Provide copies of warranties and list of factory authorized service agents.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not remove shipping blocks, plugs, caps, and desiccant dryers installed to protect the instrumentation during shipment until the instruments are installed and permanent connections are made.

1.7 SITE CONDITIONS

- A. Unless designated otherwise on the Drawings, area designations are as follows:
 - 1. Outdoor area:
 - a. Wet.
 - b. Corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.
 - c. Below grade vaults and manholes:
 - 1) Subject to temporary submergence when specifically designated on the Drawings or Specifications.
 - 2. Architecturally finished area:

- a. Dry.
 - b. Noncorrosive unless designated otherwise on the Drawings or in the Specifications.
 - c. Nonhazardous unless designated otherwise on the Drawings or in the Specifications.
3. Non-architecturally finished area: As designated elsewhere on the Drawings or in the Specifications.

PART 2 - PRODUCTS

2.1 NEMA TYPE REQUIREMENTS

- A. Provide enclosures/housing for control system components in accordance with the following:
 1. Areas designated as wet: NEMA Type 4.
 2. Areas designated as wet and/or corrosive: NEMA Type 4X.
 3. Areas designated as Class I hazardous, Groups A, B, C, or D as defined in NFPA 70:
 - a. NEMA Type 7 unless all electrical components within enclosure utilize intrinsically safe circuitry.
 - 1) Utilize intrinsically safe circuits to the maximum extent practical and as depicted in the Contract Documents.
 4. Areas designated as Class II hazardous, Groups E, F, or G as defined in NFPA 70:
 - a. NEMA Type 9 unless all electrical components within enclosure utilize intrinsically safe circuitry.
 - 1) Utilize intrinsically safe circuits to the maximum extent practical and as depicted in the Contract Documents.
 5. Either architecturally or non-architecturally finished areas designated as dry, noncorrosive, and nonhazardous: NEMA Type 12.
 6. Areas designated to be subject to temporary submersion: NEMA 6P.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

- A. System Operating Criteria:
 1. Stability: After controls have taken corrective action, as result of a change in the controlled variable or a change in setpoint, oscillation of final control element shall not exceed two (2) cycles per minute or a magnitude of movement of 0.5 PCT full travel.
 2. Response: Any change in setpoint or change in controlled variable shall produce a corresponding corrective change in position of final control element and become stabilized within 30 seconds.
 3. Agreement: Setpoint indication of controlled variable and measured indication of controlled variable shall agree within 3 PCT of full scale over a 6:1 operating range.
 4. Repeatability: For any repeated magnitude of control signal, from either an increasing or decreasing direction, the final control element shall take a repeated position within 0.5 PCT of full travel regardless of force required to position final element.
 5. Sensitivity: Controls shall respond to setpoint deviations and measured variable deviations within 1.0 PCT of full scale.
 6. Performance: All instruments and control devices shall perform in accordance with manufacturer's specifications.

2.3 ACCESSORIES

- A. Provide identification devices for instrumentation system components in accordance with Specification Section 10 14 00.
- B. Provide corrosion resistant spacers to maintain 1/4 IN separation between equipment and mounting surface in wet areas, on below grade walls and on walls of liquid containment or processing areas such as Clarifiers, Digesters, Reservoirs, etc.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Wherever feasible, use bottom entry for all conduit entry to instruments and junction boxes.
- B. Install electrical components per the requirements of the Electrical design.
- C. Panel-Mounted Instruments:
 - 1. Mount and wire so removal or replacement may be accomplished without interruption of service to adjacent devices.
 - 2. Locate all devices mounted inside enclosures so terminals and adjustment devices are readily accessible without use of special tools and with terminal markings clearly visible.
- D. See Specification Section 26 05 19.

3.2 FIELD QUALITY CONTROL

- A. See Specification Section 01 75 00.
- B. Maintain accurate daily log of all startup activities, calibration functions, and final setpoint adjustments.
 - 1. Documentation requirements include the utilization of the forms located at the end of this Specification Section.
 - a. Loop Check-out Sheet.
 - b. Instrument Certification Sheet.
 - c. Final Control Element Certification Sheet.
- C. In the event that instrument air is not available during calibration and testing, supply either filtered, dry, instrument quality air from a portable compressor or bottled, dry, instrument quality air.
 - 1. Do not, under any circumstances, apply hydrostatic test to any part of the air supply system or pneumatic control system.
- D. Pneumatic Signal Tubing Testing:
 - 1. Before the leak test is begun, blow clean with dry air.
 - 2. Test signal tubing per ISA 7.0.01, except for tubing runs of less than 10 FT where simple soap bubble testing will suffice.
 - 3. If a leak is detected, repair the leak and repeat the leak test.
 - 4. After completion of the leak test, check each signal line for obstructions.
 - a. If any are indicated, remove and retest.
- E. Instrumentation Calibration:
 - 1. Verify that all instruments and control devices are calibrated to provide the performance required by the Contract Documents.
 - 2. Calibrate all field-mounted instruments, other than local pressure and temperature gages, after the device is mounted in place to assure proper installed operation.
 - 3. Calibrate in accordance with the manufacturer's specifications.
 - 4. Bench calibrate pressure and temperature gages.
 - a. Field mount gage within seven (7) days of calibration.
 - 5. Check the calibration of each transmitter and gage across its specified range at 0, 25, 50, 75, and 100 PCT.
 - a. Check for both increasing and decreasing input signals to detect hysteresis.
 - 6. Replace any instrument which cannot be properly adjusted.
 - 7. Stroke control valves with clean dry air to verify control action, positioner settings, and solenoid functions.
 - 8. Calibration equipment shall be certified by an independent agency with traceability to NIST.
 - a. Certification shall be up-to-date.
 - b. Use of equipment with expired certifications shall not be permitted.
 - 9. Calibration equipment shall be at least three (3) times more accurate as the device being calibrated.

- F. Loop check-out requirements are as follows:
1. Check control signal generation, transmission, reception and response for all control loops under simulated operating conditions by imposing a signal on the loop at the instrument connections.
 - a. Use actual signals where available.
 - b. Closely observe controllers, indicators, transmitters, HMI displays, recorders, alarm and trip units, remote setpoints, ratio systems, and other control components.
 - 1) Verify that readings at all loop components are in agreement.
 - 2) Make corrections as required.
 - a) Following any corrections, retest the loop as before.
 2. Stroke all control valves, cylinders, drives and connecting linkages from the local control station and from the control room operator interface.
 3. Check all interlocks to the maximum extent possible.
 4. In addition to any other as-recorded documents, record all setpoint and calibration changes on all affected Contract Documents and turn over to the Owner.
- G. Provide verification of system assembly, power, ground, and I/O tests.
- H. Verify existence and measure adequacy of all grounds required for instrumentation and controls.

END OF SECTION

SECTION 40 98 00
CONTROL PANELS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Specification Section is only applicable to panels furnished with Division 46 equipment packages when so stated in the applicable Division 46 Specification Section.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Division 46 – Water and Wastewater Equipment.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI).
 - 2. ASTM International (ASTM):
 - a. B75, Standard Specification for Seamless Copper Tube.
 - 3. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated 600 Volts.
 - c. ICS 4, Industrial Control and Systems: Terminal Blocks.
 - 4. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC):
 - 1) Article 409, Industrial Control Panels.
 - 5. Underwriters Laboratories, Inc. (UL):
 - a. 508A, Standard for Safety Industrial Control Panels.
- B. Miscellaneous:
 - 1. Approved supplier of Industrial Control Panels under provisions of UL 508A.
 - a. Entire assembly shall be affixed with a UL 508A label "Listed Enclosed Industrial Control Panel" prior to shipment to the jobsite.
 - b. Control panel(s) without an affixed UL 508A label shall be rejected and sent back to the factory.

1.3 DEFINITIONS

- A. The term "panel" refers to control panels or enclosures listed in the schedule included in this Specification Section.
- B. Foreign Voltages: Voltages that may be present in circuits when the panel main power is disconnected.
- C. Intrinsically Safe:
 - 1. A device, instrument or component that will not produce sparks or thermal effects under normal or abnormal conditions that will ignite a specified gas mixture.
 - 2. Designed such that electrical and thermal energy limits inherently are at levels incapable of causing ignition.
- D. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.
- E. Instrumentation Cable:
 - 1. Multiple conductor, insulated, twisted or untwisted, with outer sheath.

2. Instrumentation cable is typically either TSP (twisted-shielded pair) or TST (twisted-shielded triad) and is used for the transmission of low current or low voltage signals.
- F. Ground Fault Circuit Interrupter (GFCI): A type of device (e.g., circuit breaker or receptacle) which detects an abnormal current flow to ground and opens the circuit preventing a hazardous situation.
- G. Programmable Logic Controller (PLC): A specialized industrial computer using programmed, custom instructions to provide automated monitoring and control functions by interfacing software control strategies to input/output devices.
- H. Remote Terminal Unit (RTU): An industrial data collection device designed for location at a remote site, that communicates data to a host system by using telemetry such as radio, dial-up telephone, or leased lines.
- I. Input/Output (I/O): Hardware for the moving of control signals into and/or out of a PLC or RTU.
- J. Supervisory Control and Data Acquisition (SCADA): Used in process control applications, where programmable logic controllers (PLCs) perform control functions but are monitored and supervised by computer workstations.
- K. Highway Addressable Remote Transducer (HART): An open, master-slave protocol for bus addressable field instruments.
- L. Digital Signal Cable: Used for the transmission of digital communication signals between computers, PLCs, RTUs, etc.
- M. Uninterruptible Power Supply (UPS): A backup power unit that provides continuous power when the normal power supply is interrupted.
- N. Loop Calibrator: Portable testing and measurement tool capable of accurately generating and measuring 4-20ma DC analog signals.

1.4 SUBMITTALS

- A. Shop Drawings:
 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 2. Prepared with computer aided design (CAD) software.
 3. Printed on 11 by 17 IN sheets.
 4. Drawings shall include a title block containing the following:
 - a. Plant or facility name where panel(s) are to be installed.
 - b. Drawing title.
 - c. Drawing number.
 - d. Revision list with revision number and date
 - e. Drawing date.
 - f. Drawing scale.
 - g. Manufacturer name, address, and telephone number.
 5. Cover sheet for each drawing set shall indicate the following:
 - a. Plant or facility name.
 - b. Project name.
 - c. Submittal description.
 - d. Revision number.
 - e. Issue date.
 6. Table of contents sheet(s) shall indicate the following for each drawing in the set:
 - a. Drawing number.
 - b. Drawing title.
 - c. Sheet number.
 7. Legend and abbreviation sheet shall indicate the following:
 - a. Description of symbols and abbreviations used.

- b. Panel construction notes including enclosure NEMA rating, finish type and color, wire type, wire color strategy, conductor sizes, and wire labeling strategy.
 - c. Confirmation that the panel(s) are to be affixed with a UL 508A label prior to shipment from the factory.
- 8. Bill of Material for each panel shall include the following component information:
 - a. Instrument tag number.
 - b. Quantity.
 - c. Functional name or description.
 - d. Manufacturer.
 - e. Complete model number.
 - f. Size or rating.
- 9. Panel exterior layout drawings to scale and shall indicate the following:
 - a. Panel materials of construction, dimensions, and total assembled weight.
 - b. Panel access openings.
 - c. Conduit access locations.
 - d. Front panel device layout.
 - e. Nameplate schedule:
 - 1) Nameplate location.
 - 2) Legend which indicates text, letter height and color, and background color.
 - f. Alarm annunciator window engraving schedule.
 - g. Layouts of graphic panels or mosaic displays.
- 10. Panel interior layout drawings shall be drawn to scale and shall indicate the following:
 - a. Sub-panel or mounting pan dimensions.
 - b. Interior device layouts.
 - c. PLC/RTU general arrangement layouts.
 - d. Wire-way locations, purpose, and dimensions.
 - e. Terminal strip designations.
 - f. Location of external wiring and/or piping connections.
 - g. Location of lighting fixtures, switches, and receptacles.
- 11. Wiring diagrams shall consist of the following:
 - a. Panel power distribution diagrams.
 - b. Control and instrumentation wiring diagrams.
 - c. PLC/RTU I/O information:
 - 1) Model number of I/O module.
 - 2) Description of I/O module type and function.
 - 3) Rack and slot number.
 - 4) Terminal number on module.
 - 5) Point or channel number.
 - 6) Programmed point addresses.
 - 7) Signal function and type.
 - d. Wiring diagrams shall identify each wire as it is to be labeled.
- B. Manufacturer catalog cut sheets for enclosure, finish, panel devices, control auxiliaries, and accessories.
- C. Electrical load calculations for each panel:
 - 1. Total connected load.
 - 2. Peak electrical demand for each panel.
- D. Climate control calculations for each panel.
 - 1. Verify that sufficient dissipation and/or generation of heat is provided to maintain interior panel temperatures within the rated operating temperatures of panel components.
- E. Operation and Maintenance Manuals:
 - 1. See Specification Section 01 33 04 for requirements for:
 - a. The mechanics and administration of the submittal process.
 - b. The content of Operation and Maintenance Manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Per Section 01 65 50.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Enclosures:
 - a. Hoffman Engineering Co.
 - b. Hammond Manufacturing.
 2. Power supplies:
 - a. Sola Hevi-Duty.
 - b. Phoenix Contact.
 - c. Rockwell Automation.Relay:
 3. Control Relays:
 - 1) Idec.
 - 2) Potter & Brumfield.
 - 3) Allen-Bradley.
 4. Time Delay Relays:
 - 1) Eagle Signal Controls.
 - 2) Idec.
 5. Panel heaters:
 - a. Hoffman Enclosures, Inc.
 - b. Hammond Manufacturing.
 6. Cooling fans and exhaust packages:
 - a. Hoffman Enclosures, Inc.
 - b. Rittal.
 7. Internal corrosion inhibitors:
 - a. Hoffman Enclosures, Inc.; Model A-HCI.
 - b. Northern Technologies International Corporation (NTIC); Model Zerust VC.
 - c. Cortec Corporation; Model VpCI Emitting Systems.
- B. Submit request for substitution in accordance with Specification Section 01 33 00.

2.2 FABRICATION

- A. General:
1. Fabricate panels with instrument arrangements and dimensions identified in the Contract Documents.
 2. Provide panel(s) with the required enclosure rating per NEMA 250 to meet classifications identified in the Contract Documents.
 3. Devices installed in panel openings shall have a NEMA enclosure rating at least equal to the panel enclosure rating.
 - a. Devices that cannot be obtained with an adequate NEMA rating shall be installed behind a transparent viewing window.
 - b. The window shall maintain the required NEMA rating of the enclosure.
 4. Panel(s) shall be completely assembled at the factory.
 - a. No fabrication other than correction of minor defects or minor transit damage shall be performed on panels at the jobsite.
 5. Painting:
 - a. Panels fabricated from steel shall have their internal and external surfaces prepared, cleaned, primed, and painted.
 - 1) Mechanically abrade all surfaces to remove rust, scale, and surface imperfections.

- 2) Provide final surface treatment with 120 grit abrasives or finer, followed by spot putty to fill all voids.
 - 3) Utilize solvent or chemical methods to clean panel surfaces.
 - 4) Apply surface conversion of zinc phosphate prior to painting to improve paint adhesion and to increase corrosion resistance.
 - 5) Electrostatically apply polyester urethane powder coating to all inside and outside surfaces.
 - 6) Bake powder coating at high temperatures to bond coating to enclosure surface.
 - a) Panel interior shall be white with semi-gloss finish.
 - b) Panel exterior shall be ANSI #61 gray with flat finish.
 - 7) Application of alkyd liquid enamel coating shall be allowed in lieu of polyester urethane powder for wall mounted NEMA 1 or NEMA 12 rated panels.
 - b. Panels fabricated from stainless steel, aluminum, or fiberglass shall not be painted.
 6. Finish opening edges of panel cutouts to smooth and true surface conditions.
 - a. Panels fabricated from steel shall have the opening edges finished with the panel exterior paint.
 7. Panel shall meet all requirements of UL 508A.
 - a. If more than one (1) disconnect switch is required to disconnect all power within a panel or enclosure, provide a cautionary marking with the word "CAUTION" and the following or equivalent, "Risk of Electric Shock-More than one (1) disconnect switch required to de-energize the equipment before servicing."
 8. Provide control panel in accordance with NFPA 70, Article 409.
 - a. In the event of any conflict between NFPA 70, Article 409 and UL 508A, the more stringent requirement shall apply.
- B. Free-Standing Panels:
1. Welded construction.
 2. Completely enclosed, self-supporting, and gasketed dusttight, NEMA 12.
 3. Rolled lip around all sides of enclosure door opening.
 4. Seams and corners welded and ground smooth to touch and smooth in visual appearance.
 5. Full height, fully gasketed flush pan doors.
 6. Full length piano hinges rated for 1.5 times door plus instrument weight.
 7. Doors with keyed alike locking handles and three-point catch.
 8. Appropriate conduit, wiring, and instrument openings shall be provided.
 9. Lifting eyebolts to allow simple, safe rigging and lifting of panel during installation.
- C. Wall Mounted Panels:
1. Seams continuously welded and ground smooth.
 2. Rolled lip around all sides of enclosure door opening.
 3. Gasketed dust tight, NEMA 12.
 4. Three-point latching mechanism operated by oil tight key-locking handle.
 5. Key doors alike.
 6. Continuous heavy GA hinge pin on doors.
 - a. Hinges rated for 1.5 times door plus instrument weight.
 7. Front full opening door.
 8. Brackets for wall mounting.
- D. Internal Panel Wiring:
1. Panel wire duct shall be installed between each row of components, and adjacent to each terminal strip.
 - a. Route wiring within the panel in wire-duct neatly tied and bundled with tie wraps.
 - b. Follow wire-duct manufacturer's recommended fill limits.
 - c. Wire-duct shall have removable snap-on covers and perforated walls for easy wire entrance.
 - d. Wire-duct shall be constructed of nonmetallic materials with rating in excess of the maximum voltage carried therein.

2. Wiring shall be installed such that if wires are removed from one (1) device, source of power will not be disrupted to other devices.
3. Splicing and tapping of wires permitted only at terminal blocks.
4. Wire bunches to doors shall be secured at each end so that bending or twisting will be around longitudinal axis of wire.
 - a. Protect bend area with sleeve.
5. Arrange wiring neatly, cut to proper length, with surplus wire removed.
 - a. Arrange wiring with sufficient clearance.
 - b. Provide abrasion protection for wire bundles that pass through openings or across edges of sheet metal.
6. AC circuits shall be routed separate from analog signal cables and digital signal cables.
 - a. Separate by at least 6 IN, except at unavoidable crossover points and at device terminations.
7. Provide at least 6 IN of separation between intrinsically safe devices and circuits and non-intrinsically safe devices and circuits.
8. Wiring to pilot devices or rotary switches shall be individually bundled and installed with a "flexible loop" of sufficient length to permit the component to be removed from panel for maintenance without removing terminations.
9. Conductors for AC and DC circuits shall be type MTW stranded copper listed for operation with 600 V at 90 DegC.
 - a. Conductor size shall be as required for load and 16 AWG minimum.
 - b. Internal panel wiring color code:
 - 1) AC circuits:
 - a) Power wiring: Black.
 - b) Control interconnections: Yellow.
 - c) Neutral: White.
 - d) Ground: Green.
 - 2) Low voltage DC circuits:
 - a) Power wiring: Blue.
 - b) Control interconnections: Violet.
 - 3) Foreign voltage circuits: Pink.
 - 4) Annunciator circuits: Red.
 - 5) Intrinsically safe circuits: Orange.
10. Analog signal cables shall be of 600 V insulation, stranded copper, twisted-shielded pairs.
 - a. Conductor size: 18 AWG minimum.
 - b. Terminate shield drain conductors to ground only at one (1) end of the cable.
11. High precision 250 ohm resistors with 0.25 percent accuracy shall be used where 4-20 mA DC analog signals are converted to 1-5 Vdc signals.
 - a. Resistors located at terminal strips.
 - b. Resistors terminated using individual terminal blocks and with no other conductors.
 - c. Resistor leads shall be un-insulated and of sufficient length to allow test or calibration equipment (e.g., HART communicator, loop calibrator) to be properly attached to the circuit with clamped test leads.
12. Analog signals for devices in separate enclosures shall not be wired in series.
 - a. Loop isolators shall be used where analog signals are transmitted between control enclosures.
13. Wire and cable identification:
 - a. Wire and cables numbered and tagged at each termination.
 - b. Wire tags:
 - 1) Slip-on, PVC wire sleeves with legible, machine-printed markings.
 - 2) Adhesive, snap-on, or adhesive type labels are not acceptable.
 - c. Markings as identified in the Shop Drawings.

E. Grounding Requirements:

1. Equipment grounding conductors shall be separated from incoming power conductors at the point of entry.

2. Minimize grounding conductor length within the enclosure by locating the ground reference point as close as practical to the incoming power point of entry.
 3. Bond electrical racks, chassis and machine elements to a central ground bus.
 - a. Nonconductive materials, such as paint, shall be removed from the area where the equipment contacts the enclosure.
 4. Bond the enclosure to the ground bus.
 - a. It is imperative that good electrical connections are made at the point of contact between the ground bus and enclosure.
 5. Panel-mounted devices shall be bonded to the panel enclosure or the panel grounding system by means of locknuts or pressure mounting methods.
 6. Sub-panels and doors shall be bonded to ground.
- F. Termination Requirements:
1. Wiring to circuits external to the panel connected to interposing terminal blocks.
 2. Terminal blocks rigidly mounted on DIN rail mounting channels.
 3. Terminal strips located to provide adequate space for entrance and termination of the field conductors.
 4. One (1) side of each strip of terminal blocks reserved exclusively for the termination of field conductors.
 5. Terminal block markings:
 - a. Marking shall be the same as associated wire marking.
 - b. Legible, machine-printed markings.
 - c. Markings as identified in the shop drawings.
 6. Terminal block mechanical characteristics, and electrical characteristics shall be in accordance with NEMA ICS 4.
 7. Terminal blocks with continuous marking strips.
 - a. Each terminal block shall be identified with machine printed labels.
 8. Terminals shall facilitate wire sizes as follows:
 - a. 120 Vac applications: Conductor size 12 AWG minimum.
 - b. Other: Conductor size 14 AWG minimum..
 9. Analog signal cable shield drain conductors shall be individually terminated.
 10. Install minimum of 20 percent spare terminals.
 11. Bladed, knife switch, isolating type terminal blocks where control voltages enter or leave the panel.
 12. Fused terminal blocks shall be used in the following circuits:
 - a. Control voltage is used to energize a solenoid valve.
 - b. DC power is connected to 2-wire, loop-powered instruments.
 13. Fused terminal blocks shall be provided with blown fuse indicators.
 14. When control circuits require more than one (1) field conductor connected to a single wiring point, a sufficient number of terminal points shall be connected internally to allow termination of only one (1) field conductor per terminal block.
 15. DIN rail mounting channels shall be installed along full length of the terminal strip areas to facilitate future expansion.
 16. Connections to devices with screw type terminals shall be made using spade-tongue, insulated, compression terminators.
- G. Component Mounting and Placement:
1. Components shall be installed per manufacturer instructions.
 2. Control relays and other control auxiliaries shall be mounted on DIN rail mounting channels where practical.
 3. Front panel devices shall be mounted within a range of 40 to 70 IN above the finished floor, unless otherwise shown in the Contract Documents.
 4. PLC/RTU and I/O rack installation:
 - a. Located such that the LED indicators and switches are readily visible with the panel door open.
 - b. Located such that repair and/or replacement of component can be accomplished without the need to remove wire terminations or other installed components.

5. Locate power supplies with sufficient spacing for circulation of air.
 6. Where components such as magnetic starters, contactors, relays, and other electromagnetic devices are installed within the same enclosure as the PLC/RTU system components, provide a barrier of at least 6 IN of separation between the “power area containing the electromagnetic devices” and the “control area”.
 7. Components mounted in the panel interior shall be fastened to an interior sub-panel using machine screws.
 - a. Fastening devices shall not project through the outer surface of the panel enclosure.
 8. Excess mounting space of at least 20 percent for component types listed below to facilitate future expansion:
 - a. Fuse holders.
 - b. Circuit breakers.
 - c. Control relays.
 - d. Time delay relays.
 - e. Intrinsically safe barriers and relays.
 9. Components installed on sub-panels shall be provided with a minimum spacing between component and wire duct of 1 IN.
 - a. Minimum of 2 IN separation between terminal strips and wire ducts.
 10. Pneumatic tubes and appurtenances:
 - a. Connect panel air piping and tubing penetrations with bulkhead fittings.
 - b. Pneumatic control tubing shall be 1/4 IN OD.
 - 1) Tubing material: Either soft annealed ASTM B75 copper or flame-resistant polyethylene.
 - c. Main headers within panels shall be minimum 1 IN.
 - d. Compression-type pressure fittings.
 - e. Equip panel instrument leads with ball type isolation valve.
 - f. Route tubing neatly and mount securely.
 - g. Do not route tubing in front of or in wire ducting.
 - h. Code terminal plates.
 - i. Pneumatic devices shall be served by a dual function filter regulator.
- H. Power Distribution:
1. Main incoming power circuits shall be protected with a thermal magnetic circuit breaker.
 - a. Limit load to maximum of 80 percent of circuit breaker rating.
 2. Component types listed below shall be individually fused so that they may be individually de-energized for maintenance:
 - a. PLC/RTU power supply modules.
 - b. Single-loop controllers.
 - c. Recorders.
 - d. Alarm annunciators.
 3. Equip each panel with necessary power supplies with ratings required for installed equipment and with minimum 25 percent spare capacity.
 4. Constant voltage transformers, balancing potentiometers, and rectifiers as necessary for specific instrument requirements.
- I. Power supplies:
1. Design and fabrication:
 - a. Converts 120 Vac input to DC power at required voltage.
 - b. DIN rail mount with enclosure (i.e., not open frame).
 - c. Switching type.
 - d. AC input: 120 Vac +/-15 percent, nominal 60 Hz.
 - e. Efficiency: Minimum 86 percent.
 - f. Rated mean time between failure (MTBF): 500,000 HRS.
 - g. Voltage regulation:
 - 1) Static: Less than 1.0 percent V_{out} .
 - 2) Dynamic: +/-2 percent V_{out} overall.
 - h. Output ripple/noise: Less than 100 mV peak to peak (20 MHz).

- i. Overload, short circuit and open circuit protection.
- j. Temperature rating: 0 to 60 DegC full rated, derated linearly to 50 percent at 70 DegC.
- k. Humidity rating: Up to 90 percent, non-condensing.
- l. LED status indication for DC power.

J. Relays:

1. Control Relays:

- a. Design and fabrication:
 - 1) Plug-in general purpose relay.
 - 2) Blade connector type.
 - 3) Switching capacity: 10 A.
 - 4) Contact material: Silver cadmium oxide.
 - 5) Provide relays with a minimum of 3 SPDT contacts.
 - 6) Coil voltage: 120 Vac or 24 Vdc.
 - 7) Relay sockets are DIN rail mounted.
 - 8) Internal neon or LED indicator is lit when coil is energized.
 - 9) Clear polycarbonate dust cover with clip fastener.
 - 10) Check button.
 - 11) Temperature rise:
 - a) Coil: 85 DegF max.
 - b) Contact: 65 DegF max.
 - 12) Insulation resistance: 100 Meg min.
 - 13) Frequency response: 1800 operations/hour.
 - 14) Operating temperature: -20 to +150 DegF.
 - 15) Life expectancy:
 - a) Electrical: 500,000 operations or more.
 - b) Mechanical: 50,000,000 operations or more.
 - 16) UL listed or recognized.
- 2. Time delay relays:
 - 1) Design and fabrication:
 - a) Melt design test and performance requirements of NEMA ICS 2-218.
 - b) Heavy-duty.
 - c) Solid-state construction.
 - d) External adjusting dial.
 - e) Auxiliary relays as required to perform functions specified or shown on Drawings.
 - f) Operates on 117 Vac (± 10 percent) power source.
 - g) Contact rating: A150 per NEMA ICS 2-125.
 - h) Furnish with "on" and "timing out" indicators.

K. Environmental Controls:

- 1. Indoor panels located in a designated electrical room or control room:
 - a. Thermostat controlled cooling fans with exhaust louvers if required to maintain temperature inside panel(s) below the maximum operating temperature rating of the internal components.
 - b. Internal corrosion inhibitors.
- 2. Environmental control components:
 - a. Panel heaters:
 - 1) Thermostat controlled.
 - 2) Fan driven.
 - 3) Components mounted in an anodized aluminum housing.
 - 4) Designed for sub-panel mounting.
 - 5) Powered from 120 Vac and protected with a dedicated circuit breaker.
 - b. Cooling fans and exhaust packages:
 - 1) Cooling fan with louver or grill and replaceable filter.
 - 2) Designed to be mounted within a panel cutout to provide positive airflow through the panel.

- 3) Cooling fan and exhaust louvers shall be designed and listed to maintain a NEMA 12 enclosure rating.
- 4) Fitted with replaceable, high-density foam or synthetic fiber.
- 5) Cooling fan controlled with a separately mounted thermostat with bi-metal sensor and adjustable dial for temperature setting.
- 6) Powered from 120 Vac and protected with a dedicated circuit breaker.
- c. Internal corrosion inhibitors:
 - 1) Contains chemical which vaporizes and condenses on surfaces in the enclosure.
 - 2) Inhibitor shall be applied in accordance with manufacturer instructions for the enclosure volume.
 - 3) Inhibitor shall be applied in the panel(s) prior to shipment from the factory.

2.3 MAINTENANCE MATERIALS

- A. Extra Materials:
 1. Quantity of 25 percent replacement lamps for each type installed (minimum of 12 of each type).
 2. Minimum 12 replacement filters for each type installed.
 3. One (1) quart of exterior finish touch-up paint.
 4. One (1) complete set of replacement corrosion inhibitors in sealed packages for each panel.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. Scope: Inspect and test entire panel assembly to verify readiness for shipment.
- B. Factory Tests:
 1. Tests shall be fully documented and signed by the factory supervisor.
 2. The panel shop shall fully test the control panel for correct wiring.
 - a. Each I/O point shall be checked by measuring or connecting circuits at the field terminal blocks.
 3. Burn-in test: Panel(s) shall be fully energized for a minimum period of 48 HRS.
 4. A PLC Central Processing Unit (CPU) shall be obtained and connected to the panel(s) if necessary for testing purposes.
 5. Testing equipment (such as digital multi-meters, analog loop calibrators, and laptop computers with PLC programming software) shall be used as required for testing.
 6. The following functions shall be tested as a minimum:
 - a. Demonstrate functions of the panel(s) required by the Contract Documents.
 - b. Correctness of wiring from all panel field terminals to all I/O points and to all panel components.
 - c. Simulate and test each discrete signal at the field terminal strips.
 - d. Simulate and test each analog signal using loop calibrators.
 - e. Correct operation of communications between PLC system Central Processing Units (CPUs) and Remote I/O bases.
 - f. Correct operation of single-loop controllers (including digital communication to microprocessor based devices).
 - g. Correct operation of all digital communication devices.
 - h. Demonstrate online and offline diagnostic tests and procedures.
 - i. Notify the Engineer in writing a minimum of 15 calendar days prior to the Factory Tests.
 - 1) Engineer has the option to witness all required tests.
 7. Make following documentation available to the Engineer at test site during the tests:
 - a. Contract Documents.
 - b. Factory Demonstration Testing procedures.
 - c. List of equipment to be testing including make, model, and serial number.

- d. Shop Drawing submittal data for equipment being tested.
- 8. Deficiencies shall be corrected prior to shipment from the factory.

3.2 INSTALLATION

- A. Install free-standing panels on 4 IN high concrete housekeeping pads.
- B. Anchor panels in a manner to prevent the enclosure from racking, which may cause the access doors to become misaligned.
- C. Obtain approved panel layouts prior to installation of conduits.
- D. Install products in accordance with manufacturer's instructions.

END OF SECTION

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DIVISION 46

WATER AND WASTEWATER EQUIPMENT



SECTION 46 66 56

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - Design, fabrication, factory testing, delivery, onsite services during construction and commissioning of an Ultraviolet (UV) Disinfection System, equipped with low pressure high intensity lamps, complete and operable with all power, control equipment and accessories necessary for an operating system.
- B. Related Requirements: Include but are not necessarily limited to:
 - 1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 – General Requirements.
 - 3. Division 03 – Concrete.
 - 4. Section 01 33 00 – Submittal Procedures.
 - 5. Section 01 33 04 – Operation and Maintenance Manual
 - 6. Section 01 65 50 – Product Delivery Requirements.
 - 7. Section 01 75 00 – Startup Procedures.
 - 8. Section 05 50 00 – Metal Fabrications.
- C. Background
 - 1. The UV Disinfection system follows a Sequencing Batch Reactor (SBR) biological system and cloth media filter system. The SBR has both influent and effluent equalization (EQ). Flow to the filtration and subsequent UV disinfection system is pumped from SBR effluent EQ at a steady rate.
 - 2. The existing Trojan UV equipment is over 20 years old and is installed in one of the two concrete channels. Drawings of the existing channels are attached to this specification section. All modifications required for the existing channels shall be fully defined in the Sellers proposal.

1.2 REFERENCES

- A. Reference Standards: Standards referenced in this section include, but are not necessarily limited to, the following:
 - 1. American National Standards Institute (ANSI).
 - 2. American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF):
 - a. Standard Methods for the Examination of Water and Wastewater, latest edition.
 - 3. United States Environmental Protection Agency (USEPA):
 - a. EPA/625/1-86/021, Municipal Wastewater Disinfection Design Manual.
 - 4. International Ultraviolet Association (IUVA):
 - a. Uniform Protocol for Wastewater UV Validation Applications (IUVA Protocol).
 - 5. National Water Research Institute (NWRI) and American Water Works Association Research Foundation (AWWARF):
 - a. Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse, August 2012.
 - 6. National Electrical Manufacturers Association (NEMA).
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 7. National Fire Protection Association (NFPA): 70, National Electric Code (NEC).
 - 8. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 519-2014, Recommended Practice and Requirements for Harmonic Control in Electric Power Systems.
 - 9. Underwriters Laboratory, Inc. (UL):
 - a. 508, UL Standards for Safety Industrial Control Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. UV System Supplier (UVSS):
 - a. Provide description of the service, support, and maintenance capabilities that will be available to Owner, including office locations, engineering, and technical personnel at these locations, and their qualifications and experience related to UV disinfection projects.
 - b. UV equipment shall be validated system in the United States by a credible third party, with bioassay dose-based sizing algorithm. The validation test protocols complies in accordance with the USEPA UVDGM, NWRI Guidelines (2003 or 2012), and/or IUVA Protocol.
 - c. Submit evidence of a minimum three years' experience in design, manufacturing and delivering equipment identical to the proposed system including major system components such as lamps, sleeves, and ballasts.
 - d. Submit evidence of a minimum of five systems sized similar to the specified flow and disinfection capacity and performance levels, identified in this Specification.
 - e. Provide an installation list with contact names and phone numbers of a minimum four wastewater treatment plants using technology identical in all aspects (i.e. lamps, sleeves, and ballasts) to the system being proposed. Equipment installed shall have been in operation for a minimum of two years.

1.4 SUBMITTALS

A. Shop Drawings (electronic submittal acceptable):

1. Acknowledgement that products submitted meet requirements of standards referenced and Performance Requirements in this specification.
2. Manufacturer's installation instructions.
3. Manufacturer's storage and handling instructions.
4. UV System Design Information:
 - a. List of UV system mechanical components and complete catalogue information, descriptive literature, specifications, and identification of materials of construction, including spare parts.
 - b. UV dosage calculations: dose calculation will be based on third party bioassay results.
 - c. Hydraulic Calculations: Demonstrating head loss through the UV system with all restrictions factored in, including flow controls, lamp modules, and channel level control at annual average flow and peak flow
 - d. Power Calculations: Showing power draw from system to achieve disinfection requirements. Estimated power consumption (kWh), harmonics generation, and power factor for individual UV bank(s) or module(s) at 50 percent, 75 percent, and 100 percent ballast power levels.
 - e. Reports of bioassay validation completed by independent third party.
 - f. All product information, calculations, drawings and other system performance data specifically required by regulatory agencies for acceptance of the technology.
 - g. Drawings showing equipment layout, cross sections, dimensions, critical clearances, and interconnections and interface requirements such as power, controls, and instrumentation.
 - h. Identify separately mounted components, connections to other work, critical clearance requirements, interconnections and interface requirements, and validated hydraulic configuration.
 - i. Bill of materials by model and part number. List manufacturer names, addresses, and phone numbers.
5. UV System Power and Control Information
 - a. Details of control and power panels including internal and external panel layouts, dimensions, access requirements, materials of construction, bill of materials, electrical schematics, and wiring diagrams. Include software and hardware component details.

- b. Input power voltage, frequency, and phase requirements, total system maximum power load, power quality thresholds, and ballast turndown capabilities.
 - c. Detailed description of instrumentation and control system, including list of functions monitored, controlled, and alarmed. Describe automatic shutdown features and interfaces with plant instrumentation and control system.
 - d. Summary of UV System control strategy including UV dose algorithm. Provide graph or table of Reduction Equivalent Dose as a function of bioassay variables.
 - e. Fully documented ladder logic listings, I/O printouts, and cross-referenced printouts documenting programmable controller software program.
 - f. Process and instrumentation diagrams and description of functions monitored, controlled, and alarmed.
 - g. Control system block diagram(s) including Human Machine Interface(s), Programmable Logic Controller(s), and data highway. Proposed layouts and development of HMI screens for control of UV System.
 - h. Summary of Ethernet Data Communication.
 - i. Data on harmonic filters, or active filters, used to mitigate harmonics to IEEE 519 levels as measured at the input terminals to the Power Distribution Center. Power factor will be 96 percent or greater.
6. Control Panel:
- a. See Specification Section 01 33 00.
 - b. Prepared with computer aided design (CAD) software.
 - c. Printed on 11 by 17 IN sheets.
 - d. Drawings shall include a title block containing the following:
 - 1) Plant or facility name where panel(s) are to be installed.
 - 2) Drawing title.
 - 3) Drawing number.
 - 4) Revision list with revision number and date
 - 5) Drawing date.
 - 6) Drawing scale.
 - 7) Manufacturer name, address, and telephone number.
 - e. Cover sheet for each drawing set shall indicate the following:
 - 1) Plant or facility name.
 - 2) Project name.
 - 3) Submittal description.
 - 4) Revision number.
 - 5) Issue date.
 - f. Table of contents sheet(s) shall indicate the following for each drawing in the set:
 - 1) Drawing number.
 - 2) Drawing title.
 - 3) Sheet number.
 - g. Legend and abbreviation sheet shall indicate the following:
 - 1) Description of symbols and abbreviations used.
 - 2) Panel construction notes including enclosure NEMA rating, finish type and color, wire type, wire color strategy, conductor sizes, and wire labeling strategy.
 - 3) Confirmation that the panel(s) are to be affixed with a UL 508A label prior to shipment from the factory.
 - h. Bill of Material for each panel shall include the following component information:
 - 1) Instrument tag number.
 - 2) Quantity.
 - 3) Functional name or description.
 - 4) Manufacturer.
 - 5) Complete model number.
 - 6) Size or rating.
 - i. Panel exterior layout drawings to scale and shall indicate the following:
 - 1) Panel materials of construction, dimensions, and total assembled weight.
 - 2) Panel access openings.

- 3) Conduit access locations.
- 4) Front panel device layout.
- 5) Nameplate schedule:
 - a) Nameplate location.
 - b) Legend which indicates text, letter height and color, and background color.
- j. Panel interior layout drawings shall be drawn to scale and shall indicate the following:
 - 1) Sub-panel or mounting pan dimensions.
 - 2) Interior device layouts.
 - 3) PLC general arrangement layouts.
 - 4) Wire-way locations, purpose, and dimensions.
 - 5) Terminal strip designations.
 - 6) Location of external wiring and/or piping connections.
 - 7) Location of lighting fixtures, switches and receptacles.
- k. Wiring diagrams shall consist of the following:
 - 1) Panel power distribution diagrams.
 - 2) Control and instrumentation wiring diagrams.
 - 3) PLC Input/Output information:
 - a) Model number of I/O module.
 - b) Description of I/O module type and function.
 - c) Rack and slot number.
 - d) Terminal number on module.
 - e) Point or channel number.
 - f) Programmed point addresses.
 - g) Signal function and type.
 - 4) Wiring diagrams shall identify each wire as it is to be labeled.
- l. Network Block Diagrams shall indicate the following:
 - 1) Diagram detailing communication cable interconnections:
 - a) Cable end to end routing and terminations requirements.
 - b) Diagram shall identify fiber strand interconnections for fiber optic cables.
 - c) Identify location of network devices such as Ethernet switches, media convertors, repeaters, radios and protocol convertors.
 - d) Identify location of network interconnection devices such as patch panels, tap boxes, antennas, and terminating resistors.
 - 2) Communication module types.
 - 3) Network power supplies.
 - 4) Cable and connector type.
 - 5) Communication addresses such as IP address or similar.
- m. PLC I/O List:
 - 1) Table indicating PLC I/O assignments for each PLC control panel.
 - 2) PLC I/O Information:
 - a) PLC I/O point type.
 - b) PLC Rack number.
 - c) PLC Slot number.
 - d) Channel or point number.
 - e) Equipment tag number.
 - f) Description/Function.
 - g) Calibration:
 - (1) Signal Scale Range.
 - (2) N.O. or N.C. contact.
 - h) Power:
 - (1) Signal type: 2-wire, 3-wire, or 4-wire.
 - (2) Control Voltage level.
 - (3) Foreign Voltage.
 - i) Project P&ID or P&ID Detail Number.
 - j) Panel Control Wiring Diagram Number.
- n. Proposed layouts and development of HMI screens for control of UV System.

- o. Summary of Ethernet Data Communication.
- p. PLC Ladder Logic:
 - 1) Print-out of annotated ladder logic programming and cross-reference listing.
- q. Manufacturer catalog cut sheets for enclosure, finish, panel devices, control auxiliaries, and accessories.
- r. Electrical load calculations:
 - 1) Total connected load.
 - 2) Peak electrical demand for each panel.
- s. Climate control calculations:
 - 1) Verify that sufficient dissipation and/or generation of heat is provided to maintain interior panel temperatures within the rated operating temperatures of panel components.
- 7. UV System Components Information
 - a. Provide measurements to verify lead length limitations on communication circuit cabling have not been exceeded.
 - b. Specifications for interconnecting cables between UV equipment, including voltage ratings, insulation type, conductor material and cable/conductor outside diameter, and maximum cable length.
 - c. Lamp data, including watt rating, initial lumen output, lamp aging factors, average lumens, and total mercury form and content. Including lamp output certification and third party validated End of Lamp Life factor.
 - d. List of qualified lamp disposal facilities within 100 miles of installed location including; names, addresses, and phone numbers, including information for disposing of burned-out or broken UV lamps; transportation charges.
 - e. Quartz sleeve data including third party validated Fouling Factor.
 - f. Complete description of automatic lamp sleeve cleaning process and maintenance requirements.
 - g. Complete description of UVT monitor; include operation and maintenance requirements necessary for compliance with EPA requirements.
 - h. Details of duty and reference UV intensity sensors including sensor traceability and uncertainty from linearity, temperature response, spectral response, angular response, and long-term drift. Include calibration requirements necessary for compliance with USEPA UVDGM requirements.
 - i. Cost of each replacement part including cost for disposal.
- B. Operation and Maintenance Manuals:
 - 1. Operation and Maintenance Manuals shall be provided which include (at a minimum):
 - a. Ordering Information
 - b. Warranty Statement
 - c. Safety Precautions
 - d. Preventative Maintenance Requirements
 - e. Maintenance Record Card
 - f. Regional Offices
 - g. Technical Data
 - h. Installation, operation and service illustrations
 - i. Additional literature as required
 - 2. At least one hard copy shall be supplied to the Owner.
 - 3. One electronic copy shall be provided to the Owner in PDF format.
- C. Informational Submittals:
 - 1. UVSS information, qualification documentation and/or certifications indicating compliance with qualification requirements.
 - 2. Disinfection performance guarantee, as identified in this Specification.
 - 3. Warranties of major UV system components, including but not limited to: lamp; ballast; quartz sleeve; wiper; intensity sensor. System installation instructions.
 - 4. Certification of factory testing and equipment assembly prior to shipment.
 - 5. Special shipping, storage and protection, and handling instructions.

6. UVSS's installation instructions.
7. Manufacturer's Certificate of Proper Installation
8. Provide OWNER information on licenses/agreements of all computer software used in the system.
9. Operation and Maintenance Data including routine maintenance requirements prior to plant startup.
10. Repair and Replacement information including, but not limited to: term; fee; products covered; guaranteed timeframe for replacement; procedure for repair or replacement and warranty on replacement equipment.
11. Contact information for UV lamp and ballast suppliers other than UVSS.
12. Current replacement cost to Owner for the following:
 - a. Electronic ballast.
 - b. UV lamp.
 - c. UV lamp quartz sleeve.
 - d. Sleeve wiper.
 - e. Intensity sensor.
13. Training Lesson Plan.
14. Field Testing Documentation:
 - a. Functional Testing Plan and Report.
 - b. Performance Testing Plan and Report.
 - c. Field Service Report.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. UVSS ships the entire UV System equipment simultaneously to designated location.
 2. Tag and mark each item of equipment as identified in the delivery schedule or on the Shop Drawings prior to shipping.
 3. Provide complete packing lists and bills of material with each shipment.
 4. Identify packages as to project, destination, and contents.
 5. Pack equipment for shipment and protect electrical equipment from moisture damage.
 6. Polish and protect surfaces from corrosion and damage during shipment, normal handling and installation.
 7. Deliver materials dry and undamaged.
 8. Identify each component with durable labeling other than paper that is resistant to sunlight exposure and moisture.
 9. A complete set of manufacturer's instructions covering storage, installation, operation, lubrication, and maintenance will be furnished no later than the date the equipment is shipped.
 10. Provide written notice to Owner a minimum seven (7) calendar days prior to anticipated date of delivery to afford an opportunity to be present and inspect unloading of UV System equipment.
- B. Storage and Handling Requirements:
 1. Storage, installation, lubrication, and startup of the equipment and motors are in strict conformance with the UVSS's instructions.
 2. UVSS's authorized representative assists upon delivery as follows:
 - a. Inspecting equipment upon arrival at Site to ensure equipment has been delivered in good order and that no damage has occurred during delivery.
 - b. Identification and notification to Contractor and Engineer of discrepancies between shipping lists and equipment received.
 3. Apply grease and lubricating oil to all bearings and similar items.
- C. Replace damaged and/or missing UV System equipment by UVSS authorized technician, with new equipment at no additional cost to Owner:
 1. Replenish any spare parts used to specified quantity.

1.6 WARRANTY

- A. Warrant UV system free from defects in materials and workmanship, including damages from shipping, for a period of 12 months from date of installation Substantial Completion or 18 months from delivery to project site. Any equipment failing within warranty period will be repaired or replaced at no cost to Owner.
- B. UVSS to provide a written warranty of nominal lamp life of minimum 12,000 hours (with prorated price after 9,000 hours) and nominal ballast life of 10 years (with replacement ballast prorated after one year; [years in operation/ warranted years] of original price.
- C. UVSS to provide a written warranty identifying that, if greater than 20 percent of lamps within the system require replacement prior to the nominal life warranted by UVSS, UVSS will replace all of the lamps in the UV System with new lamps at no cost to Owner. Full replacement of lamps does not apply, if the lamp failures can be shown to be a result of the system being operated outside the procedures indicated in UVSS O&M manual.
- D. UVSS will provide a written warranty identifying that, if greater than 20 percent of ballasts within the system require replacement prior to the nominal life warranted by UVSS, UVSS will replace all ballasts in the UV System with new ballasts at no cost to Owner. Full replacement of ballasts does not apply, if the ballast failures can be shown to be a result of the system being operated outside the procedures indicated in UVSS O&M manual.
- E. UVSS will provide a written warranty identifying that, if greater than 20 percent of the quartz sleeves fail to maintain quartz integrity prior to nominal life warranted by UVSS, the UVSS will replace all quartz sleeves at no cost to Owner. Full replacement of quartz sleeves does not apply, if the failures can be shown to be a result of the system being operated outside the procedures indicated in UVSS O&M manual.
- F. UVSS will provide a written warranty identifying that, if greater than 50 percent of sensors within the system require replacement prior to the nominal life warranted by UVSS, UVSS will replace all sensors in the UV System with new sensors at no cost to Owner. Full replacement of sensors does not apply, if the sensors failures can be shown to be a result of the system being operated outside the procedures indicated in UVSS O&M manual.

1.7 PERFORMANCE GUARANTEE

- A. Guarantee UV disinfection system, at all times, produce an effluent quality that conforms to Performance Requirements specified herein for a continuous period of one year from the date of installation Substantial Completion.
- B. Guarantee compliance with Performance Requirements provided that:
 - 1. Constructed facilities do not deviate substantially from UVSS design recommendations.
 - 2. Actual flow rates do not exceed hydraulic peak flow given in Design Criteria table.
 - 3. Wastewater characteristics are no worse than values given in Design Criteria table.
 - 4. Owner operation and maintenance procedures do not deviate from UVSS's recommendations.
- C. Should UV System fail to meet Performance Requirements within first year of operation after Substantial Completion, except for non-warranted causes as noted, UVSS shall send an authorized representative to inspect and correct UV System deficiencies within two weeks of written notification.
- D. If cause of failure is determined to be non-warranted, Owner will reimburse UVSS for all reasonable costs of investigation, otherwise, UVSS will be solely responsible for costs to modify and retest the UV System to demonstrate compliance with Performance Requirements.
- E. If correction of the failure requires provision of additional equipment, installation of additional equipment will be only as accepted by Owner. If the UV System fails to meet Performance Requirements following correction(s), Owner may require UV System to be removed within 30 days after rejection or replaced with a UV System able to meet Performance Requirements at no cost to Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE OPEN CHANNEL UV EQUIPMENT SUPPLIERS

- A. Subject to compliance with Contract requirements, the following UV System Suppliers are acceptable:
1. Trojan UV3000Plus™.
 2. Wedeco TAK 55.
 3. Or equal.

2.2 UV SYSTEM DESIGN CRITERIA AND PERFORMANCE REQUIREMENTS

- A. System description: installed equipment in City of Hailey for plant effluent disinfection. Plant effluent will be continuous flow with daily and seasonal variations throughout the year.
- B. System Validation: provide minimum pathogen inactivation requirement over full range of design flows, UV dose, and water characteristics at end of lamp life and under fouled quartz sleeve conditions.
- C. System design requirements:
1. Alternative A: System design shall be a two-bank system installed in either one channel or two-channel UV configuration (each channel 30-inches wide). The redundancy shall be provided with the second bank. A single channel shall hydraulically pass the peak hourly flow rate and treat to river discharge criteria.

If the single channel cannot pass and treat the peak hourly flow, then the alternative can be proposed with two-banks in each channel (4 banks total) with peak hourly flow split between channels and one bank operating in each channel to achieve disinfection (the second bank in each channel providing redundancy). The Alternative A Design Criteria and Performance Requirements are as follows:

DESCRIPTION	DESIGN CRITERIA
Design hydraulic peak hourly flow	2.80 MGD
Design peak daily flow	1.48 MGD
Design maximum monthly flow	1.19 MGD
Design minimum daily average flow	0.50 MGD
Effluent suspended solids	10 mg/L (Aqua-Aerobics cloth media disc filter, 10 µm opening size)
Effluent BOD ₅	10 mg/L
Performance Requirements for Direct Discharge: E. coli	126 / 100 ml, monthly geometric mean
	406 / 100 ml, instantaneous maximum
UV dose (at the end of lamp life-time and fouled quartz sleeves)	Minimum 30 mJ/cm ² at peak design flow based on MS2 phage Bioassay
UV transmittance	65% at 254nm; fouled and at the end of lamp life
Effluent temperature	10 / 25 °C (min/max)

2. Alternative B: Reuse system design shall be in a two-channel UV configuration with two-banks in each channel. The alternative shall be capable of treating the peak hourly flow to river discharge standards and be capable of treating to reuse standards with all four banks operating. The system shall provide reuse water disinfection up to 1.48 MGD. If this reuse maximum flow is exceeded, the reuse system shall be shut-down and discharge routed to

river discharge. The Alternative B Design Criteria and Performance Requirements are as follows:

DESCRIPTION	DESIGN CRITERIA
Hydraulic peak hourly flow	2.8 MGD
Reuse design peak daily flow	1.48 MGD (1,028 gpm) ⁱ
Reuse design average flow	0.96 MGD
Effluent suspended solids	10 mg/L
Effluent BOD ₅	10 mg/L
Performance Requirements for Reuse: Total coliform	2.2 / 100 ml, median of last 7 days
	23 / 100 ml, any sample
UV dose for reuse (at the end of lamp life time and fouled quartz sleeves)	Minimum 100 mJ/cm ² at peak design flow based on MS2 phage Bioassay
UV transmittance	65% at 254nm; fouled and at the end of lamp life
Effluent temperature	10 / 25 °C (min/max)

i. Reuse water distribution will be shut-down if the flow rate exceeds this value.

3. UV system type: low pressure high intensity UV lamps system equipped with automatic sleeve wiping.
4. UV open channel reactor: system shall be fitted in open channel(s).
5. UV system configuration: system consist of two existing channels. UV equipment in each channel shall be sized and configured identically.
6. Open channel UV equipment configuration: a minimum of one UV bank shall be in each channel. Reuse configuration for two UV banks in series in each channel.
7. Design UV dose: the UV system will be designed to deliver a minimum UV dose indicated in the design criteria table at peak flow, in effluent with a UV transmittance (UVT) of 65 percent at end of lamp life after reduction of quartz sleeve fouling.
8. End-of-lamp-life factor (EOLL): percent lamp output at the end of lamp life. The design UV dose shall be based on the EOLL factor of 0.50 unless UVSS has a technology-specific EOLL factor certified by independent third party. Maximum EOLL of 0.95 can be used for Alternative A (because no 9,000-hour limit for non-reuse operation). Maximum EOLL of 0.90 shall be used for Alternative B sizing for reuse target total colifor of 2.2 org/100 ml. The design shall follow equipment sizing of the alternative that requires more equipment.
9. Fouling factor (FF): percent lamp output with fouled quartz sleeve. The design UV dose shall be based on the fouling factor of 0.8 unless UVSS has technology-specific fouling factor certified by independent third party. FF greater than 0.95 will not be accepted. Water quality information shall be provided upon request.
10. Redundancy (standby capacity): one standby UV bank in each channel or one standby UV bank in redundant channel.
11. Water level control mechanism: vendor standard adjustable weir in each channel at flow exit.

2.3 GENERAL REQUIREMENTS

- A. All equipment provided under this Specification will be new and will be the standard product of a UVSS who is regularly engaged in supply of UV equipment.
- B. System sizing and configuration, proposed by UVSS to meet Performance Requirements specified herein, shall be evaluated by Engineer using EPA and NWRI UV Design Guidelines.

- C. Sizing of UV equipment shall be based on a bioassay calculation. The bioassay calculation shall be based on protocol for bioassay testing as indicated in NWRI Guidelines 2012 (or 2003), "Protocols". The bioassay calculation shall be provided to the Engineer for review.
- D. Bioassay:
 - 1. Done on equipment of identical design being proposed.
 - 2. Performed with surrogates (MS2 and/or T1 Phage) that has similar sensitivity and/or resistance to UV light as the regulatory designated indicating organism as in Performance Requirements.
 - 3. Performed by an independent credible third party and a certified laboratory.
- E. Operation Requirements: to minimize power consumption, the UV System will be capable of being operated based on actual conditions measured by in-line instruments such as UV transmittance, UV intensity sensor, and flow meters.
- F. Materials of Construction:
 - 1. All metal components considered submerged, contacted by liquid, or below the operating floor will be:
 - a. Where welding is required for stainless steel components; Type 316L-Grade (low carbon) stainless steel will be furnished.
 - b. Hardware, fasteners, anchor bolts, nuts, plates, and angles will be Type 316 stainless steel.
 - c. Nonmetallic materials will be suitable for continuous exposure to UV light.
 - d. Type 304 or type 316 Stainless steel will be used for:
 - 1) Ballast cabinet enclosure.
 - 2) Pneumatic cylinder (if applicable).
 - 2. Reference the Area Classification Table and Material Selection Table as shown on drawings for all other materials of construction not specified herein.
- G. Affix control panel with a UL 508A label "Listed Enclosed Industrial Control Panel" prior to shipment to the jobsite.
- H. Electrical assembly to meet NFPA 70 (NEC), NEMA requirements and applicable local electrical codes.
- I. Equipment components, including coatings and other accessories to comply with AWWA standards, unless specified otherwise.
- J. Harmonic frequency mitigation to comply with IEEE-519.

2.4 COMPONENTS

- A. UV Channels:
 - 1. Sized and configured identically and in parallel.
 - 2. Constructed of concrete as shown on Drawings.
 - 3. Install covers and grating as shown on Drawings (by Others).
 - 4. Interior coating: Concrete finish. If coating is preferred finish, UV manufacturer to provide recommendations on coating types resistant to UV exposure (coating by Installation Contractor).
 - 5. See Drawings for additional channel dimensions and tolerances.
 - 6. Modifications to UV channel dimensions shall be supplied with the equipment proposal. Changes to the channels shall be constructed by the installation Contractor.
 - a. UVSS to submit revised UV channel drawings for use in preparation of the installation drawings.
 - b. Costly changes to the existing UV channel dimensions or additional equipment creates overall cost impacts and will be considered in equipment award.
- B. UV Modules:
 - 1. Each module will be fully water-proofed, gasketed and capable of being hosed down from any direction for maintenance without any penetration of liquid or dust into the module interior.

2. Each module will be self-contained and will be easily removed from channel for cleaning and maintenance.
 3. Each module will have lamps mounted inside watertight quartz sleeves. The UV lamps will be completely isolated from the wastewater flowing through the channel and will be able to be replaced while wastewater is flowing through the channel.
 4. Each module will be identified by electronic serial number accessible from the UV system control panel.
- C. Ballasts:
1. Electronic ballast with multiple power settings ranging from at least 50 percent to 100 percent maximum power.
 2. Each ballast will be designed to power a maximum of two UV lamps.
 3. Warranty: UV ballasts will be warranted for minimum ten years. If ballast fails within warranty period, provide replacement ballast with prorated price after one year: (years in operation / warranted years) of original price.
- D. UV Lamps:
1. Low pressure high intensity amalgam lamps.
 2. The lamp bases shall be of a durable construction resistant to UV light.
 3. Warranty: UV lamps will be warranted for minimum 12,000 hours of useful life. If lamp fails within warranty period, provide replacement lamp with prorated price after 9,000 hours of use: (hours in operation beyond 9,000 hours / warranted operating hours) of original price.
 4. After 12,000 hours of operation, average UV lamp output will be no less than 90 percent of a new lamp (after 100 hours initial burn-in).
 5. UV lamps shall not require an extended cool down period (greater than 10 minutes) prior to restart should the power to the UV system fail or be interrupted for a short period of time.
 6. Lamp disposal: UVSS to ensure disposal of used lamps to UVSS designated location at no cost to Owner.
- E. Quartz Sleeve:
1. Each quartz sleeve will be independently sealed within system.
 2. Sleeves will have a minimum UV transmittance of 90 percent at 254 nm immediately after sleeve cleaning.
 3. Materials: high purity rated silicon dioxide quartz for maximum possible UV transmittance.
- F. Automatic Cleaning System (Required):
1. The UV system shall be equipped with an automatic wiping system with selectable wiping frequency.
 2. Automatically initiated and controlled cleaning cycle capable of cleaning lamp sleeves and UV sensor, with manual cleaning override.
 3. UV system will be fully operational, providing disinfection, during cleaning cycles.
 4. The cleaning cycle will be manually or automatically initiated and controlled from the operator interface.
 5. Cleaning cycle intervals will be field adjustable within the range of once per hour to once per week.
 6. Wipers will be fabricated of UV resistant material and installed in a manner which accommodates any irregularities associated with the quartz sleeves and precludes any binding during operation.
 7. The wiped length of the quartz sleeve shall be no less than the complete arc length.
 8. The wipers shall be replaceable without having to dismantle the wiper drive system, without complete removal of the quartz sleeves, or without disassembly of UV module.
- G. UV Intensity Sensor:
1. Provide at least one UV intensity sensor for each UV bank.
 2. Provide indication corresponding to 0 to 100 percent produced UV intensity.
 3. Measure only the germicidal portion of UV light at 253.7 nanometers.
 4. No degradation after prolonged exposure to UV light.

5. Automatically cleaned at the same frequency as UV lamps.
- H. Online UV Transmittance Monitor:
1. Provide one UV online transmittance analyzer (Hach UVAS sensor and Hach sc200 controller).
 2. Online UVT monitor continuously track effluent transmittance at the 253.7 nm germicidal wavelength.
 3. Sensor will provide reagent-free operation without needs for sample conditioning.
 4. Provide self-supported stand or handrail mounting kit for the controller; and adjustable mounting kit for fully submersible sensor.
- I. Bench-top UV Spectrophotometer:
1. Measure percent of UV transmittance at 253.7 nanometers:
 2. Single beam with front panel.
 3. 100 percent UV transmittance control adjustment.
 4. Range of 1 to 100 percent UV transmittance.
 5. Wavelength accuracy of 0.16 plus or minus half band width.
 6. Include the following items:
 - a. Two matched quartz cuvettes.
 - b. One gallon cuvette cleaning solution.
 - c. One gallon 100 percent UV transmittance standard solution.
- J. Accessories
1. Equipment Identification Plates:
 - a. 16-gauge Type 316 stainless steel identification plate securely mounted on each separate equipment component and control panel in a readily visible location.
 - b. Bear 3/8 inch-high engraved block type black enamel filled equipment identification number and letters indicated in this specification and as shown on Drawings.
 2. Lifting Lugs:
 - a. Attach to equipment assemblies and components weighing over 100 pounds.
 3. Anchor Bolts:
 - a. Type 316 stainless steel, sized by UVSS.
- K. Water Level Control:
1. Adjustable Weir Design by UVSS.
 2. Weir position to be designed by UVSS to adjust and maintain a minimum channel water level as required to keep lamps submerged properly.
 3. Coordinate with design engineer and Owner prior to fabrication and installation.
 4. Located downstream of UV System in each open channel.
- L. Safety Equipment:
1. Include five face shields and five goggles that block UV energy between 200 to 400 nanometers.
 2. Include five signs reading: "WARNING - ULTRAVIOLET EQUIPMENT - USE EYE PROTECTION".
 - a. All signage will be constructed of corrosion and UV resistance materials.
 - b. Signs will be mounted by contractor at Owner specified locations.

2.5 ELECTRICAL

- A. UVSS to design, construct and supply electrical components, wiring, and controls on or within the UV System as a whole in accordance with the current edition of the National Electrical Code and all applicable state and local electrical codes.
- B. Electrical System Characteristics:
1. Voltage: 480V, 3-phase, 60 Hz
 2. Available Fault Current: 25,000 amps rms.
- C. Power Distribution Center (PDC):

1. UVSS to provide PDCs for each bank or channel (as required) to power the components in each channel such as lamp ballasts, wipers, instrumentation, etc.
 - a. Each PDC shall be rated 480 volt, three-phase, three-wire (plus ground) sized to handle the power requirements of the equipment plus 25 percent.
 - b. Transformer, if required, will power each PDC to provide correct voltage required by equipment. Transformers shall be furnished by UVSS. Contractor will furnish and install all cable and conduit between the PDC and transformers.
 - c. Data concentration will be through integrated circuit boards located inside PDCs. Circuit breakers and ground fault circuit interrupters (GFCI) will be located inside PDC and be capable of being reset and tested locally at PDC. Provide visual confirmation of a tripped GFCI.
 - d. Wiring inside the PDC will be properly isolated for proper ventilation and to prevent damage to wiring.
 - e. Each module in the vertical system will be isolated via two rectifier cards that each feed a ballast rack.
 2. Contractor (separate installation contract) shall mount each PDC on elevated supports or housekeeping pads.
- D. General Wiring and Termination Requirements:
1. Each rack/module will be field serviceable while located in the channel and will be fitted with separate water-resistant UL rated multipin connectors for power and data.
 2. UVSS to recommend data cable specifications and sizing required for the integrated system.
 3. UVSS to provide integral or chain-connected waterproof caps for each multipin connector.
 4. UVSS to provide conductor size and quantities to coordinate design and installation requirements with Contractor.
 5. UVSS to provide multi-conductor cables and molded connectors for connecting modules and PDC.
 6. Electrical power terminals will be rated for 75 degrees C conductors.
 7. Contractor (separate installation contract) to field terminate and make connections of power interconnect cables and data cables provided in between the racks/modules and PDC.
 8. Contractor (separate installation contract) to provide cable tray for power and data cables or conductors.
- E. Transient Voltage Surge Suppression:
1. Protect all elements of the control panel against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems. First-stage high energy metal oxide varistor and second-stage bipolar silicon avalanche device will be separated by series impedance. Include grounding wire, stud or terminal.
 2. All panels and enclosures must have a separate isolated copper ground bus for signal and shield ground connections. This isolated ground will be bonded to a common ground point in accordance with the applicable local codes and standards.
- F. UVSS will provide harmonic filters and any other equipment required to meet IEEE-519 standards. Harmonic filters, if required, will be powered and controlled from each PDC. If harmonic filters are furnished by UVSS, Contractor will coordinate, furnish, and install all cable and conduit between the PDC and the harmonic filter.

2.6 INSTRUMENTATION AND CONTROL

- A. UVSS to provide UV System Unit Control Panel consisting of Ethernet switch, PLC and associated I/O modules, HMI, uninterruptible power supply, and other associated UV control equipment.
- B. General:
1. Provide single source coordination responsibility.
 2. The manufacturer shall not condition or void any warranty for the performance of the products of this specification due to incompatibility of any components.
 3. The Owner's plant Process Instrumentation and Control System (PICS) is based on Rockwell Automation's digital control systems and associated Ethernet/IP network

protocol. If manufacturer provided control panels include digital control system elements including, but not limited to, variable frequency drives, programmable logic controllers (PLC), and programmable overload relays, these systems shall be as follows:

- 1) All controllers shall have a Rockwell Automation Studio 5000 based controller interface, and the data shall be compatible with produce and consume tag formatting to interface with the Owner's plant PICS.
 - 2) All digital control system elements connected to the PICS via Ethernet shall utilize native Ethernet IP protocol. The term "native" used in this context means that the protocol is integral to the equipment—a converter, gateway or card used to convert from one protocol to another (e.g., Modbus Plus to Ethernet IP) is not required. The use of these devices is not acceptable.
 - 3) Provide digital control system application passwords to the Owner prior to project completion.
 - 4) Programs shall be provided to owner's programmer to allow the programmer to access information for developing monitoring screens for the overall plant SCADA system.
4. Manufacturer's standard design for all other control panel components and control logic unless specific requirements are specified elsewhere.
 5. NEMA or IEC rated components are acceptable, whichever is used in the manufacturer's standard engineered design, unless specific requirements are required in the specific equipment Specification Section.
 6. Affix entire assembly with a UL 508A or UL 698A label "Listed Enclosed Industrial Control Panel" prior to delivery. Control panels without an affixed UL 508A or UL 698A label shall be rejected.
 7. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes.
 - a. Minimum Short Circuit Current Rating at 480Y/277V: 30,000 amps rms symmetrical.
 - b. Minimum Short Circuit Current Rating at 208Y/120 or 120/240V: 10,000 amps rms symmetrical.
- C. Industrial 8 port Ethernet Switch: Allan Bradley 1783-US8T. No substitutions.
- D. Programmable Logic Controller (PLC) hardware: Allen-Bradley, CompactLogix Platform with latest firmware version.
1. Design and fabrication:
 - a. On-board Ethernet.
 - b. PLC Programming by UVSS.
- E. Operator Interface Unit (OIU):
1. Panel mount touchscreen HMI (Human Machine Interface: Allen Bradley PanelView Plus 7.
 2. Touch screen operator interface shall be mounted through the enclosure door and sealed with the proper manufacturer gaskets and hardware in order to maintain the panel enclosure rating.
 3. Provide with (2) protective overlays.
 4. Design and fabrication:
 - a. Ethernet/IP communications to PLC.
 - b. OIU Programming by UVSS.
- F. Process Control:
1. The PLC shall be enclosed within NEMA 12 unit control cabinet suitable for installation within designated process area.
 2. The UV control system will be capable of controlling UV banks based on the pumped flow measured upstream of UV system, intensity measurements and transmittance measurements. The control panel will provide complete operator interface through a display screen.
 3. Provide PLC monitoring of uninterruptible power supply (UPS) units. As a minimum, monitor UPS status and common alarm conditions by the UPS manufacturer.

- G. All communication with the Owner's Plant SCADA System shall be via Ethernet network connection. Software addresses for interface with Plant Control System will be coordinated through submittal process.
- H. Provide all control, monitoring, trending, and alarm signals to Owner's Plant Control System to support replication of OIT screens at Owner's HMI, including system control and operator adjustment of setpoints. Data will be organized within contiguous memory blocks in PLC to simplify coordination and interface with Owner's Plant Control System.
- I. The Operator Interface shall be a menu driven touchscreen capable connection to SCADA.
 - 1. Operator adjustable lamp status: manual, off, or auto.
 - 2. Cycle each bank for equal wear and time off to minimize bank cycling.
 - 3. UPS status and common alarm conditions.
 - 4. Information displayed as minimum when prompted:
 - a. Module identification.
 - b. UV intensity.
 - c. UV transmittance.
 - d. Lamp hours.
 - e. Cycles.
 - f. Communication link status.
 - g. Backup battery condition.

2.7 SOURCE QUALITY CONTROL

- A. General:
 - 1. Do not ship UV System until factory test report is approved by Engineer and Owner.
 - 2. Factory test major components of UV System for compliance with specified requirements during a single test session.
- B. Factory Test Plan and Report:
 - 1. Develop and submit test plan. Plan will include, but not limited to:
 - a. Daily test schedule for duration of test.
 - b. Delivery of UV dosage.
 - c. Test of lamps
 - d. Test of intensity sensors.
 - e. Test of wiping system.
 - f. Test of control power panel.
 - g. Test of instrumentation and controls.
 - h. Test of operator interface units.
 - 2. Upon conclusion of tests, submit Test Report documenting tests performed, items witnessed, and results.
- C. Quality Control:
 - 1. UV System is UL tested, approved, and stickered prior to shipment.
 - 2. Owner and Engineer, at their discretion, may witness UV System equipment assembling and factory testing at the UV manufacturer's fabrication facility prior to shipment to site.
 - 3. UVSS will coordinate equipment assembly and factory testing with Owner and provide a minimum three week advanced notification of all activities.
 - 4. Owner will pay all travel costs associated with witnessing equipment assembly or testing.
- D. Following shipment, UVSS will provide written certification that UV System has been factory tested to comply with the specifications herein and has been properly assembled prior to shipment.

2.8 MAINTENANCE MATERIALS

- A. General:
 - 1. Identical with original installed parts.
 - 2. In clearly identified and labeled containers with quantity, item description, and part number.
- B. Provide following spare parts:

1. 10 percent installed UV lamps.
2. 10 percent installed UV lamp sleeves.
3. 10 percent installed ballasts.
4. 10 percent UV cleaning wipers.
5. 10 percent UV intensity sensors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. A separate installation Contractor shall install the UV equipment supplied in accordance with Contract Documents, and the UVSS's engineering drawings and instructions.
- B. The installation Contractor shall provide and install anchor bolts, fasteners, washers, and templates needed for installation of UV equipment.

UVSS to provide technical support during the installation. UVSS will assign competent and experienced factory trained authorized representative(s) to provide technical direction during installation, adjusting, and testing of UV System and ancillary equipment.

3.2 FIELD QUALITY CONTROL

- A. General:
 1. UVSS will complete Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturer's Field Services, upon satisfactory installation of UV System.
 2. UVSS will calibrate instruments, sensors, and meters supplied for testing, including UVT analyzers, UV intensity sensors, and power consumption meters.
- B. If the UV System and ancillary equipment fail to meet Performance Requirements specified herein, modifications to equipment or operational changes will be made to produce an installation which will satisfy the requirements:
 1. Owner will notify UVSS, and UVSS will investigate the problem and develop a corrective plan within two weeks of notification.
 2. After modifications, the equipment will be completely re-tested as specified in this Section. Additional testing will have the same requirements and duration as initial testing specified.
 3. UVSS will be solely responsible for costs for modifications to UV System. This includes payments of all structural or electrical modifications necessary to accommodate the modified equipment.
 4. UVSS will be solely responsible for costs for re-testing required to demonstrate compliance. This includes all engineering fees and expenses associated with Owner's and Engineer's witness of the re-tests.
- C. Additional testing periods beyond the initial periods will not be a basis for extension of contract time or claims for additional compensation from Owner.
- D. If UV System and ancillary equipment fail to meet Performance Requirements specified herein, and after several attempts of implementing the correcting measures by UVSS, it will be Owner's option to require any or all, of the following:
 1. Complete removal of the UV System and allow associated equipment within 30 days after rejection.
 2. Replacement with equipment able to meet Performance Requirements specified in this Section at no additional cost to Owner:
 3. In the interim between removal of the UV System and installation and testing of the replacement UV System, Contractor will provide continuous disinfection at all times at the expense of the original UVSS.
 4. All payments made by Owner associated with UV System equipment will be returned to Owner if the UV System cannot perform in accordance with the Specification.

3.3 SYSTEM STARTUP

- A. Qualified UVSS technical representative will be present full time for a minimum period of three working days plus travel time, or as many days as necessary for successful UV system startup.
- B. UVSS will establish, verify, and demonstrate proper installation and operation of the UV System during startup, including but not limited to:
 - 1. Provide checking and adjustment for proper equipment installation.
 - 2. Provide supervision and assistance for startup operation.
 - 3. Perform Functional Testing on equipment in accordance with this Section.
 - 4. Perform Performance Testing on equipment in accordance with this Section.
- C. Contractor will furnish labor, material, equipment, and services required to conduct and satisfactorily complete startup, exclusive of the supplies provided by UVSS.
- D. UVSS will supervise the startup and provide assistance, to operate all support systems provided by or required by UVSS for operation of the UV System.
- E. UVSS will furnish all necessary supplies (excluding power) needed for the initial startup and testing of the equipment.

3.4 TESTING

- A. General:
 - 1. The following tests will be completed before the date of substantial completion by the Installation Contractor:
 - a. Functional Testing.
 - b. Performance Testing.
 - 2. Contractor will supply all manpower and equipment, exclusive of supervision of the UVSS, necessary to conduct and complete the testing.
 - 3. Contractor will be responsible for operation and maintenance of the UV System equipment, at the direction of UVSS, until compliance with all disinfection requirements has been demonstrated.
 - 4. UVSS will provide a Testing Plan, including procedure and schedule, to Owner for review and approval before scheduling and performing any tests.
 - 5. Sampling and testing procedure will comply with NWRI Guidelines.
 - 6. Testing will be under the direct supervision of the UVSS's field representative.
 - 7. UVSS field representative will be present for the first full week of testing and be available remotely for the remaining test period.
 - 8. Owner may conduct additional sampling and testing at any time at Owner's expense without providing advance notification to the UVSS.
 - 9. Testing will be conducted at a time selected by the Contractor and mutually agreed to by UVSS and Owner.
 - 10. If UV system fails to meet any test requirements, Owner will notify UVSS, and UVSS shall investigate the problem and develop a corrective plan acceptable to Owner within two weeks of notification. UVSS shall be solely responsible for costs for modifications to the UV system and for retesting required to demonstrate compliance with all test requirements.
 - 11. Additional testing period beyond initial periods will not be basis for extension of contract time or claim for additional compensation from Owner.
- B. Functional Testing:
 - 1. Functional Testing is to demonstrate that the UV System and related control system operates in accordance with the specifications, including all operating, monitoring, and control functions.
 - 2. Functional Testing will be conducted after installation, but prior to Performance Testing.
 - 3. The Contractor, with assistance from the UVSS's representative, will conduct Functional Testing.
 - 4. Functional Testing will be conducted on each individual component item until it has achieved one continuous hour of satisfactory operation.

5. Functional Testing will be conducted to each UV reactor with flow to include, but not be limited to:
 - a. Wiring continuity test.
 - b. Control system loop test.
 - c. UV intensity sensor test to determine sensor-to-sensor variability, impact of sensor position and sensor accuracy. All on-line sensors will be tested.
 - d. Wiping system test.
 - e. Water level control functional test.
 - f. Monitoring instrument calibration.
 - g. Control function test.
 - h. Alarm function test.
 - i. Harmonics test.
 6. The Functional Test will include confirming the operability of serial interface between UV control panels, PLC, and the plant control system. Both UVSS and Contractor will be present during the interface test.
 7. Functional Testing will be witnessed by Owner.
- C. Performance Testing:
1. Performance Testing is to demonstrate that the UV System can achieve specified disinfection requirements and meeting the head loss requirements without exceeding the maximum power usage as stated in UVSS's proposal.
 2. Performance Testing will be conducted based on conditions for flow, UV transmittance, and dose as specified, and adjusted for degradation such as equipment aging and wear, fouling and cleaning efficiency.
 3. Performance testing will be conducted for a minimum of 30 consecutive days.
 4. The UVSS will provide detailed testing protocol for Owner's review and approval prior to the testing. The testing protocol will follow the NWRI guidelines, including, but not limited to the following:
 - a. Testing flow conditions: peak design flow and average flow based on a flow rate per lamp basis.
 - b. Testing will be conducted on each individual bank.
 - c. Testing will be conducted on each channel under design peak flow and average flow conditions with the control system in automatic settings.
 - d. Each test will take place over a minimum 2-hour period with samples collected during the period at approximately half hour increments following the start of each test.
 - e. Samples for indicating organism will be collected on the system influent and effluent for each test.
 - f. Sample analysis will be in accordance with the procedures described in the latest edition of "Standard Methods for the Examination of Water and Wastewater".
 5. Contractor and Owner will operate the facility such that specified flow conditions are approximately simulated to each UV channel. All reasonable efforts will be made to approximate steady-state flow conditions for the duration required to allow samples to be taken.
 6. Testing will be conducted after the lamps have completed a 100-hour burn-in period.
 7. The lamps will be automatically cleaned at a maximum rate of 48 cycles per day per lamp for the duration of the test. Manual cleaning of any kind by UVSS will not be allowed during the testing period.
 8. Sample collection will be done by Contractor and Owner's laboratory personnel. The sample collection will be directed by UVSS representative.
 9. Sample analysis will be conducted at Owner's laboratory and at Owner's expense.
 10. The Contractor will coordinate with laboratory personnel to collect, preserve, and transport the samples to the laboratory; conduct the required analyses, and report the results. Chain of custody procedures will be followed using a custody form typically used by Owner.
 11. All testing results will be compared against the disinfection requirements described in this Section.
 12. The data to be determined from each test will include, but is not limited to, the following:

- a. Flow rate and flows split between reactors/channels.
 - b. Detention time based on volume of water flowing by the UV lamps.
 - c. Number of lamps in operation.
 - d. UV dose.
 - e. Indicating organism counts in system influent and effluent.
 - f. Total suspended solids.
 - g. Biochemical Oxygen Demand (BOD₅).
 - h. UV transmittance.
 - i. UV intensity reading from the online instrumentation.
 - j. Water levels under various flow conditions.
 - k. Wiping frequency.
 - l. Power consumption: amps, kW demand, and kWh operating of the UV System and ancillary equipment.
13. Influent characterization will be conducted on the first day of the testing period. The following water quality data will be collected (as minimal) on the UV System INFLUENT sample for characterization:
- a. Indicating organism counts (cfu/100mL)
 - b. Total suspended solids (TSS)
 - c. Biochemical oxygen demand (BOD₅)
 - d. pH
 - e. Temperature
 - f. UV transmittance
 - g. Total dissolved solids (TDS)
 - h. Hardness
 - i. Calcium
 - j. Total and dissolved iron
- D. Test Reports:
- 1. UVSS representative will prepare the Functional Testing Report and the Performance Testing Report based on test results.
 - 2. For each report, one electronic copy will be submitted to Engineer.
 - 3. Owner will provide sampling data paperwork to the UVSS, for inclusion in the report, from any portion of the analysis conducted by Owner.
 - 4. Report will include the following information when applicable to either Functional Testing or Performance Testing:
 - a. Date and time of inspection, sampling, or testing.
 - b. Flow condition during testing.
 - c. Record of conditions at the plant noting any unusual circumstances.
 - d. Plans and description of locations of samples taken and testing performed.
 - e. Lamp status.
 - f. Ballast status.
 - g. Laboratory reports including:
 - 1) Signature of the person performing tests.
 - 2) Standard method and analytical method for conducting the test.
 - 3) Chain of custody sheets.
 - 4) Testing results.
 - h. Interpretation of results.
 - i. Recommended corrective actions to bring equipment into compliance, if required.
 - 5. Submit test reports to Owner within two weeks of test completion for review and acceptance.
 - 6. Performance Testing will not be conducted prior to the acceptance of the Functional Testing Report.

3.5 TRAINING

- A. Qualified UVSS technical representative will be on site for a minimum period of two working days plus travel time for training of operations and maintenance personnel.

- B. Training General:
 - 1. Training will not commence until accepted detailed lesson plan for each training activity has been reviewed by Owner.
 - 2. UVSS to provide training to designated Owner's personnel performing operation and maintenance of the UV system.
 - 3. UVSS will submit a Training Lesson Plan to Owner prior to conducting the training. Training aids and hands-on demonstrations should be described in the Training Lesson Plan.
 - 4. Training will consist of both classroom and hands-on sessions conducted at time and location acceptable to Owner.
 - 5. Contractor to designate a person responsible for scheduling and coordinating training.
- C. The UVSS will maintain records of the individuals that have completed training and provide information required for the documentation of training hours required for Owner's personnel.
- D. Instructions will be specific to the models of equipment provided and will include both classroom and hands-on instruction.
- E. A minimum of two sessions for each training topic will be conducted to allow for multiple shifts of Owner's personnel to receive the same training.
- F. Training sessions may be recorded by Owner at Owner's expense.
- G. UVSS will be responsible for all costs associated with training and will provide required materials, texts and supplies.
- H. UVSS will provide all training materials in written and electronic format. All training materials will be in consistent with the contents in O&M Manual.
- I. Contractor to coordinate training periods with Owner's operating personnel and UVSS's representatives, and with submittal of O&M Manuals.
 - 1. Training will be completed after startup/commissioning.
 - 2. Initial training will be completed prior to commencement of Functional Testing.
 - 3. Operation and Maintenance Manuals will be reviewed, accepted, and resubmitted in accordance with this section before start of training.
 - 4. Modifications resulting from startup of facility will be incorporated into final Operation and Maintenance Manuals.

3.6 EXISTING CHANNEL DRAWINGS

- A. See attached drawings from original design.

END OF SECTION

NO.	ADDENDUM NO. 1	DATE	BY	DATE
REVISIONS	DATE	BY	DATE	BY
DESIGNED DRK				
APPROVED				

DRAWN LC	CHECKED
DESIGNED DRK	
APPROVED	

City of
Hailey

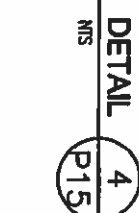
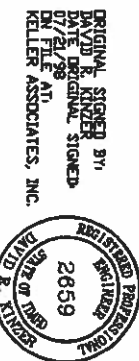


WOODSIDE TREATMENT PLANT
UV SYSTEM PLAN

PROJECT NO. 167016
SHEET NO. P15

POWER CENTER DETAIL

2
P15



JOINT DETAIL

5
P15



LEVEL SENSOR

7
P15



STILLING PLATE DETAIL

8
P15



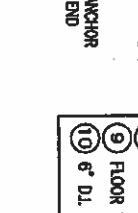
DETAIL 1

1
P15



DETAIL 3

3
P15



UV SYSTEM PLAN

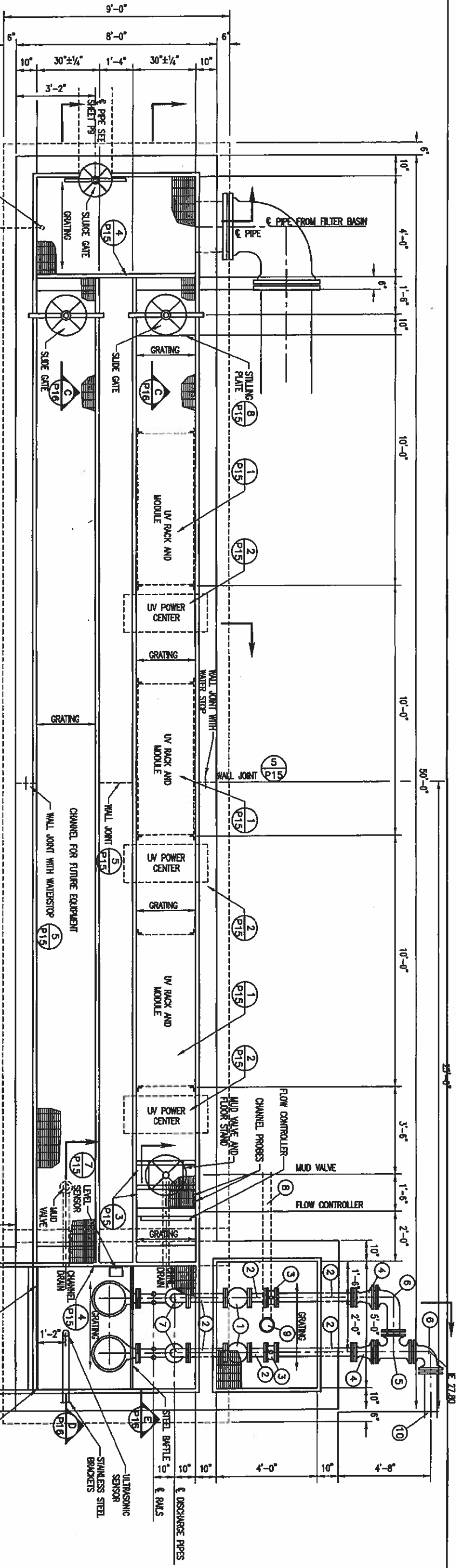
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PIPING KEY NOTES

- 1" FLANGED CHECK VALVE
- 4" D.I. PIPE
- 4" BUTTERFLY VALVE WITH MANUAL OPERATOR
- 4" 90° ELBOW
- 4" 90° ELBOW
- 6" D.I. ELBOW WITH THRUST BLOCK
- 6" D.I. ELBOW WITH THRUST BLOCK
- 4" FLANGE D.I. ELBOW (TURNED DOWN)
- 4" C.I. DRAIN
- 6" D.I. PIPE

RECORD DRAINING

These record drawings have been prepared, in part, on the basis of information furnished by the contractor. The contractor is responsible for the accuracy of the information furnished and for the incorporation of the same into the drawings as a result of field observations.



RECORD DRAWING

These record drawings have been prepared in part on the basis of information compiled and furnished by others. The Engineer will not be responsible for any errors or omissions which have been incorporated into this document as a result. Date: 03/15/01

