

SOLICITATION, OFFER, AND AWARD <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NO. W912EF22R0015	2. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	3. DATE ISSUED 18-Aug-2022	PAGE OF PAGES 1 OF 74
IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.				
4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.		6. PROJECT NO.	
7. ISSUED BY CODE W912EF USAED, WALLA WALLA - CONTRACTING DIV. DAVID C BOONE 201 N. THIRD AVENUE WALLA WALLA WA 99362-1876 TEL: 509-527-7205 FAX: 509-527-7802		8. ADDRESS OFFER TO <i>(If Other Than Item 7)</i> CODE <div style="text-align: center; font-weight: bold; padding: 10px;">See Item 7</div>		
9. FOR INFORMATION CALL:	A. NAME DAVID C. BOONE		B. TELEPHONE NO. <i>(Include area code) (NO COLLECT CALLS)</i> 509-527-7205	
SOLICITATION				
NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".				
10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS <i>(Title, identifying no., date):</i> PROJECT TITLE: McNary Drainage, Unw aterting and Equilization (DUE) System Rehabilitation LOCATION: McNary Lock and Dam, Umatilla, Oregon				
11. The Contractor shall begin performance w ithin <u>10</u> calendar days and complete it w ithin _____ calendar days after receiving <input type="checkbox"/> award, <input checked="" type="checkbox"/> notice to proceed. This performance period is <input checked="" type="checkbox"/> mandatory, <input type="checkbox"/> negotiable. <i>(See 00 70 00 _____.)</i>				
12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? <i>(If "YES," indicate w ithin how many calendar days after award in Item 12B.)</i> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			12B. CALENDAR DAYS 10	
13. ADDITIONAL SOLICITATION REQUIREMENTS: A. Sealed offers in original and _____ copies to perform the w ork required are due at the place specified in Item 8 by <u>03:00 PM</u> <i>(hour)</i> local time <u>19 Sep 2022</u> <i>(date)</i> . If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due. B. An offer guarantee <input type="checkbox"/> is, <input checked="" type="checkbox"/> is not required. C. All offers are subject to the (1) w ork requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference. D. Offers providing less than <u>90</u> calendar days for Government acceptance after the date offers are due w ill not be considered and w ill be rejected.				

SOLICITATION, OFFER, AND AWARD (Continued) <i>(Construction, Alteration, or Repair)</i>										
OFFER (Must be fully completed by offeror)										
14. NAME AND ADDRESS OF OFFEROR <i>(Include ZIP Code)</i>					15. TELEPHONE NO. <i>(Include area code)</i>					
CODE FACILITY CODE					16. REMITTANCE ADDRESS <i>(Include only if different than Item 14)</i> See Item 14					
					17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. <i>(Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)</i>					
AMOUNTS		SEE SCHEDULE OF PRICES								
18. The offeror agrees to furnish any required performance and payment bonds.										
19. ACKNOWLEDGMENT OF AMENDMENTS <i>(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)</i>										
AMENDMENT NO.										
DATE										
20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER <i>(Type or print)</i>					20B. SIGNATURE				20C. OFFER DATE	
AWARD (To be completed by Government)										
21. ITEMS ACCEPTED:										
22. AMOUNT		23. ACCOUNTING AND APPROPRIATION DATA								
24. SUBMIT INVOICES TO ADDRESS SHOWN IN <i>(4 copies unless otherwise specified)</i>				ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> 41 U.S.C. 253(c)					
26. ADMINISTERED BY			CODE		27. PAYMENT WILL BE MADE BY: CODE					
CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE										
<input type="checkbox"/> 28. NEGOTIATED AGREEMENT <i>(Contractor is required to sign this document and return _____ copies to issuing office.)</i> Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.					<input type="checkbox"/> 29. AWARD <i>(Contractor is not required to sign this document.)</i> Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.					
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN <i>(Type or print)</i>					31A. NAME OF CONTRACTING OFFICER <i>(Type or print)</i>					
30B. SIGNATURE			30C. DATE		TEL: EMAIL:			31B. UNITED STATES OF AMERICA BY		
								31C. AWARD DATE		

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Section 00 21 00 - Instructions

Walla Walla District Corps of Engineers
McNary Powerhouse Drainage, Unwatering, and Equalization System Rehabilitation

The magnitude of construction is estimated to be between \$5,000,000 and \$10,000,000.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>U/M*</u>	<u>U/P*</u>	<u>AMOUNT</u>
Base Items					
0001	Drainage Header System Rehabilitation	1	JOB	XXXXX	\$ _____
0002	Unwatering Pump and Drainage Pump System Rehabilitation	1	JOB	XXXXX	\$ _____
0003	EL 207 Gallery – Scroll Case Drain Valves, Draft Tube Drain Valves, and Equalizer Valves Upgrades	1	JOB	XXXXX	\$ _____
0004	Station Service Units – Drain Valve Upgrades	1	JOB	XXXXX	\$ _____
BASE ITEMS TOTAL \$ _____					
Optional Items					
0005	Drainage Header Point Repair (Optional)	Est* 10	LF	\$ _____	\$ _____
OPTIONAL ITEMS TOTAL \$ _____					
SCHEDULE TOTAL \$ _____					

IMPORTANT See Section 01 22 00.00 28; MEASUREMENT AND PAYMENT; Paragraph; Retainage of Payment, for withholding of payment for final deliverables.

U/M* = Unit of Measure

U/P* = Unit Price

Est* = Estimated

Quantities identified as Estimated (“Est”) in the bid schedule are subject to FAR Clause 52.211-18, VARIATION IN ESTIMATED QUANTITY, located in Section 00 70 00.

Note: Funds are not presently available. No award will be made until funds are available for obligation.

A. BASIS FOR AWARD

The award will be made based on the best overall (i.e., best value-tradeoff) proposal that is determined to be the most beneficial to the Government, based on an integrated assessment, with appropriate consideration given to the five (5) evaluation factors: Technical Experience; Schedule; Past Performance; Small Business Participation; and Price.

Factor 1, Technical Experience is more important than Factor 2, Schedule, Factor 3, Past Performance, and Factor 4, Small Business Participation. Factor 2, Schedule is equally as important as Factor 3, Past Performance and both are more important than Factor 4, Small Business Participation. When combined, the non-price factors (Factors 1, 2, 3, and 4) are significantly more important than Factor 5, Price.

The following paragraphs B through E cover the Factors to be evaluated, the evaluation approach for each Factor to include factor rating tables, proposal submission requirements and final discussion guidance.

B. FACTORS TO BE EVALUATED

The following evaluation factors will be used to evaluate each proposal.

1. FACTOR 1 – Technical Experience

Risk will be evaluated as one aspect of the technical evaluation, inherent in the technical evaluation factor ratings. Risk assesses the degree to which the offeror's proposed technical approach for the requirements of the solicitation may cause disruption of schedule, increased price, degradation of performance, the need for increased Government oversight, or the likelihood of unsuccessful contract performance.

Evaluation of the offeror's proposal shall address the factor as it applies to the scope of work. A detailed explanation of the criteria for the evaluation is set forth in the Evaluation Approach, Paragraph C of this section. During evaluations of each proposal, the Government will assign each factor an adjectival rating and write a narrative evaluation reflecting the identified findings.

2. FACTOR 2 – Schedule

Risk will be evaluated as one aspect of the technical evaluation, inherent in the technical evaluation factor rating. Risk assesses the degree to which the offeror's proposed technical approach for the requirements of the solicitation may cause disruption of schedule, increased price, degradation of performance, the need for increased Government oversight, or the likelihood of unsuccessful contract performance.

3. FACTOR 3 – Past Performance

Each offeror's current and past performance will be reviewed to determine relevancy and confidence.

4. FACTOR 4 – Small Business Participation

The extent of Small Business Participation will be evaluated for unrestricted acquisitions.

5. FACTOR 5 – Price

The resulting award will be a firm-fixed price contract. Price reasonableness will be utilized in the evaluation of the proposal.

C. EVALUATION APPROACH

All proposals will be evaluated by the Source Selection Evaluation Board (SSEB). The following sections define the information to be provided and describe how the information for each factor and will be evaluated and rated.

1. The overarching evaluation approach for all factors is as follows:
 - a. Adequacy of Response. The proposal will be evaluated to determine whether the offerors methods and approach have adequately and completely considered, defined, and satisfied the requirements specified in the RFP. The proposal will be evaluated to determine the extent to which each requirement has been addressed in the proposal in accordance with the proposal submission section of the RFP. Marginal levels of overall detail could indicate a lack of understanding concerning the requirements and may result in the entire factor receiving an unfavorable rating and/or being eliminated from the competitive range.
2. **Factor 1 Technical Experience**

Proposals will be evaluated to determine experience with mechanical and electrical industrial installation relevant with the scope and complexity required in the solicitation. Offerors shall provide sufficient information to clearly demonstrate the breadth and depth of the Offeror's (and major subcontractor's) electrical and mechanical industrial installation experience. Major subcontractors are defined as members of an offeror's overall team who are expected to perform ten (10) percent or more of the proposed effort. The Offeror shall also submit the written consent of its major subcontractors to allow the disclosure of its subcontractor's technical experience to the Offeror. In addition, signed letters of commitment shall be included for all major subcontractors for their technical experience to be considered. **Proposals shall conform to the solicitation requirements, to include all stated terms, conditions, representations, certifications, and all other information required of this solicitation.**

Offerors shall submit the following for Factor 1:

Offerors must demonstrate electrical industrial installation experience and mechanical industrial installation experience by providing no more than five (5) projects performed within the last ten (10) years, which collectively demonstrate all the elements identified below. Individual projects that include all elements will be considered more favorable. If a subcontractor is proposed, the proposal will be considered more favorable if the proposal contains evidence of the prime and subcontractor working successfully together previously on relevant projects, than an offer with a prime and subcontractor with no prior experience working together on relevant projects. If a joint venture is proposed, the proposal will be considered more favorable if the proposal contains evidence of the firms working successfully together previously on relevant projects, than an offer with a joint venture with no prior experience working together on relevant projects.

I. Electrical Industrial Installation Experience Elements:

- At least 80% physically complete at the time of proposal submission. If project is not complete, provide documentation such as an invoice, letter from the owner, PPQ response or CPARS to demonstrate 80% physically complete.
- Complete equipment upgrade of at least a 500 KVA system that collectively include the following:
 - 480V switchgear, motor control centers, panelboards and motors.
 - Installation and programming of Human Machine Interface (HMI) and Programmable Logic Controllers (PLC) for motor controls.
- Contractors shall be rated more favorably if work included the following:
 - Medium voltage equipment removal or installation .
 - Installation work involving temporary 480V motor power and control measures.
 - Installation of 3 phase, medium voltage, dry-type transformers.
- Use Attached "Offeror Experience Form" to describe the projects in which the Offeror has relevant installation experience. Project experience shall include adequate detail to demonstrate the relevancy of the scope of work for comparison to that required in this solicitation.

II. Mechanical Industrial Installation Experience Elements:

- At least 80% physically complete at the time of proposal submission. If project is not complete, provide documentation such as an invoice, letter from the owner, PPQ response or CPARS to demonstrate 80% physically complete.
- Installation of vertical turbine or centrifugal pumps that have a minimum capacity of 3,500gpm.
- Installation of a minimum 12" diameter steel piping and isolation control valves.
- Contractors shall be rated more favorably if the installation included the following:
 - Installation of work occurred in hazardous environments such as confined spaces or in the presence of fall hazards.
 - Installation work that required diving within boat restricted zone of hydroelectric plant.
 - Installation work involving water diversion and temporary pumping control measures.
- Use Attached "Offeror Experience Form" to describe the projects in which the Offeror has relevant installation experience. Project experience shall include adequate detail to demonstrate the relevancy of the scope of work for comparison to that required in this solicitation.

3. **Factor 2 Schedule**

This factor evaluates the offeror's understanding of the required scope of work and evaluates the offeror's ability to complete all requirements within the period of performance. **Proposals shall conform to the solicitation requirements to include all stated terms, conditions, representations, certifications, and all other information required by this solicitation.**

Offerors should assume for evaluation purposes, a Notice To Proceed (NTP) date of 20 October 2022.

Offerors shall submit the following for Factor 2:

- I. Provide a schedule that shall reflect the planned activities, order of major tasks identified, task dependencies and durations proposed to successfully accomplish the entire project from notice to proceed to final commissioning, and contract close-out. At a minimum, the schedule shall include the following:
 - a. Pre-Construction Submittals submitted/approved within 60 calendar days from NTP being issued.
 - b. Compliance with Work and Operational Restrictions Specification (01 14 00.02 28) and acknowledgement of outage requirements in the 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK clause.
 - c. Discuss how work to complete one task may impact or be impacted by work to complete other tasks.
 - d. Major Activities:
 - i. Pre-construction submittals
 - ii. Outage duration needed for valve replacements, for each main unit
 - iii. Rehabilitation of the Unwatering Pumps
 - iv. Long lead fabrication and procurement items
 - v. Motor Control Center (MCC) demolition and replacement
 - vi. Rehabilitation of the Drainage System
 - vii. Contractor and Government Commissioning of Major Activities
- II. Work plan addressing the following items:
 - a. Discuss how work to complete one task may impact or be impacted by work to complete other tasks.
 - b. Document capabilities and availability of resources (manufacturing, equipment and personnel) necessary to complete all required major tasks identified in the schedule.
 - c. List all major subcontractors with their respective role and responsibility to complete all major tasks. Refer to the requirement for a letter of commitment for subcontractors in submission requirements for Factor 1.
 - d. Explain the communication process between different crews, subcontractors, and managers, including the superintendent, project manager, safety officer and quality control personnel. Include an organization chart to show the communication channels.

TECHNICAL FACTOR RATINGS: Ratings outlined below focus on strengths, deficiencies, weaknesses, risks and uncertainties of the offeror's proposal. The rating depicts how well the offeror's proposal meets the Technical subfactor requirements.

Technical Factor Ratings	
Rating	Definition
Outstanding	Proposal indicates an exceptional approach and understanding of the requirements and contains multiple strengths, and risk of unsuccessful performance is low.
Good	Proposal indicates a thorough approach and understanding of the requirements and contains at least one strength, and risk of unsuccessful performance is low to moderate.
Acceptable	Proposal meets requirements and indicates an adequate approach and understanding of the requirements, and risk of unsuccessful performance is no worse than moderate.
Marginal	Proposal has not demonstrated an adequate approach and understanding of the requirements, and/or risk of unsuccessful performance is high.
Unacceptable	Proposal does not meet requirements of the solicitation, and thus, contains one or more deficiencies, and/or risk of unsuccessful performance is unacceptable. Proposal is non-awardable.

4. **Factor 3 - Past Performance**

There are three aspects to the past performance evaluation: Recency, Relevancy (including context of data) and Quality (including general trends in the contractor performance and source of information).

The Government will evaluate the offeror's record of past and current performance to ascertain the probability of successfully performing the required efforts of the scope of work. **Proposals shall conform to the solicitation requirements to include all stated terms, conditions, representations, certifications, and all other information required by this solicitation.**

- a. The Government will focus its inquiries on the offeror's (and major subcontractor's) record of performance as it relates to all solicitation requirements, including price, schedule, performance and management of sub-contractors. Major sub-contractors are defined as members of an offeror's overall team who are expected to perform ten (10) percent or more of the proposed effort. The Offeror shall also submit the written consent of its major subcontractors to allow the disclosure of its subcontractor's past performance information to the Offeror. In addition, signed letters of commitment shall be included for all major subcontractors for their past performance to be considered.

Offerors are reminded to include the most recent and relevant efforts (within the past ten years) in their proposal. Absent any recent and relevant past performance history or when the performance record is so sparse that no meaningful confidence assessment rating can be reasonably assigned, the offeror will be assigned a "neutral confidence rating" and its proposal will not be evaluated favorably or unfavorably on past performance. The Government may use data provided by the offeror in its proposal and data obtained from other sources, including data obtained through interviews with personnel familiar with the contractor and their current and past performance under Federal, State, or Local government or commercial contracts for same or similar services as compared to the North American Industry Classification System (NAICS) 237990, Other Heavy and Civil Engineering Construction. Data submitted by the offeror or gathered from other sources by the government in conducting performance risk assessments shall not extend past ten years prior to the issue date of the request for proposal, but may include performance data generated during the past ten years without regard to the contract award date. CPARS data is limited to the past 6 years. Offeror's shall provide additional performance data for projects beyond six years.

- b. Offerors should submit all Government and/or commercial contract numbers and descriptions for the prime offeror and each major subcontractor in performance or awarded during the past ten years, from the issue date of this request for proposal, which are relevant to the efforts required by this solicitation.
- c. The past performance factor considers each offeror's demonstrated current and relevant past record of performance in supplying products and services that meet the contract requirements.

- d. **RECENCY:** The Government will evaluate recency by examining the offerors' record of past performance and to assess the time period during which the offeror's past performance is considered relevant.
- e. **RELEVANCY:** The Government will conduct a performance assessment based on the relevancy of the Offeror's current and past performance, as well as that of its major subcontractors, as it relates to the probability of successful accomplishment of the required effort. These efforts include all aspects of schedule, performance and customer support, including the Offeror's submitted subcontracting plan for this project and the Offeror's record of: 1) Conforming to specifications and standards of good workmanship; 2) Maintaining program execution within price; 3) Adherence to contract schedules, including the administrative aspects of performance; 4) Ability to resolve technical and manufacturing problems quickly and effectively; 5) Businesslike concern for the interest of its customers; 6) Establishing and maintaining adequate management of subcontractors; and 7) Compliance with subcontracting plans submitted on previous projects.

Past Performance Relevancy Ratings	
Rating	Definition
Very Relevant	Present/past performance effort involved essentially the same scope and magnitude of effort and complexities this solicitation requires.
Relevant	Present/past performance effort involved similar scope and magnitude of effort and complexities this solicitation requires.
Somewhat Relevant	Present/past performance effort involved some of the scope and magnitude of effort and complexities this solicitation requires.
Not Relevant	Present/past performance effort involved little or none of the scope and magnitude of effort and complexities this solicitation requires.

- f. **QUALITY:** The third aspect of the past performance evaluation is to establish the overall quality of the offeror's past performance. The quality past performance evaluations conducted gathers information from offeror's customers to determine how well the offeror performed those past contracts. This quality assessment will be reflected in the overall confidence assessment described below.
- g. **PERFORMANCE CONFIDENCE ASSESSMENT:** The final step is for the team to arrive at a single consensus performance confidence assessment for the offeror. Because this source selection requires a greater level of discrimination with the past performance evaluation, evaluators shall use the ratings in the chart below. This rating considers the assessed quality of the relevant/current efforts gathered (documented results from Past Performance Questionnaires, interviews, CPARS, and other sources form the support and basis for this assessment). Ensure the rationale for the conclusions reached are included.

Performance Confidence Assessments	
Rating	Definition
Substantial Confidence	Based on the offeror's recent/relevant performance record, the Government has a high expectation that the offeror will successfully perform the required effort.

Satisfactory Confidence	Based on the offeror's recent/relevant performance record, the Government has a reasonable expectation that the offeror will successfully perform the required effort.
Neutral Confidence	No recent/relevant performance record is available or the offeror's performance record is so sparse that no meaningful confidence assessment rating can be reasonably assigned. The offeror may not be evaluated favorably or unfavorably on the factor of past performance.
Limited Confidence	Based on the offeror's recent/relevant performance record, the Government has a low expectation that the offeror will successfully perform the required effort.
No Confidence	Based on the offeror's recent/relevant performance record, the Government has no expectation that the offeror will be able to successfully perform the required effort.

5. **Factor 4 – Small Business Participation Proposal**

Other than small business offerors will be evaluated on the level of proposed participation of small business concerns in performance of this acquisition (as small business subcontractors) relative to the objectives and goals established herein. Small business contractors may achieve small business participation goals through their own performance/participation as a prime and also through a joint venture, teaming arrangement, and subcontracting to other small businesses.

The government will evaluate:

- a. The extent to which such firms, as defined in FAR Part 19, are specifically identified in proposals;
- b. The extent of commitment to use such firms. The proposal will be rated more favorably under this factor if it contains an enforceable commitment in the form of a signed letter of commitment (LOC);
- c. Identification of the complexity and variety of the work small firms are to perform;
- d. The extent past performance is in compliance with FAR 52.219-8 "Utilization of Small Business" and maximizing opportunities for U.S. Small Business Subcontractors.
- e. The extent to which the offeror meets or exceeds the goals. The goals for this procurement are:
 - Total Small Business (any type of small business) 5% of the total contract value (the sum of all CLINs);
 - Subcategory Small Business
 - Small Disadvantaged Business (SDB) 0.5% of the total contract value;
 - Woman-Owned Small Business (WOSB) 0.5% of the total contract value;
 - Historically Underutilized Business Zone (HUBZone) 0.5% of the total contract value;
 - Veteran Owned Small Business (VOSB) 1% of the total contract value;
 - Service Disabled Veteran Owned Small Business (SDVOSB) 0.5% of the total contract value;

Small Business Participation Factor Rating Definitions:

Small Business Participation Factor Ratings	
Rating	Definition
Outstanding	Proposal indicates an exceptional approach and understanding of the small business

	objectives.
Good	Proposal indicates a thorough approach and understanding of the small business objectives.
Acceptable	Proposal meets requirements and indicates an adequate approach and understanding of the small business objectives.
Marginal	Proposal has not demonstrated an adequate approach and understanding of the small business objectives.
Unacceptable	Proposal does not meet small business objectives. Proposal is non-awardable.

6. **Factor 5 – Price**

Offerors must submit completed Contract Line Item Numbers (CLINs) with unit price, quantity, and extended price. All extensions of the unit prices shown will be subject to verification by the Government.

An evaluation will be performed on the proposed prices. The evaluation will not be assigned an adjectival rating. However, it will be evaluated for completeness and reasonableness in accordance with FAR 15.305 and FAR 15.404.

- a. Completeness - To be complete, the Offeror must provide all data that is requested and necessary to evaluate the price. The Government will assess the extent to which the proposed prices comply with the content and format requirements set forth in this solicitation.
- b. Reasonableness - The Offerors proposal is evaluated through price analysis techniques as described in FAR Subpart 15.305(a) (1) and 15.404-1(b). For price to be reasonable, it must represent a price that provides best value to the Government when consideration is given to prices in the market, (market conditions may be evidenced by other competitive proposals), and technical and functional capabilities of the Offeror. The Offerors price will be evaluated to determine if any are unreasonably high in relation to the anticipated work under the contract, as well as with current industry standards.

D. PROPOSAL SUBMISSION

1. **Introduction.** The offeror's proposal shall be submitted electronically, as set forth below. The solicitation shall provide the Government address and receipt date for proposal submission. Files shall not contain classified data. The use of hyperlinks in proposals is prohibited.

The offeror's proposal shall consist of two (2) volumes. The Volumes are:

Volume I - Technical, Past Performance

Volume II – Small Business Participation Plan, Price, Solicitation, Offer and Award Documents and Certifications/Representations.

Offerors are cautioned that “parroting” of the Technical requirements with a statement of intent to perform does not reflect an understanding of the requirement or capability to perform. Offerors are responsible for including sufficient details to permit a complete and accurate evaluation of each proposal. Proprietary information shall be clearly marked.

2. **Proposal Submission Requirements.**

- a. Each volume shall be submitted as a separate PDF or ZIP file. Any pages that are changed (as a result of negotiations or proposal revisions) should be of a different color and have changed information clearly marked by a vertical line in the right margin of the page. The revised pages shall be dated.
- b. Printing shall be single spaced. Each paragraph shall be separated by at least one blank line. A standard, 12-point minimum font size applies. Arial or Times New Roman fonts are required. Tables and

illustrations may use a reduced font size no less than 8-point and may be landscape.

- c. The following volumes of material shall be submitted:

VOLUME TITLE	PRINTED COPIES	ELECTRONIC COPIES
Volume I	Printed copies not required.	1
Volume II	Printed copies not required.	1

- d. Proposals may be rejected for failure to adhere to the proposal preparation requirements.
- e. Proposals shall conform to the solicitation requirements to include all stated terms, conditions, representations, certifications, and all other information required of this solicitation.
- f. To submit proposals electronically via DoD SAFE, email Contract Specialist, David Boone at david.c.boone@usace.army.mil, Hillary Morgan at hillary.a.morgan@usace.army.mil and Contracting Officer, Jani Long at jani.c.long@usace.army.mil for a unique code with valid email address and point of contact for your company. Mr. Boone will provide you with your unique code, then you will need to go to the following website: <https://safe.apps.mil/>

At the DoD SAFE website select “Drop-Off,” then enter your unique code and submit your proposal(s). When your proposal is submitted via the DoD SAFE website, the website will provide notification of the submittal to the recipients. For this solicitation, the recipient will be: **David C. Boone**, david.c.boone@usace.army.mil and **Hillary Morgan** hillary.a.morgan@usace.army.mil

- **When your files have been “picked-up,” you will receive an email notification. If you have not received a notification and it has been more than one business day since your “drop-off” – please contact David Boone at david.c.boone@usace.army.mil and Hillary Morgan at hillary.a.morgan@usace.army.mil**

For the purposes of determining whether the proposal was received “late” in accordance with FAR 15.208, the date and time the file(s) are uploaded into the DoD SAFE website as identified in the DoD SAFE email sent to the Contract Specialist(s)/Contracting Officer will be the time and date the Government received the proposal. **Do not assume that electronic communication is instantaneous. Please make allowances for delays in transmittal.**

NOTE: ONLY in the unusual case that the DoD SAFE website is “down” (not operational); the Offeror should email their proposal to the following individuals prior to the proposal due date and time: David Boone whose email address is david.c.boone@usace.army.mil and Hillary Morgan at hillary.a.morgan@usace.army.mil

SUBMISSION DEADLINE – Proposals shall be received by the USACE Contracting Activity no later than the time and date specified in Block 13 of Standard Form 1442. Official time will be established by the clock located in the area where proposals are received. Late proposals may not be accepted.

3. Proposal Files.

- a. Format. The submission shall be clearly indexed and logically assembled. Each volume shall be clearly identified and shall begin at the top of a page. All pages of each volume shall be appropriately numbered and identified by the complete company name, date and RFP number in the header and/or footer. Scans must be in color and at least 600 dpi. All files created in MS Word (doc) files shall use the following page setup parameters:

Margins – Top, Bottom, Left, Right – 1”
From Edge – Header, Footer 0.5” Page
Size, Width – 8.5”

NOTE: 11X17 folded pages are acceptable for tables/graphic representations. The following additional restrictions apply:

File Packaging. All of the proposal files shall be compressed (zipped) into one file entitled proposal zip using WinZip version 6.2 or later, or as separate uploads in their native format, i.e. doc, xls, ppt, etc., and submitted electronically via DoD SAFE. Files shall be in read-only format, using PDF files. All price breakdown information to aid in the Price evaluation shall be submitted in Microsoft Office Excel Read/Write format. **Please note – Self extracting exe files are not acceptable.

b. **Content Requirement.** All information shall be confined to the appropriate file. The offeror shall confine submissions to essential matters, sufficient to define the proposal in a concise manner, to permit a complete and accurate evaluation of each proposal. Each file of the proposal shall consist of a Table of Contents, Summary Section, and the Narrative discussion. The Summary Section shall contain a brief abstract of the file. Proprietary information shall be clearly marked.

Sub-Contractor Identification:

- a. Offerors should clearly identify the firm(s) that will be utilized during performance of the contract or work that will be self-performed. Ensure the proposal is clear as to which function the Offeror or subcontractor will be performing. If the prime contractor proposes to use a subcontractor, the offeror shall submit a signed Letter of Commitment from the subcontractor with the proposal.
 - a. If a subcontractor is proposed, the proposal will be considered more favorable if the proposal contains evidence of the prime and subcontractor working successfully together previously on relevant projects.
 - b. If a joint venture is proposed, the proposal will be considered more favorable if the proposal contains evidence of the joint venture entity working successfully together previously on relevant projects.

(i) **VOLUME I, TAB 1 –Technical Experience**

(i) **VOLUME I, TAB 2 –Schedule**

(iii) **VOLUME I, TAB 3 – Past Performance.** This tab shall contain current and past performance information regarding similar contracts. Offerors shall submit Government and/or commercial contracts for the prime offeror and each major contract currently in performance or awarded during the past ten (10) years, from the issue date of this RFP, which are relevant to the efforts required by this solicitation. Relevant efforts are defined as services/efforts that are the same as or similar to the effort required by the RFP. Data concerning the offeror shall be provided first, followed by each proposed major subcontractor, in alphabetical order. The Offeror shall also submit the written consent of its major subcontractors to allow the disclosure of its subcontractor's past performance information to the Offeror. In addition, signed letters of commitment shall be included for all major subcontractors for their past performance to be considered. This tab shall be organized into the following sections:

(1) **Section 1 – Contract Descriptions.** This section shall include the following information in the following format. Ensure all information is current and accurate.

- (a) Contractor/Subcontractor place of performance, CAGE Code and DUNS Number. If the work was performed as a subcontractor, also provide the name of the prime contractor and Point of Contact (POC) within the prime contractor organization (name, and current address, e-mail address, and telephone and fax numbers).
- (b) Government contracting activity, (or private firm) and current address, Procuring Contracting Officer's name, e-mail address, telephone and fax numbers.

- (c) Technical representative/COR and current email address, telephone and fax numbers.
- (d) Government contract administration activity and the Administrative Contracting Officer's name, current e-mail address, telephone and fax number.
- (e) Government contract administration activity's Pre-Award point of contact name, and current e-mail address, telephone and fax numbers.
- (f) Contract Number and, in the case of Indefinite Delivery type contracts, GSA contracts, and Blanket Purchase Agreements, include Delivery Order/Task Order Numbers.
- (g) Contract Type (specific type such as Fixed-Price (FP), Cost Reimbursement (CR), Time & Material (T&M), etc.). In the case of Indefinite Delivery contracts, indicate specific type (Requirements, Definite Quantity, and Indefinite Quantity) and secondary contract type (FP, CR, T&M, etc.).
- (h) Awarded price.
- (i) Final or projected final price.
- (j) Original delivery schedule, including dates of start and completion or work.
- (k) Final or projected final, delivery schedule, including dates of start and completion of work.

(2) Section 2 – Performance. Offerors shall provide a specific narrative explanation of each contract listed in Section 1 - Contract Description, describing the objectives achieved and detailing how the effort is relevant to the requirement of this RFP.

- (a) For any contracts that did not/do not meet original schedule or technical performance requirements, provide a brief explanation of the reason(s) for the shortcomings and any corrective action(s) taken to avoid recurrence. The offerors shall list each time the delivery schedule was revised and provide an explanation of why the revision was necessary. All Requests for Deviation and Requests for Waiver shall be addressed with respect to causes and corrective actions. The offerors shall also provide copy of any Cure Notices or Show Cause Letters received on each contract listed and a description of any corrective action implemented by the offeror or proposed subcontractor. The offerors shall indicate if any of the contracts listed were terminated and the type and reasons for the termination.
- (b) For all contracts, the offeror shall provide data on all manufacturing warranty returns. Data shall delineate total number of warranty returns, number of Could Not Duplicate (CND), number of failures attributable to GFE component failures, and number and nature of failures attributable to the offeror's delivered product.

(3) Section 3 – Subcontracts. Offerors shall provide an outline of how the effort required by the RFP will be assigned for performance within the offeror's corporate entity and among the proposed subcontractors. The information provided for the prime offeror and each proposed major subcontractor shall include the entire company name, company address, CAGE Code, DUNS Number and type of work to be performed by citing the applicable Government technical specification. This includes all subcontractors and suppliers who will be providing critical hardware/services or whose subcontract is for more than 10% of the total proposed Price.

(4) Section 4 – New Corporate Entities. New corporate entities may submit data on prior contracts involving its officers and employees. However, in addition to the other requirements in this section, the offeror shall discuss in detail the role performed by such persons in the prior contracts cited to demonstrate the relevancy of experience and past performance with this solicitation. Information should be included in the files described

in the sections above. Signed Letters of Commitment shall be included in the proposal for these employees in order to be considered. Letters of Commitment must be signed both by the company official and the employee.

(5) Section 5-Past Performance Questionnaire. For all contracts identified in Section 1 - Contract Descriptions, complete a Past Performance Questionnaire for any project that has not received a formal Contractor Performance Assessment Reporting System (CPARS) evaluation. The offeror shall complete Part I of the Past Performance Questionnaire and

E-mail the questionnaire to the technical representative responsible for the current and past contract. The Point of Contacts (POCs) shall be instructed to electronically complete Part II of the questionnaire and e-mail the entire questionnaire to the Contracting Office no later than the proposal due date, to

David.C.Boone@usace.army.mil and Hillary.a.morgan@usace.army.mil. **The offeror shall submit**, with its proposal, a list of all the POCs who were sent questionnaires. The POC List shall be submitted in Word for Windows Table Format to include the following fields:

Solicitation Number; Company Name; Contract Number; Government Agency; POC Last Name, First Name; POC Title; POC Telephone Number; POC E-mail Address; and Date E-Mail to POC (month/day).

(6) Section 6-Submissions. Offerors are discouraged from providing points of contact with another contractors' facility, i.e., in case an offeror (or one of his/her team members) is in a subcontract with another contractor who has submitted a proposal on the same requirement. Offerors shall provide and submit the prime contract number and all Governmental agency points of contact (POC) in lieu of subcontract numbers or prime contract POCs in situations as described above.

(iii) VOLUME II, TAB 1 – Price. This tab shall consist of all information, required to support proposed prices. Certified pricing data is not currently required; however, the Government reserves the right to request such data prior to award. There are no page limitations for this tab.

The offeror shall ensure that the information submitted in this tab is consistent with and fully supports the amounts set forth in the SF1442 and continuation sheets.

(iv) VOLUME II, TAB 2– Small Business Participation Plan. See Small Business Participation Plan. Large business Offerors are required to complete a Small Business Participation Plan (form attached). Offerors must propose the level of participation of small businesses (as small business subcontractors) in the performance of this acquisition relative to the objectives/goals set forth in the evaluation of this area.

(v) VOLUME II, TAB 3– SOLICITATIONS, OFFER AND AWARD DOCUMENTS AND CERTIFICATIONS/REPRESENTATIONS

Certifications and Representations – Each offeror shall complete (fill-in and signatures) the solicitation sections indicated below using the file (without modification to the file) provided with the RFP. An authorized official of the firm shall sign the SF1442 and all certifications requiring original signature. An Acrobat PDF file shall be created to capture the signatures for submission.

Section 00 21 00 – Standard Form 1442 Solicitation, Offer and Award

Section 00 45 00 – Representations, Certification, and Other Statements of Offerors

Solicitations, Offer and Award Documents and Certifications/Representations shall not be submitted separately from that submitted in VOLUME II – SOLICITATIONS, OFFER AND AWARD DOCUMENTS AND CERTIFICATIONS /REPRESENTATIONS.

E. DISCUSSIONS

1. GENERAL INFORMATION. In accordance with FAR provision 52.215-1, the Government intends to evaluate proposals and award a contract without discussions with offerors. Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary.

ATTENTION TO OFFERORS

Offerors(s) may be asked to provide the following information for the Government's use in the determination of offerors(s) responsibility, pursuant to FAR Part 9.

QUALIFICATIONS

1. Current Balance Sheet and latest Profit and Loss Statement prepared from the most recent fiscal year and certified by an officer of the company.
2. The name of your banking firm, telephone number and the name of the individual to contact for a line-of-credit reference.

Banking Institution _____

Telephone Number _____

Person to Contact _____

Email Address _____

3. Tax ID Number _____

4. Years of experience (in the field of the proposed work). _____

Indicate similarity of work currently under way to work required for this project.

5. List of present work to include agency or firm name, address, telephone number and email address of primary point of contact responsible for inspection and acceptance of the work. (Attach list)

6. List of previous work to include agency or firm name, address, telephone number and email address of primary point of contact responsible for inspection and acceptance of the work. (Attach list)

7. Percentage of work under this contract to be subcontracted _____ %

Return completed form with all attachments to:

Email: david.c.boone@usace.army.mil and hillary.a.morgan@usace.army.mil

OR

Physical/Mailing Address: Walla Walla District Corps of Engineers, ATTN: CT David Boone, 201 North Third Avenue, Walla Walla, WA 99362-1876.

Offerors shall price all line items of the bid schedule.

AWARD will be made, as a whole, to one offeror.

BONDS: If the successful bidder, upon acceptance of its offer by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed payments bonds or alternate payment protection within **10 Calendar days** after receipt of the contract award forms by the offeror, the Contracting Officer may terminate the contract for default.

ARITHMETIC DISCREPANCIES:

- (a) For the purposes of evaluating proposals, the following will be used to resolve arithmetic discrepancies found on the face of the Bid Schedule as submitted by the offeror:
 - a. Obviously misplaced decimal points will be corrected.
 - b. In a discrepancy between unit price and extended price, the unit price will govern;
 - c. Calculation errors in extension of unit prices will be corrected;
 - d. Calculation errors in the addition of lump-sum and extended prices will be corrected.
- (b) For the purpose of proposal evaluation, the government will proceed on the assumption that the offeror intends his proposal to be evaluated on the basis of unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above the proposal will be so reflected on the abstract of offers.
- (c) These correction procedures shall not be used to resolve any ambiguity in the proposal

OFFER QUANTITIES: Proposals for less than the specified quantities of each item in the bid schedule will not be considered.

CONTRACTOR RESPONSIBILITY, PREAWARD SURVEY

In order to determine a contractor's responsibility for purposes of contract award the contractor is required to provide a statement regarding previous experience and past performance in performing comparable work, information related to the business organization, financial resources, and/or plant to be used in performing the work. (See the Attention to Bidders form included in this solicitation.) In accordance with FAR 9.104-1, to be determined responsible, a prospective contractor must –

- (a) Have adequate financial resources to perform the contract, or the ability to obtain them;
- (b) Be able to comply with the required or proposed delivery or performance schedule, taking into consideration all existing commercial and governmental business commitments;
- (c) Have a satisfactory performance record. (A prospective contractor shall not be determined responsible or nonresponsible solely on the basis of a lack of relevant performance history except as provided in FAR 9.104-2);
- (d) Have a satisfactory record of integrity and business ethics;
- (e) Have the necessary organization, experience, accounting and operational controls, and technical skills, or the ability to obtain them;
- (f) Have the necessary production, construction, and technical equipment and facilities, or the ability to obtain them; and
- (g) Be otherwise qualified and eligible to receive an award under applicable laws and regulations.

BIDDER INQUIRY

All inquiries regarding this solicitation are to be submitted via Bidder Inquiry. Telephone and email inquiries will not be accepted. Bidder Inquiry is a web-site that allows bidders to post questions regarding the solicitation and view all questions by other bidders and responses by USACE. Bidder Inquiry can be accessed through ProjNet at (<https://www.projnet.org>)

To submit and review inquiry items, prospective vendors will need to use the Bidder Inquiry Key presented below and follow the instructions listed below the key for access. A prospective vendor who submits a comment /question will receive an acknowledgement of their comment/question via email. Another email to the same address will notify the prospective vendor once the reply is available for viewing.

TIMING OF BIDDER INQUIRIES: Bidders are encouraged to submit their bidder inquiries promptly. The Government will make every effort to answer all bidder inquiries; however, the closer to the bid or proposal due date an inquiry is received, the less likely it is that a timely response can be provided.

The Bidder Inquiry Key is: **QZMJ5M-VJ3GU4**

Specific Instructions for ProjNet Bid Inquiry Access:

1. From the ProjNet home page linked above, click on **Quick Add** on the upper right side of the screen.
2. Identify the Agency. This should be marked as **USACE**.
3. Key. Enter the **Bidder Inquiry Key** listed above.
4. Email. Enter the email address you would like to use for communication.
5. Click Continue. A page will then open saying that a user account was not found and will ask you to create one using the provided form.
6. Enter your First Name, Last Name, Company, City, State, Phone, Email, Secret Question, Secret Answer, and Time Zone. Make sure to remember your Secret Question and Answer as they will be used from this point on to access the ProjNet system.
7. Click Add User. Once this is completed you are now registered within ProjNet and are currently logged into the system.

Instructions for Entering Questions:

1. After you are logged in click on the "post new inquiry", it is on the left side of the window under the Word "Submit"
 - a.) This is the window where you will enter your questions
 - b.) Comment Classification: Click on the down arrow to the right of the words "Please select from below", select "Public"
 - c.) Discipline: This is where you select who this question should be directed to. Example; if the question is about an electrical drawing or specification select: "Electrical" from the pull down list.
 - d.) Sheet. Enter the sheet number of the drawing you are asking about.
 - e.) Detail. Enter the detail name of the detail shown on the drawing that you are asking about.
 - f.) Specification. Enter the Specification number and paragraph number.
 - g.) File. Use this if you are going to attach a pdf file.
 - h.) Question. Enter your question here.

Specific Instructions for Future ProjNet Bid Inquiry Access:

1. For future access to ProjNet, you will not be provided any type of password. You will utilize your Secret Question and Secret Answer to log in.
2. From the ProjNet home page linked above, click on **Quick Add** on the upper right side of the screen.
3. Identify the Agency. This should be marked as **USACE**.
4. Key. Enter the **Bidder Inquiry Key** listed above.
5. Email. Enter the email address you used to register previously in ProjNet.
6. Click Continue. A page will then open asking you to enter the answer to your Secret Question.
7. Enter your Secret Answer and click Login. Once this is completed you are now logged into the system.

For questions about the ProjNet Bidder Inquiry, please contact the Call Center help desk toll free at 1-800-428-HELP, which operates from 8AM to 5PM (Central US time zone). Bidder inquiry help questions can also be emailed to the helpdesk at staff@projnet.info

OFFEROR EXPERIENCE FORM

Technical Factor:

Factor Title:

Name of Offeror: _____

Project Title: _____

Contract/Project Number: _____

Project Location: _____

Total Contract Value: \$_____

(Final value if completed, current value if not completed)

If Offeror performed as Subcontractor, Value of Subcontract: \$ _____

Construction Phase Start Date: _____

Construction Phase Completion Date: _____

(Actual date if project has been completed, anticipated date if project is not complete)

Name of Customer/Client: _____

Telephone Number of Customer/Client: _____

Email Address of Customer/Client: _____

Description of Project's Scope:

[illegible]

[illegible]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

NAVFAC/USACE PAST PERFORMANCE QUESTIONNAIRE (Form PPQ-0)

CONTRACT INFORMATION (Contractor to complete Blocks 1-4)

1. Contractor Information

Firm Name:

CAGE Code:

Address:

DUNs Number:

Phone Number:

Email Address:

Point of Contact:

Contact Phone Number:

2. Work Performed as: ☐ Prime Contractor ☐ Sub Contractor ☐ Joint Venture ☐ Other (Explain)

Percent of project work performed:

If subcontractor, who was the prime (Name/Phone #):

3. Contract Information

Contract Number:

Delivery/Task Order Number (if applicable):

Contract Type: ☐ Firm Fixed Price ☐ Cost Reimbursement ☐ Other (Please specify):

Contract Title:

Contract Location:

Award Date (mm/dd/yy):

Contract Completion Date (mm/dd/yy):

Actual Completion Date (mm/dd/yy):

Explain Differences:

Original Contract Price (Award Amount):

Final Contract Price (*to include all modifications, if applicable*):

Explain Differences:

4. Project Description:

Complexity of Work ☐ High ☐ Med ☐ Routine

How is this project relevant to project of submission? (*Please provide details such as similar equipment, requirements, conditions, etc.*)

CLIENT INFORMATION (Client to complete Blocks 5-8)

5. Client Information

Name:

Title:

Phone Number:

Email Address:

6. Describe the client's role in the project:

7. Date Questionnaire was completed (mm/dd/yy):

8. Client's Signature:

ADJECTIVE RATINGS AND DEFINITIONS TO BE USED TO BEST REFLECT

YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE

RATING	DEFINITION	NOTE
(E) Exceptional	Performance meets contractual requirements and exceeds many to the Government/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor was highly effective.	An Exceptional rating is appropriate when the Contractor successfully performed multiple significant events that were of benefit to the Government/Owner. A singular benefit, however, could be of such magnitude that it alone constitutes an Exceptional rating. Also, there should have been NO significant weaknesses identified.
(VG) Very Good	Performance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the contractor were effective.	A Very Good rating is appropriate when the Contractor successfully performed a significant event that was a benefit to the Government/Owner. There should have been no significant weaknesses identified.
(S) Satisfactory	Performance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the contractor appear or were satisfactory.	A Satisfactory rating is appropriate when there were only minor problems, or major problems that the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified. Per DOD policy, a fundamental principle of assigning ratings is that contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.
(M) Marginal	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the contractor has not yet identified corrective actions. The contractor's proposed actions appear only marginally effective or were not fully implemented.	A Marginal is appropriate when a significant event occurred that the contractor had trouble overcoming which impacted the Government/Owner.
(U) Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the contractor's corrective actions appear or were ineffective.	An Unsatisfactory rating is appropriate when multiple significant events occurred that the contractor had trouble overcoming and which impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating.
(N) Not Applicable	No information or did not apply to your contract	Rating will be neither positive nor negative.

TO BE COMPLETED BY CLIENT

**PLEASE CIRCLE THE ADJECTIVE RATING WHICH BEST REFLECTS
YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE.**

1. QUALITY:	
a) Quality of technical data/report preparation efforts	E VG S M U N
b) Ability to meet quality standards specified for technical performance	E VG S M U N
c) Timeliness/effectiveness of contract problem resolution without extensive customer guidance	E VG S M U N
d) Adequacy/effectiveness of quality control program and adherence to contract quality assurance requirements (without adverse effect on performance)	E VG S M U N
2. SCHEDULE/TIMELINESS OF PERFORMANCE:	
a) Compliance with contract delivery/completion schedules including any significant intermediate milestones. <i>(If liquidated damages were assessed or the schedule was not met, please address below)</i>	E VG S M U N
b) Rate the contractor's use of available resources to accomplish tasks identified in the contract	E VG S M U N
3. CUSTOMER SATISFACTION:	
a) To what extent were the end users satisfied with the project?	E VG S M U N
b) Contractor was reasonable and cooperative in dealing with your staff (including the ability to successfully resolve disagreements/disputes; responsiveness to administrative reports, businesslike and communication)	E VG S M U N
c) To what extent was the contractor cooperative, businesslike, and concerned with the interests of the customer?	E VG S M U N
d) Overall customer satisfaction	E VG S M U N
4. MANAGEMENT/ PERSONNEL/LABOR	
a) Effectiveness of on-site management, including management of subcontractors, suppliers, materials, and/or labor force?	E VG S M U N
b) Ability to hire, apply, and retain a qualified workforce to this effort	E VG S M U N
c) Government Property Control	E VG S M U N
d) Knowledge/expertise demonstrated by contractor personnel	E VG S M U N
e) Utilization of Small Business concerns	E VG S M U N
f) Ability to simultaneously manage multiple projects with multiple disciplines	E VG S M U N
g) Ability to assimilate and incorporate changes in requirements and/or priority, including planning, execution and response to Government changes	E VG S M U N
h) Effectiveness of overall management (including ability to effectively lead, manage and control the program)	E VG S M U N
5. COST/FINANCIAL MANAGEMENT	
a) Ability to meet the terms and conditions within the contractually agreed price(s)?	E VG S M U N
b) Contractor proposed innovative alternative methods/processes that reduced cost, improved maintainability or other factors that benefited the client	E VG S M U N

c) If this is/was a Government cost type contract, please rate the Contractor's timeliness and accuracy in submitting monthly invoices with appropriate back-up documentation, monthly status reports/budget variance reports, compliance with established budgets and avoidance of significant and/or unexplained variances (under runs or overruns)	E	VG	S	M	U	N
d) Is the Contractor's accounting system adequate for management and tracking of costs? <i>If no, please explain in Remarks section.</i>	Yes			No		
e) If this is/was a Government contract, has/was this contract been partially or completely terminated for default or convenience or are there any pending terminations? <i>Indicate if show cause or cure notices were issued, or any default action in comment section below.</i>	Yes			No		
f) Have there been any indications that the contractor has had any financial problems? <i>If yes, please explain below.</i>	Yes			No		
6. SAFETY/SECURITY						
a) To what extent was the contractor able to maintain an environment of safety, adhere to its approved safety plan, and respond to safety issues? (Includes: following the users rules, regulations, and requirements regarding housekeeping, safety, correction of noted deficiencies, etc.)	E	VG	S	M	U	N
b) Contractor complied with all security requirements for the project and personnel security requirements.	E	VG	S	M	U	N
7. GENERAL						
a) Ability to successfully respond to emergency and/or surge situations (including notifying COR, PM or Contracting Officer in a timely manner regarding urgent contractual issues).	E	VG	S	M	U	N
b) Compliance with contractual terms/provisions <i>(explain if specific issues)</i>	E	VG	S	M	U	N
c) Would you hire or work with this firm again? <i>(If no, please explain below)</i>	Yes			No		
d) In summary, provide an overall rating for the work performed by this contractor.	E	VG	S	M	U	N

Please provide responses to the questions above (if applicable) and/or additional remarks. Furthermore, please provide a brief narrative addressing specific strengths, weaknesses, deficiencies, or other comments which may assist our office in evaluating performance risk (please attach additional pages if necessary):

SMALL BUSINESS PARTICIPATION PROPOSAL

Other than Small Business Offerors (**large businesses**) are required to complete a Small Business Participation Proposal. Offerors should propose the level of participation of small businesses (as a small business prime and/or small business sub-contractors) in the performance of the acquisition relative to the objectives/goals set forth in the evaluation of this area.

(a) Check the applicable size and categories for the **PRIME** offeror only -- Check all applicable boxes:

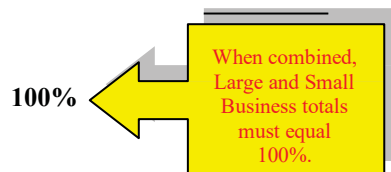
- ☐ } Large Prime
- ☐ } Historically Black Colleges or Universities and Minority Institutions (HBCU)
- or
- ☐ } Small Business Prime; also categorized as a
 - ☐ } Small Disadvantaged Business (SDB)
 - ☐ } Woman-Owned Small Business (WOSB)
 - ☐ } Historically Underutilized Business Zone (HUB Zone) Small Business
 - ☐ } Veteran Owned Small Business (VOSB)
 - ☐ } Service Disabled Veteran Owned Small Business (SDVOSB)

(b) Submit the total combined percentage of work to be performed by both large and small businesses (include the percentage of work to be performed both by Prime and Sub-contractors):

Example: If Prime proposes a price of \$1,000,000 (including all options), and small business(es) will provide \$250,000 in services/supplies as a prime or subcontractor, the
% planned for small businesses is 25%; and 75% for large business equaling 100%.

Total Percentage planned for Large Business(es) _____ % = \$ _____

Total Percentage planned for Small Business(es) _____ % = \$ _____



(c) Please indicate the total percentage of participation to be performed by each type of subcategory small business. The percentage of work performed by Small Businesses that qualify in multiple small business categories may be counted in each category:

Example: Victory Prop Mgt (WOSB and SDVOSB) performing 2%; and Williams Group (SDB, HubZ and WOSB) performing 3%. Results equate to: SDB 3%;

HubZone 3%; WOSB 5%; SDVOSB 2%; VOSB 2%;). SDVOSBs are also VOSBs automatically; however VOSBs are not automatically SDVOSBs.

Small Disadvantaged Business	_____ %
HUB Zone Small Business	_____ %
Woman Owned Small Business	_____ %
Service Disabled Veteran Owned SB	_____ %
Veteran Owned Small Business	_____ %
HBCU/MI	_____ %

(d) List principle supplies/services to be performed by Small Businesses:

Example: If a Small Business qualifies also as a WOSB and a SDVOSB, and you can add them to each category below in which they qualify.

Name of Company	Identify Type of Service/Supply
Small Business (SB):	
_____	_____
_____	_____
_____	_____
Small Disadvantaged Business (SDB):	
_____	_____
_____	_____
_____	_____
Women-Owned Small Business (WOSB):	
_____	_____
_____	_____
_____	_____
Historically Underutilized Business Zone (HUB Zone):	
_____	_____
_____	_____
_____	_____
Veteran Owned Small Business (VOSB):	

_____	_____
_____	_____
_____	_____

Service Disabled Veteran Owned Small Business (SDVO):

_____	_____
_____	_____
_____	_____

Historically Black Colleges and Universities and Minority Institutions (HBCU/MI):

_____	_____
_____	_____
_____	_____

(e) Describe the extent of commitment to use small businesses (for example, what types of commitments if any are in place for this specific acquisition either – small business prime, written contract, verbal, enforceable, non-enforceable, joint venturing, mentor- protégé, etc.)

**Additional Important Note for Other Than U.S. Small Businesses ONLY.
Small Business Subcontracting Plan is Required (FAR 52.219-9)**

Separate from Small Business Participation Plan, other than U.S. Small Business offerors must also submit a subcontracting plan meeting the requirements of FAR 52.219-9 and DFARS 252.219-7003 (or DFARS 252.219-7004 if the offeror has a comprehensive subcontracting plan). Other than U.S. Small Businesses must submit acceptable subcontracting plans to be eligible for award. Subcontracting Plans shall reflect and be consistent with the commitments offered in the Small Business Participation Plan.

CLAUSES INCORPORATED BY REFERENCE

52.204-7	System for Award Management	OCT 2018
52.204-22	Alternative Line Item Proposal	JAN 2017
52.215-16	Facilities Capital Cost of Money	JUN 2003
52.215-20	Requirements for Certified Cost or Pricing Data and Data Other Than Certified Cost or Pricing Data	NOV 2021
52.232-13	Notice Of Progress Payments	APR 1984
52.236-28	Preparation of Proposals--Construction	OCT 1997
252.204-7019	Notice of NIST SP 800-171 DoD Assessment Requirements	NOV 2020

CLAUSES INCORPORATED BY FULL TEXT

52.215-1 INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (NOV 2021)

(a) Definitions. As used in this provision--

“Discussions” are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

“In writing or written” means any worded or numbered expression that can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

“Proposal modification” is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

“Proposal revision” is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

“Time”, if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) Amendments to solicitations. If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) Submission, modification, revision, and withdrawal of proposals. (1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show--

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each

item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) Submission, modification, revision, and withdrawal of proposals.

(i) Offerors are responsible for submitting proposals, and any modifications, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

(ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and--

(1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(3) It is the only proposal received.

(B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

(d) Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall--

(1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with-- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and

(2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) Contract award.

(1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced

between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) If a post-award debriefing is given to requesting offerors, the Government shall disclose the following information, if applicable:

(i) The agency's evaluation of the significant weak or deficient factors in the debriefed offeror's offer.

(ii) The overall evaluated cost or price and technical rating of the successful and the debriefed offeror and past performance information on the debriefed offeror.

(iii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection.

(iv) A summary of the rationale for award.

(v) For acquisitions of commercial products, the make and model of the product to be delivered by the successful offeror.

(vi) Reasonable responses to relevant questions posed by the debriefed offeror as to whether source-selection procedures set forth in the solicitation, applicable regulations, and other applicable authorities were followed by the agency.

(End of provision)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm fixed-price contract resulting from this solicitation.

(End of provision)

52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of provision)

52.222-5 CONSTRUCTION WAGE RATE REQUIREMENTS--SECONDARY SITE OF THE WORK (MAY 2014)

(a)(1) The offeror shall notify the Government if the offeror intends to perform work at any secondary site of the work, as defined in paragraph (a)(1)(ii) of the FAR clause at 52.222-6, Construction Wage Rate Requirements, of this solicitation.

(2) If the offeror is unsure if a planned work site satisfies the criteria for a secondary site of the work, the offeror shall request a determination from the Contracting Officer.

(b)(1) If the wage determination provided by the Government for work at the primary site of the work is not applicable to the secondary site of the work, the offeror shall request a wage determination from the Contracting Officer.

(2) The due date for receipt of offers will not be extended as a result of an offeror's request for a wage determination for a secondary site of the work.

(End of provision)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
3.8%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is **Umatilla, Umatilla County, Oregon**

(End of provision)

52.225-12 NOTICE OF BUY AMERICAN REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (MAY 2014)

(a) Definitions. "Commercially available off-the-shelf (COTS) item," "construction material," "designated country construction material," "domestic construction material," and "foreign construction material," as used in this provision, are defined in the clause of this solicitation entitled "Buy American -- Construction Materials Under Trade Agreements" (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American statute should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American statute before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American statute, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic or designated country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic or designated country construction material, and the offeror shall be required to furnish such domestic or

designated country construction material. An offer based on use of the foreign construction material for which an exception was requested-- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.233-2 SERVICE OF PROTEST (SEP 2006)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Walla Walla US Army Corps of Engineers, Contracting Division, 201 North 3rd, Walla Walla, Washington 99362-1876.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995) – ALTERNATE I (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) An organized site visit has been scheduled for--

06 September 2022 at 1:00 p.m. Pacific Time

(c) Participants will meet at--

**McNary Lock and Dam
82790 Devore Road
Umatilla, OR 97882**

There will be only one site visit offered. Offerors planning to attend must register for the site by sending an email to: hillary.a.morgan@usace.army.mil and david.c.boone@usace.army.mil

Firms must register no later than the day before the site visit.

Site visit attendees must provide the following information in the email:

- (1) Solicitation Number
- (2) Project Title
- (3) Name of individual(s) attending
- (4) Name of company being represented
- (5) Phone number of company
- (6) Are all individuals U.S. Citizens?

If not, please refer to ACCESS FOR FOREIGN NATIONALS in Section 00 73 00

Each individual must have picture identification on his/her person while at the project site. There can be no substitutions of one individual for another. If an individual arrives at the site visit without having called ahead of

time and/or without picture identification, that individual may not be allowed on the project.

Participants of scheduled site visit must abide by the U.S. Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1, latest version) in accordance with Section 5, "Personal Protective and Safety Equipment." It is the responsibility of the participants to wear personal protective and safety equipment as required by this regulation. Failure to comply could result in denial of access to site visit location.

The latest version of EM 385-1-1 is available online at:
<http://www.usace.army.mil/SafetyandOccupationalHealth.aspx>

All attendees must follow federal, state, and local guidelines for the mitigation of COVID 19 when attending this site visit. Please ensure all attendees have PPE with them in order to comply with COVID 19 mitigation measures. The ACCESS FOR FOREIGN NATIONALS requirement in Section 00 73 00 applies to site visits as well as to performance of the work.

Site Visit Guidelines:

Government staff will read the script (Description of the project).

The Government will not be answering any questions during the walkthrough. Potential offerors will be allowed to take equipment specific pictures and measurements of equipment that is along the predetermined pathway only.

Once site visit is complete, contractor attendees will be escorted back to the Visitor Center and the site visit walkthrough is complete.

To ensure consistent information is shared among all potential offerors, all questions must be submitted through the ProjNet bidder inquiry process outlined in the solicitation.

(End of provision)

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<https://www.acquisition.gov/>

(End of provision)

52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984)

(a) The use in this solicitation of any Federal Acquisition Regulation (48 CFR Chapter 1) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the provision.

The use in this solicitation of any Defense Federal Acquisition Regulation Supplement

(b) (48 CFR Chapter 2) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of provision)

Section 00 45 00 - Representations and Certifications

CLAUSES INCORPORATED BY REFERENCE

52.204-16	Commercial and Government Entity Code Reporting	AUG 2020
252.203-7005	Representation Relating to Compensation of Former DoD Officials	NOV 2011
252.204-7008	Compliance With Safeguarding Covered Defense Information Controls	OCT 2016

CLAUSES INCORPORATED BY FULL TEXT

52.204-8 ANNUAL REPRESENTATIONS AND CERTIFICATIONS (JAN 2022)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 237990.

(2) The small business size standard is \$39,500,000.

(3) The small business size standard for a concern that submits an offer, other than on a construction or service acquisition, but proposes to furnish an end item that it did not itself manufacture, process, or produce is 500 employees if the acquisition--

(i) Is set aside for small business and has a value above the simplified acquisition threshold;

(ii) Uses the HUBZone price evaluation preference regardless of dollar value, unless the offeror waives the price evaluation preference; or

(iii) Is an 8(a), HUBZone, service-disabled veteran-owned, economically disadvantaged women-owned, or women-owned small business set-aside or sole-source award regardless of dollar value.

(b)(1) If the provision at 52.204-7, System for Award Management, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the provision at 52.204-7, System for Award Management, is not included in this solicitation, and the Offeror has an active registration in the System for Award Management (SAM), the Offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The Offeror shall indicate which option applies by checking one of the following boxes:

() Paragraph (d) applies.

() Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c) (1) The following representations or certifications in SAM are applicable to this solicitation as indicated:

(i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless—

(A) The acquisition is to be made under the simplified acquisition procedures in Part 13;

(B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or

(C) The solicitation is for utility services for which rates are set by law or regulation.

(ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed \$150,000.

(iii) 52.203-18, Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements--Representation. This provision applies to all solicitations.

(iv) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include the provision at 52.204-7, System for Award Management.

(v) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that—

(A) Are not set aside for small business concerns;

(B) Exceed the simplified acquisition threshold; and

(C) Are for contracts that will be performed in the United States or its outlying areas.

(vi) 52.204-26, Covered Telecommunications Equipment or Services--Representation. This provision applies to all solicitations.

(vii) 52.209-2, Prohibition on Contracting with Inverted Domestic Corporations--Representation.

(viii) 52.209-5, Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.

(ix) 52.209-11, Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law. This provision applies to all solicitations.

(x) 52.214-14, Place of Performance--Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.

(xi) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.

(xii) 52.219-1, Small Business Program Representations (Basic, Alternates I, and II). This provision applies to solicitations when the contract will be performed in the United States or its outlying areas.

(A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.

(B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.

(C) The provision with its Alternate II applies to solicitations that will result in a multiple-award contract with more than one NAICS code assigned.

(xiii) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract will be performed in the United States or its outlying areas.

(xiv) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.

(xv) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.

(xvi) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial products or commercial services.

(xvii) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA-designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.

(xviii) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA- designated items.

(xix) 52.223-22, Public Disclosure of Greenhouse Gas Emissions and Reduction Goals--Representation. This provision applies to solicitations that include the clause at 52.204-7.)

(xx) 52.225-2, Buy American Certificate. This provision applies to solicitations containing the clause at 52.225-1.

(xxi) 52.225-4, Buy American--Free Trade Agreements--Israeli Trade Act Certificate. (Basic, Alternates I, II, and III.) This provision applies to solicitations containing the clause at 52.225- 3.

(A) If the acquisition value is less than \$25,000, the basic provision applies.

(B) If the acquisition value is \$25,000 or more but is less than \$50,000, the provision with its Alternate I applies.

(C) If the acquisition value is \$50,000 or more but is less than \$92,319, the provision with its Alternate II applies.

(D) If the acquisition value is \$92,319 or more but is less than \$100,000, the provision with its Alternate III applies.

(xxii) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.

(xxiii) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan--Certification. This provision applies to all solicitations.

(xxiv) 52.225-25, Prohibition on Contracting with Entities Engaging in Certain Activities or Transactions Relating to Iran—Representation and Certification. This provision applies to all solicitations.

(xxv) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions.

(2) The following representations or certifications are applicable as indicated by the Contracting Officer:

[Contracting Officer check as appropriate.]

X (i) 52.204-17, Ownership or Control of Offeror.

X (ii) 52.204-20, Predecessor of Offeror.

(iii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.

(iv) 52.222-48, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment--Certification.

(v) 52.222-52 Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services--Certification.

(vi) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (Alternate I only).

(vii) 52.227-6, Royalty Information.

(A) Basic.

(B) Alternate I.

(viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.

(d) The Offeror has completed the annual representations and certifications electronically in SAM accessed through <https://www.sam.gov>. After reviewing the SAM information, the Offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [offeror to insert changes, identifying change by clause number, title, date]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR Clause	Title	Date	Change
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Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on SAM.

(End of provision)

52.204-24 REPRESENTATION REGARDING CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT (NOV 2021)

The Offeror shall not complete the representation at paragraph (d)(1) of this provision if the Offeror has represented that it "does not provide covered telecommunications equipment or services as a part of its offered products or services to the Government in the performance of any contract, subcontract, or other contractual instrument" in paragraph (c)(1) in the provision at 52.204-26, Covered Telecommunications Equipment or Services--Representation, or in paragraph (v)(2)(i) of the provision at 52.212-3, Offeror Representations and Certifications--Commercial Products and Commercial Services. The Offeror shall not complete the representation in paragraph (d)(2) of this provision if the Offeror has represented that it "does not use covered telecommunications equipment or

services, or any equipment, system, or service that uses covered telecommunications equipment or services" in paragraph (c)(2) of the provision at 52.204-26, or in paragraph (v)(2)(ii) of the provision at 52.212-3.

(a) Definitions. As used in this provision-

Backhaul, covered telecommunications equipment or services, critical technology, interconnection arrangements, reasonable inquiry, roaming, and substantial or essential component have the meanings provided in the clause 52.204-25, Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment.

(b) Prohibition.

(1) Section 889(a)(1)(A) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Pub. L. 115-232) prohibits the head of an executive agency on or after August 13, 2019, from procuring or obtaining, or extending or renewing a contract to procure or obtain, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. Nothing in the prohibition shall be construed to--

(i) Prohibit the head of an executive agency from procuring with an entity to provide a service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or

(ii) Cover telecommunications equipment that cannot route or redirect user data traffic or cannot permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(2) Section 889(a)(1)(B) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Pub. L. 115-232) prohibits the head of an executive agency on or after August 13, 2020, from entering into a contract or extending or renewing a contract with an entity that uses any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. This prohibition applies to the use of covered telecommunications equipment or services, regardless of whether that use is in performance of work under a Federal contract. Nothing in the prohibition shall be construed to--

(i) Prohibit the head of an executive agency from procuring with an entity to provide a service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or

(ii) Cover telecommunications equipment that cannot route or redirect user data traffic or cannot permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(c) Procedures. The Offeror shall review the list of excluded parties in the System for Award Management (SAM) (<https://www.sam.gov>) for entities excluded from receiving federal awards for "covered telecommunications equipment or services."

(d) Representations. The Offeror represents that--

(1) It [____] will, [____] will not provide covered telecommunications equipment or services to the Government in the performance of any contract, subcontract or other contractual instrument resulting from this solicitation. The Offeror shall provide the additional disclosure information required at paragraph (e)(1) of this section if the Offeror responds "will" in paragraph (d)(1) of this section; and

(2) After conducting a reasonable inquiry, for purposes of this representation, the Offeror represents that--

It [____] does, [____] does not use covered telecommunications equipment or services, or use any equipment, system, or service that uses covered telecommunications equipment or services. The Offeror shall provide the additional disclosure information required at paragraph (e)(2) of this section if the Offeror responds "does" in paragraph (d)(2) of this section.

(e) Disclosures.

(1) Disclosure for the representation in paragraph (d)(1) of this provision. If the Offeror has responded "will" in the representation in paragraph (d)(1) of this provision, the Offeror shall provide the following information as part of the offer:

(i) For covered equipment--

(A) The entity that produced the covered telecommunications equipment (include entity name, unique entity identifier, CAGE code, and whether the entity was the original equipment manufacturer (OEM) or a distributor, if known);

(B) A description of all covered telecommunications equipment offered (include brand; model number, such as OEM number, manufacturer part number, or wholesaler number; and item description, as applicable); and

(C) Explanation of the proposed use of covered telecommunications equipment and any factors relevant to determining if such use would be permissible under the prohibition in paragraph (b)(1) of this provision.

(ii) For covered services--

(A) If the service is related to item maintenance: A description of all covered telecommunications services offered (include on the item being maintained: Brand; model number, such as OEM number, manufacturer part number, or wholesaler number; and item description, as applicable); or

(B) If not associated with maintenance, the Product Service Code (PSC) of the service being provided; and explanation of the proposed use of covered telecommunications services and any factors relevant to determining if such use would be permissible under the prohibition in paragraph (b)(1) of this provision.

(2) Disclosure for the representation in paragraph (d)(2) of this provision. If the Offeror has responded "does" in the representation in paragraph (d)(2) of this provision, the Offeror shall provide the following information as part of the offer:

(i) For covered equipment--

(A) The entity that produced the covered telecommunications equipment (include entity name, unique entity identifier, CAGE code, and whether the entity was the OEM or a distributor, if known);

(B) A description of all covered telecommunications equipment offered (include brand; model number, such as OEM number, manufacturer part number, or wholesaler number; and item description, as applicable); and

(C) Explanation of the proposed use of covered telecommunications equipment and any factors relevant to determining if such use would be permissible under the prohibition in paragraph (b)(2) of this provision.

(ii) For covered services--

(A) If the service is related to item maintenance: A description of all covered telecommunications services offered (include on the item being maintained: Brand; model number, such as OEM number, manufacturer part number, or wholesaler number; and item description, as applicable); or

(B) If not associated with maintenance, the PSC of the service being provided; and explanation of the proposed use of covered telecommunications services and any factors relevant to determining if such use would be permissible under the prohibition in paragraph (b)(2) of this provision.

(End of provision)

52.209-7 INFORMATION REGARDING RESPONSIBILITY MATTERS (OCT 2018)

(a) Definitions. As used in this provision--

Administrative proceeding means a non-judicial process that is adjudicatory in nature in order to make a determination of fault or liability (e.g., Securities and Exchange Commission Administrative Proceedings, Civilian Board of Contract Appeals Proceedings, and Armed Services Board of Contract Appeals Proceedings). This includes administrative proceedings at the Federal and State level but only in connection with performance of a Federal contract or grant. It does not include agency actions such as contract audits, site visits, corrective plans, or inspection of deliverables.

Federal contracts and grants with total value greater than \$10,000,000 means--

(1) The total value of all current, active contracts and grants, including all priced options; and

(2) The total value of all current, active orders including all priced options under indefinite-delivery, indefinite-quantity, 8(a), or requirements contracts (including task and delivery and multiple-award Schedules).

Principal means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a division or business segment; and similar positions).

(b) The offeror () has () does not have current active Federal contracts and grants with total value greater than \$10,000,000.

(c) If the offeror checked "has" in paragraph (b) of this provision, the offeror represents, by submission of this offer, that the information it has entered in the Federal Awardee Performance and Integrity Information System (FAPIS) is current, accurate, and complete as of the date of submission of this offer with regard to the following information:

(1) Whether the offeror, and/or any of its principals, has or has not, within the last five years, in connection with the award to or performance by the offeror of a Federal contract or grant, been the subject of a proceeding, at the Federal or State level that resulted in any of the following dispositions:

(i) In a criminal proceeding, a conviction.

(ii) In a civil proceeding, a finding of fault and liability that results in the payment of a monetary fine, penalty, reimbursement, restitution, or damages of \$5,000 or more.

(iii) In an administrative proceeding, a finding of fault and liability that results in--

(A) The payment of a monetary fine or penalty of \$5,000 or more; or

(B) The payment of a reimbursement, restitution, or damages in excess of \$100,000.

(iv) In a criminal, civil, or administrative proceeding, a disposition of the matter by consent or compromise with an acknowledgment of fault by the Contractor if the proceeding could have led to any of the outcomes specified in paragraphs (c)(1)(i), (c)(1)(ii), or (c)(1)(iii) of this provision.

(2) If the offeror has been involved in the last five years in any of the occurrences listed in (c)(1) of this provision, whether the offeror has provided the requested information with regard to each occurrence.

(d) The offeror shall post the information in paragraphs (c)(1)(i) through (c)(1)(iv) of this provision in FAPIS as required through maintaining an active registration in the System for Award Management, which can be accessed via <https://www.sam.gov> (see 52.204-7).

(End of provision)

252.204-7007 ALTERNATE A, ANNUAL REPRESENTATIONS AND CERTIFICATIONS (MAY 2021)

Substitute the following paragraphs (b), (d) and (e) for paragraphs (b) and (d) of the provision at FAR 52.204-8:

(b)(1) If the provision at FAR 52.204-7, System for Award Management, is included in this solicitation, paragraph (e) of this provision applies.

(2) If the provision at FAR 52.204-7, System for Award Management, is not included in this solicitation, and the Offeror has an active registration in the System for Award Management (SAM), the Offeror may choose to use paragraph (e) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The Offeror shall indicate which option applies by checking one of the following boxes:

☐ (i) Paragraph (e) applies.

☐ (ii) Paragraph (e) does not apply and the Offeror has completed the individual representations and certifications in the solicitation.

(d)(1) The following representations or certifications in the SAM database are applicable to this solicitation as indicated:

(i) 252.204-7016, Covered Defense Telecommunications Equipment or Services--Representation. Applies to all solicitations.

(ii) 252.216-7008, Economic Price Adjustment--Wage Rates or Material Prices Controlled by a Foreign Government. Applies to solicitations for fixed-price supply and service contracts when the contract is to be performed wholly or in part in a foreign country, and a foreign government controls wage rates or material prices and may during contract performance impose a mandatory change in wages or prices of materials.

(iii) 252.225-7042, Authorization to Perform. Applies to all solicitations when performance will be wholly or in part in a foreign country.

(iv) 252.225-7049, Prohibition on Acquisition of Certain Foreign Commercial Satellite Services--Representations. Applies to solicitations for the acquisition of commercial satellite services.

(v) 252.225-7050, Disclosure of Ownership or Control by the Government of a Country that is a State Sponsor of Terrorism. Applies to all solicitations expected to result in contracts of \$150,000 or more.

(vi) 252.229-7012, Tax Exemptions (Italy)--Representation. Applies to solicitations when contract performance will be in Italy.

(vii) 252.229-7013, Tax Exemptions (Spain)--Representation. Applies to solicitations when contract performance will be in Spain.

(viii) 252.247-7022, Representation of Extent of Transportation by Sea. Applies to all solicitations except those for direct purchase of ocean transportation services or those with an anticipated value at or below the simplified acquisition threshold.

(2) The following representations or certifications in SAM are applicable to this solicitation as indicated by the Contracting Officer: [Contracting Officer check as appropriate.]

☐ (i) 252.209-7002, Disclosure of Ownership or Control by a Foreign Government.

☐ (ii) 252.225-7000, Buy American--Balance of Payments Program Certificate.

___ (iii) 252.225-7020, Trade Agreements Certificate.

___ Use with Alternate I.

X (iv) 252.225-7031, Secondary Arab Boycott of Israel.

___ (v) 252.225-7035, Buy American--Free Trade Agreements--Balance of Payments Program Certificate.

___ Use with Alternate I.

___ Use with Alternate II.

___ Use with Alternate III.

___ Use with Alternate IV.

___ Use with Alternate V.

___ (vi) 252.226-7002, Representation for Demonstration Project for Contractors Employing Persons with Disabilities.

___ (vii) 252.232-7015, Performance-Based Payments--Representation.

(e) The Offeror has completed the annual representations and certifications electronically via the SAM website at <https://www.acquisition.gov/>. After reviewing the SAM database information, the Offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in FAR 52.204-8(c) and paragraph (d) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer, and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [Offeror to insert changes, identifying change by provision number, title, date ____]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR/DFARS provision No.	Title	Date	Change

Any changes provided by the Offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications located in the SAM database.

(End of provision)

Section 00 70 00 - Conditions of the Contract

CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUN 2020
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	MAY 2014
52.203-6	Restrictions On Subcontractor Sales To The Government	JUN 2020
52.203-7	Anti-Kickback Procedures	JUN 2020
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	MAY 2014
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	MAY 2014
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	JUN 2020
52.203-13	Contractor Code of Business Ethics and Conduct	NOV 2021
52.203-17	Contractor Employee Whistleblower Rights and Requirement To Inform Employees of Whistleblower Rights	JUN 2020
52.203-19	Prohibition on Requiring Certain Internal Confidentiality Agreements or Statements	JAN 2017
52.204-2 Alt II	Security Requirements (MAR 2021) - Alternate II	APR 1984
52.204-4	Printed or Copied Double-Sided on Postconsumer Fiber Content Paper	MAY 2011
52.204-9	Personal Identity Verification of Contractor Personnel	JAN 2011
52.204-10	Reporting Executive Compensation and First-Tier Subcontract Awards	JUN 2020
52.204-13	System for Award Management Maintenance	OCT 2018
52.204-18	Commercial and Government Entity Code Maintenance	AUG 2020
52.204-19	Incorporation by Reference of Representations and Certifications.	DEC 2014
52.204-23	Prohibition on Contracting for Hardware, Software, and Services Developed or Provided by Kaspersky Lab and Other Covered Entities	NOV 2021
52.204-25	Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment	NOV 2021
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	NOV 2021
52.209-9	Updates of Publicly Available Information Regarding Responsibility Matters	OCT 2018
52.209-10	Prohibition on Contracting With Inverted Domestic Corporations	NOV 2015
52.210-1	Market Research	NOV 2021
52.211-13	Time Extensions	SEP 2000
52.215-2	Audit and Records--Negotiation	JUN 2020
52.215-11	Price Reduction for Defective Certified Cost or Pricing Data--Modifications	JUN 2020
52.215-13	Subcontractor Certified Cost or Pricing Data--Modifications	JUN 2020
52.215-15	Pension Adjustments and Asset Reversions	OCT 2010
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions	JUL 2005
52.215-19	Notification of Ownership Changes	OCT 1997

52.215-21 Alt II	Requirements for Certified Cost or Pricing Data and Data Other Than Certified Cost or Pricing Data -- Modifications (NOV 2021) - Alternate II	OCT 1997
52.219-4 (Dev)	Notice of Price Evaluation Preference for HUBZone Small Business Concerns (DEVIATION 2020-O0008)	SEP 2021
52.219-8	Utilization of Small Business Concerns	OCT 2018
52.219-9 Alt II	Small Business Subcontracting Plan (NOV 2021) Alternate II	NOV 2016
52.219-16	Liquidated Damages-Subcontracting Plan	SEP 2021
52.222-3	Convict Labor	JUN 2003
52.222-4	Contract Work Hours and Safety Standards - Overtime Compensation	MAY 2018
52.222-6	Construction Wage Rate Requirements	AUG 2018
52.222-7	Withholding of Funds	MAY 2014
52.222-8	Payrolls and Basic Records	JUL 2021
52.222-9	Apprentices and Trainees	JUL 2005
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	MAY 2014
52.222-12	Contract Termination-Debarment	MAY 2014
52.222-13	Compliance With Construction Wage Rate Requirements and Related Regulations	MAY 2014
52.222-14	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	MAY 2014
52.222-21	Prohibition Of Segregated Facilities	APR 2015
52.222-26	Equal Opportunity	SEP 2016
52.222-27	Affirmative Action Compliance Requirements for Construction	APR 2015
52.222-35	Equal Opportunity for Veterans	JUN 2020
52.222-36	Equal Opportunity for Workers with Disabilities	JUN 2020
52.222-37	Employment Reports on Veterans	JUN 2020
52.222-40	Notification of Employee Rights Under the National Labor Relations Act	DEC 2010
52.222-50	Combating Trafficking in Persons	NOV 2021
52.222-54	Employment Eligibility Verification	DEC 2021
52.222-55	Minimum Wages for Contractor Workers Under Executive Order 14026	JAN 2022
52.222-62	Paid Sick Leave Under Executive Order 13706	JAN 2022
52.223-2	Affirmative Procurement of Biobased Products Under Service and Construction Contracts	SEP 2013
52.223-3	Hazardous Material Identification And Material Safety Data	FEB 2021
52.223-5	Pollution Prevention and Right-to-Know Information	MAY 2011
52.223-6	Drug-Free Workplace	MAY 2001
52.223-10	Waste Reduction Program	MAY 2011
52.223-11	Ozone-Depleting Substances and High Global Warming Potential Hydrofluorocarbons.	JUN 2016
52.223-12	Maintenance, Service, Repair, or Disposal of Refrigeration Equipment and Air Conditioners.	JUN 2016
52.223-15	Energy Efficiency in Energy-Consuming Products	MAY 2020
52.223-17	Affirmative Procurement of EPA-Designated Items in Service and Construction Contracts	AUG 2018
52.223-18	Encouraging Contractor Policies To Ban Text Messaging While Driving	JUN 2020
52.223-19	Compliance with Environmental Management Systems	MAY 2011
52.224-1	Privacy Act Notification	APR 1984
52.224-2	Privacy Act	APR 1984
52.225-13	Restrictions on Certain Foreign Purchases	FEB 2021

52.227-1	Authorization and Consent	JUN 2020
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	JUN 2020
52.227-4	Patent Indemnity-Construction Contracts	DEC 2007
52.228-2	Additional Bond Security	OCT 1997
52.228-5	Insurance - Work On A Government Installation	JAN 1997
52.228-11	Individual Surety--Pledge of Assets	FEB 2021
52.228-12	Prospective Subcontractor Requests for Bonds	MAY 2014
52.228-14	Irrevocable Letter of Credit	NOV 2014
52.228-15	Performance and Payment Bonds--Construction	JUN 2020
52.229-3	Federal, State And Local Taxes	FEB 2013
52.232-5	Payments under Fixed-Price Construction Contracts	MAY 2014
52.232-17	Interest	MAY 2014
52.232-18	Availability Of Funds	APR 1984
52.232-23 Alt I	Assignment of Claims (May 2014) - Alternate I	APR 1984
52.232-27	Prompt Payment for Construction Contracts	JAN 2017
52.232-33	Payment by Electronic Funds Transfer--System for Award Management	OCT 2018
52.232-39	Unenforceability of Unauthorized Obligations	JUN 2013
52.232-40	Providing Accelerated Payments to Small Business Subcontractors	NOV 2021
52.233-1	Disputes	MAY 2014
52.233-3	Protest After Award	AUG 1996
52.233-4	Applicable Law for Breach of Contract Claim	OCT 2004
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13 Alt I	Accident Prevention (Nov 1991) - Alternate I	NOV 1991
52.236-14	Availability and Use of Utility Services	APR 1984
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-21 Alt I	Specifications and Drawings for Construction (Feb 1997) - Alternate I	APR 1984
52.236-26	Preconstruction Conference	FEB 1995
52.242-5	Payments to Small Business Subcontractors	JAN 2017
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	JUN 2007
52.244-6	Subcontracts for Commercial Products and Commercial Services	JAN 2022
52.245-1 Alt I	Government Property (SEP 2021) Alternate I	APR 2012
52.245-9	Use And Charges	APR 2012
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.247-34	F.O.B. Destination	NOV 1991
52.248-3	Value Engineering-Construction	OCT 2020

52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (Apr 2012) - Alternate I	SEP 1996
52.249-10	Default (Fixed-Price Construction)	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7000	Requirements Relating to Compensation of Former DoD Officials	SEP 2011
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2008
252.203-7002	Requirement to Inform Employees of Whistleblower Rights	SEP 2013
252.203-7003	Agency Office of the Inspector General	AUG 2019
252.203-7004	Display of Hotline Posters	AUG 2019
252.204-7000	Disclosure Of Information	OCT 2016
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004	Antiterrorism Awareness Training for Contractors.	FEB 2019
252.204-7006	Billing Instructions	OCT 2005
252.204-7012	Safeguarding Covered Defense Information and Cyber Incident Reporting	DEC 2019
252.204-7015	Notice of Authorized Disclosure of Information for Litigation Support	MAY 2016
252.204-7020	NIST SP 800-171 DoD Assessment Requirements	NOV 2020
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Country that is a State Sponsor of Terrorism	MAY 2019
252.211-7007	Reporting of Government-Furnished Property	MAR 2022
252.219-7003	Small Business Subcontracting Plan (DOD Contracts)	DEC 2019
252.223-7001	Hazard Warning Labels	DEC 1991
252.223-7004	Drug Free Work Force	SEP 1988
252.223-7006	Prohibition On Storage, Treatment, and Disposal of Toxic or Hazardous Materials	SEP 2014
252.223-7008	Prohibition of Hexavalent Chromium	JUN 2013
252.225-7012	Preference For Certain Domestic Commodities	DEC 2017
252.225-7016	Restriction On Acquisition Of Ball and Roller Bearings	JUN 2011
252.225-7048	Export-Controlled Items	JUN 2013
252.227-7033	Rights in Shop Drawings	APR 1966
252.231-7000	Supplemental Cost Principles	DEC 1991
252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	DEC 2018
252.232-7010	Levies on Contract Payments	DEC 2006
252.232-7017	Accelerating Payments to Small Business Subcontractors--Prohibition on Fees and Consideration	APR 2020
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7002	Obstruction of Navigable Waterways	DEC 1991
252.242-7006	Accounting System Administration	FEB 2012
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	DEC 2012
252.244-7000	Subcontracts for Commercial Items	JAN 2021
252.245-7001	Tagging, Labeling, and Marking of Government-Furnished Property	APR 2012
252.245-7002	Reporting Loss of Government Property	JAN 2021
252.245-7003	Contractor Property Management System Administration	APR 2012
252.245-7004	Reporting, Reutilization, and Disposal	DEC 2017
252.247-7023	Transportation of Supplies by Sea	FEB 2019

CLAUSES INCORPORATED BY FULL TEXT

52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to

- (a) Commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed,
- (b) prosecute the work diligently, and
- (c) complete the entire work ready for use not later than 30 April 2024.

ADULT FISH PASSAGE WORK WINDOW: 1 January through 28/29 February, annually.

- Project annual maintenance on McNary Fishladders occurs during the Adult Fish Passage Work Window. One fishladder at a time will be removed from service during the work window: each for one month, typical. Anticipated Fishladders outage periods are as follows:
 - Washington Fishladder outages: January 2023, February 2024.
 - Oregon Fishladder outages: February 2023, January 2024.

See SECTION 01 14 00.20 28 WORK AND OPERATIONAL RESTRICTIONS for additional information and required work for each Work Phase below.

(1) The Contractor shall complete all work for the Drainage, Unwatering, and Equalization System Rehabilitation by not later than 30 April 2024.

(2) Work on this contract is phased and must be completed in the specified order and within the specified time. All required work must be completed within the specified Phase, fully operational, and commissioned prior to beginning work on the next Phase, unless approved otherwise, in writing, by the Contracting Officer.

- a. Phase 1 – Drainage System and Main Turbine Unit Valve Upgrades.
- b. Phase 2 – Unwatering System Upgrades.
- c. Phase 3 – Station Service Turbine Unit Valve Upgrades.

(3) **All work for the Unwatering System Isolation Valve Replacement (including the 90 degree bend immediately downstream of the valve) must occur during the Adult Fish Passage Work Window 2024.** Coordinate Contractor work window dates with the Contracting Officer a minimum of 120 calendar days prior to start of the Adult Fish Passage Work Window 2024. Assume the following:

- a. 7 calendar day Contractor work window.
- b. Contractor work window timeframe will be coordinated to allow Project annual maintenance on the Washington and Oregon Fishladders, as well as all Contractor work (including all diving) required for the Isolation Valve Replacement.

(4) Government support is limited between 20 December and 2 January, annually. No additional Main Turbine Units will be removed from service, or returned to service, during this time unless approved in writing by the Contracting Officer.

(5) The Contractor shall complete final cleanup and demobilization by not later than 15 calendar days after completion of work in (1) above.

(6) The Contractor shall complete the final, approved submission of the following by not later than 30 calendar days after completion of work in (1) above. See SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS for additional information:

- a. O&M manuals.

- b. As-Built drawings.
- c. Shop Drawings.
- d. Record Drawings.
- e. Spare Parts submission.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of **\$2,967.00** for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.

52.217-7 OPTION FOR INCREASED QUANTITY--SEPARATELY PRICED LINE ITEM (MAR 1989)

The Government may require the delivery of the numbered line item, identified in the Schedule as an option item, in the quantity and at the price stated in the Schedule. The Contracting Officer may exercise the option by written notice to the Contractor within **30 calendar days of Government receipt of "Documentation Of CCTV Inspection" submittal. See SECTION 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL, for additional information.** Delivery of added items shall continue at the same rate that like items are called for under the contract, unless the parties otherwise agree.

(End of clause)

52.219-28 POST-AWARD SMALL BUSINESS PROGRAM REREPRESENTATION (SEP 2021)

(a) Definitions. As used in this clause--

Long-term contract means a contract of more than five years in duration, including options. However, the term does not include contracts that exceed five years in duration because the period of performance has been extended for a cumulative period not to exceed six months under the clause at 52.217-8, Option to Extend Services, or other appropriate authority.

Small business concern--

(1) Means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR part 121 and the size standard in paragraph (d) of this clause. Such a concern is "not dominant in its field of operation" when it does not exercise a controlling or major influence on a national basis in a kind of business activity in which a number of business concerns are primarily engaged. In determining whether dominance exists, consideration shall be given to all appropriate factors, including volume of business, number of employees, financial resources, competitive status or position, ownership or control of materials, processes, patents, license agreements, facilities, sales territory, and nature of business activity.

(2) Affiliates, as used in this definition, means business concerns, one of whom directly or indirectly controls or has the power to control the others, or a third party or parties control or have the power to control the others. In determining whether affiliation exists, consideration is given to all appropriate factors including common ownership, common management, and contractual relationships. SBA determines affiliation based on the factors set forth at 13 CFR 121.103.

(b) If the Contractor represented that it was any of the small business concerns identified in 19.000(a)(3) prior to award of this contract, the Contractor shall rerepresent its size and socioeconomic status according to paragraph (f) of this clause or, if applicable, paragraph (h) of this clause, upon occurrence of any of the following:

(1) Within 30 days after execution of a novation agreement or within 30 days after modification of the contract to include this clause, if the novation agreement was executed prior to inclusion of this clause in the contract.

(2) Within 30 days after a merger or acquisition that does not require a novation or within 30 days after modification of the contract to include this clause, if the merger or acquisition occurred prior to inclusion of this clause in the contract.

(3) For long-term contracts--

(i) Within 60 to 120 days prior to the end of the fifth year of the contract; and

(ii) Within 60 to 120 days prior to the date specified in the contract for exercising any option thereafter.

(c) If the Contractor represented that it was any of the small business concerns identified in 19.000(a)(3) prior to award of this contract, the Contractor shall rerepresent its size and socioeconomic status according to paragraph (f) of this clause or, if applicable, paragraph (h) of this clause, when the Contracting Officer explicitly requires it for an order issued under a multiple-award contract.

(d) The Contractor shall rerepresent its size status in accordance with the size standard in effect at the time of this rerepresentation that corresponds to the North American Industry Classification System (NAICS) code(s) assigned to this contract. The small business size standard corresponding to this NAICS code(s) can be found at <https://www.sba.gov/document/support--table-size-standards>.

(e) The small business size standard for a Contractor providing an end item that it does not manufacture, process, or produce itself, for a contract other than a construction or service contract, is 500 employees if the acquisition--

(1) Was set aside for small business and has a value above the simplified acquisition threshold;

(2) Used the HUBZone price evaluation preference regardless of dollar value, unless the Contractor waived the price evaluation preference; or

(3) Was an 8(a), HUBZone, service-disabled veteran-owned, economically disadvantaged women-owned, or women-owned small business set-aside or sole-source award regardless of dollar value.

(f) Except as provided in paragraph (h) of this clause, the Contractor shall make the representation(s) required by paragraph (b) and (c) of this clause by validating or updating all its representations in the Representations and Certifications section of the System for Award Management (SAM) and its other data in SAM, as necessary, to ensure that they reflect the Contractor's current status. The Contractor shall notify the contracting office in writing within the timeframes specified in paragraph (b) of this clause, or with its offer for an order (see paragraph (c) of this clause), that the data have been validated or updated, and provide the date of the validation or update.

(g) If the Contractor represented that it was other than a small business concern prior to award of this contract, the Contractor may, but is not required to, take the actions required by paragraphs (f) or (h) of this clause.

(h) If the Contractor does not have representations and certifications in SAM, or does not have a representation in SAM for the NAICS code applicable to this contract, the Contractor is required to complete the following rerepresentation and submit it to the contracting office, along with the contract number and the date on which the rerepresentation was completed:

(1) The Contractor represents that it [] is, [] is not a small business concern under NAICS Code 237990 assigned to contract number .

(2) [Complete only if the Contractor represented itself as a small business concern in paragraph (h)(1) of this clause.] The Contractor represents that it [] is, [] is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) [Complete only if the Contractor represented itself as a small business concern in paragraph (h)(1) of this clause.] The Contractor represents that it [] is, [] is not a women-owned small business concern.

(4) Women-owned small business (WOSB) concern eligible under the WOSB Program. [Complete only if the Contractor represented itself as a women-owned small business concern in paragraph (h)(3) of this clause.] The Contractor represents that--

(i) It [] is, [] is not a WOSB concern eligible under the WOSB Program, has provided all the required documents to the WOSB Repository, and no change in circumstances or adverse decisions have been issued that affects its eligibility; and

(ii) It [] is, [] is not a joint venture that complies with the requirements of 13 CFR part 127, and the representation in paragraph (h)(4)(i) of this clause is accurate for each WOSB concern eligible under the WOSB Program participating in the joint venture.

[The Contractor shall enter the name or names of the WOSB concern eligible under the WOSB Program and other small businesses that are participating in the joint venture: .] Each WOSB concern eligible under the WOSB Program participating in the joint venture shall submit a separate signed copy of the WOSB representation.

(5) Economically disadvantaged women-owned small business (EDWOSB) concern. [Complete only if the Contractor represented itself as a women-owned small business concern eligible under the WOSB Program in (h)(4) of this clause.] The Contractor represents that--

(i) It [] is, [] is not an EDWOSB concern eligible under the WOSB Program, has provided all the required documents to the WOSB Repository, and no change in circumstances or adverse decisions have been issued that affects its eligibility; and

(ii) It [] is, [] is not a joint venture that complies with the requirements of 13 CFR part 127, and the representation in paragraph (h)(5)(i) of this clause is accurate for each EDWOSB concern participating in the joint venture. [The Contractor shall enter the name or names of the EDWOSB concern and other small businesses that are participating in the joint venture: .] Each EDWOSB concern participating in the joint venture shall submit a separate signed copy of the EDWOSB representation.

(6) [Complete only if the Contractor represented itself as a small business concern in paragraph (h)(1) of this clause.] The Contractor represents that it [] is, [] is not a veteran-owned small business concern.

(7) [Complete only if the Contractor represented itself as a veteran-owned small business concern in paragraph (h)(6) of this clause.] The Contractor represents that it [] is, [] is not a service-disabled veteran-owned small business concern.

(8) [Complete only if the Contractor represented itself as a small business concern in paragraph (h)(1) of this clause.] The Contractor represents that--

(i) It [] is, [] is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material changes in ownership and control, principal office, or HUBZone employee percentage have occurred since it was certified in accordance with 13 CFR part 126; and

(ii) It [] is, [] is not a HUBZone joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (h)(8)(i) of this clause is accurate for each HUBZone small business concern participating in the HUBZone joint venture. [The Contractor shall enter the names of each of the HUBZone small business concerns participating in the HUBZone joint venture: .] Each HUBZone small business concern participating in the HUBZone joint venture shall submit a separate signed copy of the HUBZone representation.

[Contractor to sign and date and insert authorized signer's name and title.]

(End of clause)

52.223-7 NOTICE OF RADIOACTIVE MATERIALS (JAN 1997)

(a) The Contractor shall notify the Contracting Officer or designee, in writing, **30** days prior to the delivery of, or prior to completion of any servicing required by this contract of, items containing either (1) radioactive material requiring specific licensing under the regulations issued pursuant to the Atomic Energy Act of 1954, as amended, as set forth in Title 10 of the Code of Federal Regulations, in effect on the date of this contract, or (2) other radioactive material not requiring specific licensing in which the specific activity is greater than 0.002 microcuries per gram or the activity per item equals or exceeds 0.01 microcuries. Such notice shall specify the part or parts of the items which contain radioactive materials, a description of the materials, the name and activity of the isotope, the manufacturer of the materials, and any other information known to the Contractor which will put users of the items on notice as to the hazards involved (OMB No. 9000-0107).

* The Contracting Officer shall insert the number of days required in advance of delivery of the item or completion of the servicing to assure that required licenses are obtained and appropriate personnel are notified to institute any necessary safety and health precautions. See FAR 23.601(d).

(b) If there has been no change affecting the quantity of activity, or the characteristics and composition of the radioactive material from deliveries under this contract or prior contracts, the Contractor may request that the Contracting Officer or designee waive the notice requirement in paragraph (a) of this clause. Any such request shall-

(1) Be submitted in writing;

(2) State that the quantity of activity, characteristics, and composition of the radioactive material have not changed; and

(3) Cite the contract number on which the prior notification was submitted and the contracting office to which it was submitted.

(c) All items, parts, or subassemblies which contain radioactive materials in which the specific activity is greater than 0.002 microcuries per gram or activity per item equals or exceeds 0.01 microcuries, and all containers in which such items, parts or subassemblies are delivered to the Government shall be clearly marked and labeled as required by the latest revision of MIL-STD 129 in effect on the date of the contract.

(d) This clause, including this paragraph (d), shall be inserted in all subcontracts for radioactive materials meeting the criteria in paragraph (a) of this clause.

(End of clause)

52.225-11 BUY AMERICAN--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (NOV 2021)

(a) Definitions. As used in this clause--

Caribbean Basin country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a Caribbean Basin country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a Caribbean Basin country into a new and different construction material distinct from the materials from which it was transformed.

Commercially available off-the-shelf (COTS) item—

(1) Means any item of supply (including construction material) that is--

(i) A commercial product (as defined in paragraph (1) of the definition of "commercial product" at Federal Acquisition Regulation (FAR) 2.101);

(ii) Sold in substantial quantities in the commercial marketplace; and

(iii) Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace; and

(2) Does not include bulk cargo, as defined in 46 U.S.C. 40102(4) such as agricultural products and petroleum products.

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the construction material.

Designated country means any of the following countries:

(1) A World Trade Organization Government Procurement Agreement (WTO GPA) country (Armenia, Aruba, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, Ukraine, or United Kingdom);

(2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Canada, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Korea (Republic of), Mexico, Morocco, Nicaragua, Oman, Panama, Peru, or Singapore);

(3) A least developed country (Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, or Zambia); or

(4) A Caribbean Basin country (Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saba, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sint Eustatius, Sint Maarten, or Trinidad and Tobago).

Designated country construction material means a construction material that is a WTO GPA country construction material, an FTA country construction material, a least developed country construction material, or a Caribbean Basin country construction material.

Domestic construction material means--

(1) For construction material that does not consist wholly or predominantly of iron or steel or a combination of both-

(i) An unmanufactured construction material mined or produced in the United States; or

(ii) A construction material manufactured in the United States, if--

(A) The cost of its components mined, produced, or manufactured in the United States exceeds 55 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic. Components of unknown origin are treated as foreign; or

(B) The construction material is a COTS item; or

(2) For construction material that consists wholly or predominantly of iron or steel or a combination of both, a construction material manufactured in the United States if the cost of foreign iron and steel constitutes less than 5 percent of the cost of all components used in such construction material. The cost of foreign iron and steel includes but is not limited to the cost of foreign iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the construction material and a good faith estimate of the cost of all foreign iron or steel components excluding COTS fasteners. Iron or steel components of unknown origin are treated as foreign. If the construction material contains multiple components, the cost of all the materials used in such construction material is calculated in accordance with the definition of "cost of components".

Fastener means a hardware device that mechanically joins or affixes two or more objects together. Examples of fasteners are nuts, bolts, pins, rivets, nails, clips, and screws.

Foreign construction material means a construction material other than a domestic construction material.

Foreign iron and steel means iron or steel products not produced in the United States. Produced in the United States means that all manufacturing processes of the iron or steel must take place in the United States, from the initial melting stage through the application of coatings, except metallurgical processes involving refinement of steel additives. The origin of the elements of the iron or steel is not relevant to the determination of whether it is domestic or foreign.

Least developed country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a least developed country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

Free Trade Agreement country construction material means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

Least developed country construction material means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a least developed country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

Predominantly of iron or steel or a combination of both means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components excluding COTS fasteners.

Steel means an alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements.

United States means the 50 States, the District of Columbia, and outlying areas.

WTO GPA country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a WTO GPA country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a WTO GPA country into a new and different construction material distinct from the materials from which it was transformed.

(b) Construction materials.

(1) This clause implements 41 U.S.C. chapter 83, Buy American, by providing a preference for domestic construction material. In accordance with 41 U.S.C. 1907, the domestic content test of the Buy American statute is waived for construction material that is a COTS item, except that for construction material that consists wholly or predominantly of iron or steel or a combination of both, the domestic content test is applied only to the iron and steel content of the construction material, excluding COTS fasteners. (See FAR 12.505(a)(2)). In addition, the Contracting Officer has determined that the WTO GPA and Free Trade Agreements (FTAs) apply to this acquisition. Therefore, the Buy American restrictions are waived for designated country construction materials.

(2) The Contractor shall use only domestic or designated country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to information technology that is a commercial product or to the construction materials or components listed by the Government as follows:

NONE.

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American statute is unreasonable when the cost of such material exceeds the cost of foreign material by more than 20 percent;

(ii) The application of the restriction of the Buy American statute to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American statute.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American statute applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American statute applies, use of foreign construction material is noncompliant with the Buy American statute.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) *
Item 1:			
Foreign construction material....
Domestic construction material...
Item 2:			
Foreign construction material....
Domestic construction material...

[* Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued)].

[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]

[Include other applicable supporting information.]

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least **twenty-five percent (25%)** of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

www.acquisition.gov/content/regulations

(End of clause)

52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Defense Federal Acquisition Regulation Supplement (48 CFR Chapter 2) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of clause)

252.236-7001 CONTRACT DRAWINGS AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

- (1) Check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting Officer of any discrepancies;
- (4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and
- (5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

- (1) Large-scale drawings shall govern small-scale drawings; and
- (2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified in specification **SECTION 00 01 15.00 28 LIST OF DRAWINGS**.

Bentley DGN format CAD, are the only CAD systems used by Walla Walla District. Contract drawings created on CAD in Bentley DGN format, will be available in electronic form for use by the Contractor. No For Information Only drawings are available on CAD. The Contractor assumes all risks associated in using electronic CAD drawings. The contract drawings shall govern if there are any discrepancies between the electronic copy and the contract drawing. The Contractor shall promptly notify the Contracting Officer of any discrepancies. The Government will not be responsible to correct the electronic CAD drawing. Electronic copies of CAD drawings are only available in Bentley DGN format. The Government will provide the files via DoD SAFE file exchange.

(End of clause)

INCREMENTALLY-FUNDED CONTRACTS

(a) The responsibilities of the Corps are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.

(b) Pursuant to the authority of 33 U.S.C. § 621 and 16 U.S.C. § 839d-1 this contract is incrementally funded on a fiscal year basis by the Bonneville Power Administration (BPA). Funds are not available at the inception of this contract to cover the entire contract price. The sum of **(TO BE DETERMINED)** has been reserved under this contract by the Corps and is available for payment to the contractor during the current fiscal year. In accordance with the Memorandum of Agreement (MOA) between BPA and the Department of the Army (Contract No. DE MS79-94BP94655), the Sub-agreement 18GS-75746 between the Corps and BPA sets the total funding requirements for project construction and the annual funding requirements. The Corps has agreed to perform the work specified within the estimated annual funding requirements and shall coordinate with BPA in updating funding requirements. The liability of the Corps for payments beyond the funds currently reserved under this contract is contingent on the availability of additional funds from BPA under the MOA and Sub-agreement.

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract.

(d) Contingent upon additional funds being provided by BPA to the Corps, the contracting officer may at any time reserve additional funds for payments under this contract by issuing an administrative change to the contract.

(e) If earnings will be such that funds reserved for this contract will be exhausted before the end of the fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under this contract during that fiscal year. This notice shall be given not less than 45 or more than 60 days prior to the estimated date of exhaustion.

(f) Upon receipt of the contractor's notice under subparagraph (d), the contracting officer shall promptly provide written notice to the contractor that the Corps is-

- (1) Increasing the Corps' reservation of funds under this contract in a specified amount; or
- (2) Reducing the scope of work or terminating the contract; or
- (3) Unable to reserve additional funds until the following fiscal year.

(g) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under a "Suspension of Work" or similar clause or in any other manner under this contract.

(h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of the exhaustion of funds.

(i)) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds,

the Corps has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be at no cost to the Corps, except that, to the extent that additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(j) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under this contract during the fiscal year, the Corps reserves the right, by modification to the contract, to reduce said reservation by the amount of such excess.

(k) The term "Reservation" means funds that have been set aside and made available for payment under this contract by the Corps.

Section 00 73 00 - Supplementary Conditions

INVOICES/PAYMENT REQUESTS

Invoices/payment requests must be submitted to Corps of Engineers, Walla Walla District, Attention: Construction Branch, 201 N. Third Ave., Walla Walla, WA 99362.

BONDS: If the successful offeror, upon acceptance of its offer by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed payments bonds or alternate payment protection **within 10** Calendar days after receipt of the contract award forms by the offeror, the Contracting Officer may terminate the contract for default/cause.

REQUIRED LIABILITY INSURANCE PURSUANT TO FAR 28.306

In accordance with the clause 52.228-5 Insurance – Work on a Government Installation, the Contractor shall procure and maintain during the entire period of his performance under this contract the following minimum insurance:

- (i) Coverage complying with state laws governing insurance requirements pertaining to Workmen’s Compensation and Employers’ Liability Insurance.
- (ii) Bodily injury liability insurance with minimum limits of \$500,000 per occurrence shall be required on the comprehensive form of policy.
- (iii) Automobile bodily injury and property damage liability with minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury liability; and \$20,000 per occurrence for property damage liability shall be required.
- (iv) The Insurance Certificate will name the Walla Walla District, U.S. Army Corps of Engineers, 201 N. Third Avenue, Walla Walla, Washington 99362 as the Certificate Holder.

EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

In accordance with FAR 31.105(d)(2)(i)(b), allowable ownership and operating costs shall be determined using Engineer Pamphlet (EP) 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule.

TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with CLAUSE: DEFAULT (FIXED-PRICE CONSTRUCTION) of the CONTRACT CLAUSES. In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

- (1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
- (2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. A weather delay day is any day when the maximum temperature does not exceed 32 degrees Fahrenheit or when 0.10 inch or more of precipitation occurs. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

Monthly Anticipated Adverse Weather Delay Work Days Based on (7) Day Work Week

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
McNary Dam	8	3	3	2	3	2	0	1	1	2	4	12

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled workday. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number "Anticipated Adverse Weather Delay Work Days", above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days and issue a modification in accordance with the CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION) of the CONTRACT CLAUSES.

(End of Clause)

LISTING OF GOVERNMENT-FURNISHED PROPERTY

(a) The following will be made available to the Contractor to use during the performance of this job. The Contractor is responsible to ensure this property is returned to the Government in the same condition as prior to use. Bridge Cranes are located inside the Powerhouse.

Item No.	Description	Quantity	Unit Acquisition Cost	Total Acquisition Cost
1	McNary Powerhouse 350 ton Bridge Cranes	2	\$16,200,000	\$32,400,000

(b) The above estimated acquisition cost is applicable to accounting for Government-furnished property. This cost shall not be included by the Contractor in the proposal price. (52.245-1 Alt I, Government Property)

U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385-1-1

This paragraph applies to contracts and purchase orders that require the contractor to comply with EM 385-1-1 (e.g., contracts that include the Accident Prevention clause at FAR 52.236-13 and/or other safety provisions). EM 385-1-1 and its changes are available <http://www.usace.army.mil/SafetyandOccupationalHealth.aspx>.

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

ACCESS FOR FOREIGN NATIONALS:

SITE VISIT AND CONTRACT WORK: Security clearance for foreign nationals to attend a site visit or to perform onsite work requires a minimum of 5 weeks prior to site visit or onsite work. Please send documentation by email (.pdf files are preferred) to david.c.boone@usace.army.mil and jani.c.long@usace.army.mil

Acceptable forms of documentation include:

A US passport, Certificate of US citizenship (INS Form N-560 or N-561), Certificate of Naturalization (INS Form N-550 or N-570), foreign passport with I-551 stamp or attached INS Form I-94 indicating employment authorization, Alien Registration Receipt Card with photograph (INS Form I-151 or I-551), Temporary Resident Card (INS Form I-688), Employment Authorization Card (INS Form I-688A), Reentry Permit (INS Form I-327), Refugee Travel Document (INS Form I-571), Employment Authorization Document issued by the INS which contains a photograph (INS Form I-688B).

Foreign nationals **must** have received clearance prior to being granted access to the project site.

PROFIT: Alternate structured approaches -- Construction contracts. [UDG 5115.404-73-1]

Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors shall be as stated below.

(1) The following alternate structured approach shall be used for all firm-fixed price construction in accordance with Defense Federal Acquisition Regulation Supplement (DFARS) 215.404-4(b)(1). For all other actions, the weighted guidelines method described at DFARS 215.404-71 shall be used.

Factor	Rate	Weight	Value
Degree of Risk	20		
Relative Difficulty of Work	15		
Size of Job	15		
Period of Performance	15		
Contractor's Investment	5		
Assistance by Government	5		
Subcontracting	25		
TOTAL	100%		

(2) Based on the circumstances of the procurement action, each of the above factors shall be weighted from 0.03 to 0.12 as indicated below. "Value" shall be obtained by multiplying the rate by the weight. The value column, when totaled, indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.

(a) *Degree of risk.* Where the work involves no risk or the degree of risk is very small, the weighting should be 0.03; as the degree of risk increases, the weighting should be increased up to a maximum of 0.12. Lump sum items shall generally have a higher weight than unit price items. Consider the nature of subcontractors, amount and type of labor included in costs and whether the negotiation is before or after performance of work. Modifications, settled before the fact, have a much greater risk than those settled after the fact. A weight of 0.03 is appropriate for after the fact equitable adjustments and/or settlements.

(b) *Relative Difficulty of Work.* If the work is difficult and complex, the weight should be 0.12 and should be proportionately reduced to 0.03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Other things to consider are the nature of the work, by whom it is to be done (i.e., subcontractors, consultants), etc.

(c) *Size of Job.* Work estimated up to \$100,000 shall be weighted at 0.12. Work estimated between \$100,000 and \$5,000,000 shall be proportionately weighted from 0.12 to 0.05. Work from \$5,000,000 to \$10,000,000 shall be weighted at 0.04. Work in excess of \$10,000,000 shall be weighted at 0.03. It should be noted that control of fixed expenses generally improves with increased job magnitude.

(d) *Period of Performance.* Work not to exceed 1 month is to be weighted at 0.03. Durations between 1 and 24 months are to be proportionately weighted between 0.03 and 0.12. Work in excess of 24 months is to be weighted at 0.12.

(e) *Contractor's Investment.* To be weighted from 0.03 to 0.12 on the basis of below average, average and above average. Consider the amount of subcontracting, Government-furnished property or data such as surveys, method of making progress payments, and any mobilization payment items.

(f) *Assistance by Government.* To be weighted from 0.12 to 0.03 on the basis of average to above average. Consider use of Government-owned property, equipment and facilities, expediting assistance, etc.

(g) *Subcontracting.* To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted use 0.03. The weighting should be increased proportionately to 0.12 where all the work is performed by the contractor's own forces.

General Decision Number: OR20220077 07/08/2022

Superseded General Decision Number: OR20210077

State: Oregon

Construction Type: Heavy

County: Umatilla County in Oregon.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022: 	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022: 	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker

protections under the Executive Orders is available at
<https://www.dol.gov/agencies/whd/government-contracts>.

Modification Number	Publication Date
0	01/07/2022
1	02/18/2022
2	02/25/2022
3	04/01/2022
4	05/20/2022
5	06/24/2022
6	07/08/2022

CARP1503-022 06/01/2021

	Rates	Fringes
CARPENTER (Excluding Form		
Work).....	\$ 43.80	18.56
MILLWRIGHT.....	\$ 46.89	19.01

ELEC0112-004 06/01/2021

	Rates	Fringes
ELECTRICIAN.....	\$ 50.00	22.93

ENGI0701-040 01/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 45.90	15.35
GROUP 1A.....	\$ 48.06	15.35
GROUP 1B.....	\$ 50.22	15.35
GROUP 2.....	\$ 43.99	15.35
GROUP 3.....	\$ 42.84	15.35
GROUP 4.....	\$ 41.01	15.35
GROUP 5.....	\$ 39.77	15.35
GROUP 6.....	\$ 36.55	15.35

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: CRANE: Helicopter Operator, when used in erecting work; Whirley Operator, 90 ton and over; LATTICE BOOM CRANE: Operator 200 tons through 299 tons, and/or over 200 feet boom; HYDRAULIC CRANE: Hydraulic Crane Operator 90 tons through 199 tons with luffing or tower attachments;

GROUP 1A: HYDRAULIC CRANE: Hydraulic Operator, 200 tons and over (with luffing or tower attachment); LATTICE BOOM CRANE: Operator, 200 tons through 299 tons, with over 200 feet boom;

GROUP 1B: LATTICE BOOM CRANE: Operator, 300 tons through 399 tons with over 200 feet boom; Operator 400 tons and over

GROUP 2: CRANE: Cableway Operator, 25 tons and over;
 HYDRAULIC CRANE: Hydraulic crane operator 90 tons through 199 tons (without luffing or tower attachment);
 TOWER/WHIRLEY OPERATOR: Tower Crane Operator; Whirley Operator, under 90 tons; LATTICE BOOM CRANE: 90 through 199 tons and/or 150 to 200 feet boom; HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (with luffing or tower attachment); Rubber tired scraper with tandem scrapers; Loader 120,000 lbs and above; BLADE: Auto Grader; Blade Operator-Robotic; Bulldozer over 120,000 lbs and above;

GROUP 3: HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (without luffing or tower attachment); LATTICE BOOM CRANES: Lattice Boom Crane-50 through 89 tons (and less than 150 feet boom); Rubber Tired Scraper: with tandem scrapers; self loading, paddle wheel, auger type, finish and/or 2 or more units; Loader 60,000 lbs and less than 120,000 lbs; Bulldozer over 70,000 lbs up to and including 120,000 lbs;

GROUP 4: CRANE: Hydraulic Crane Operator, under 50 tons; LATTICE BOOM CRANE OPERATOR: Lattice Boom Crane Operator, under 50 tons; TRACKHOE/BACKHOE-ROBOTIC: track and wheel type, up to and including 20,000 lbs. with any or all attachments; BLADE: Blade Operator; Tractor operator with boom attachment; DRILLING: Churn Drill and Earth Boring Machine Operator; Directional Drill Operator over 20,000 lbs pullback; CRANE: Chicago boom and similar types; Boom type lifting device, 5 ton capacity or less; Rubber-Tired Scraper, single engine, single scraper; Compactor-Self Propelled; Loaders 25,000 lbs and less than 60,000 lbs; Bulldozer over 20,000 lbs and more than 100 horse up to 70,000 lbs; Screed; Compactor with blade; Mechanic

GROUP 5: TRACKHOE/BACKHOE HYDRAULIC: Track type up to and including 20,000 lbs, Wheel type (Ford, John Deer, Case Type); Boom truck operator; DRILLING: Churn Drill and Earth Boring Machine Operator; Directional Drill Operator less than 20,000 lbs pullback; Loaders, rubber tired type, less than 25,00 lbs; Forklift over 5 ton, Bulldozer 20,000 lbs or 100 horses or less; Roller; Compactor without blade

GROUP 6: LOADERS: (less than 1 cu yd.); Oiler; Grade Checker; Crane oiler; Forklift; Roller (non-asphalt)

Zone Differential (add to Zone 1 rates):

Zone 2 - \$3.00

Zone 3 - \$6.00

For the following metropolitan counties: MULTNOMAH; CLACKAMAS; MARION; WASHINGTON; YAMHILL; AND COLUMBIA; CLARK; AND COWLITZ COUNTY, WASHINGTON WITH MODIFICATIONS AS INDICATED:

All jobs or projects located in Multnomah, Clackamas and Marion Counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Highway 26 and West of Mile Post 30 on Highway 22 and all jobs or projects located in Yamhill County, Washington County and Columbia County and all jobs or projects located in Clark & Cowlitz County, Washington except that portion of Cowlitz County in the Mt. St. Helens "Blast Zone" shall receive Zone I pay for all classifications.

All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone III pay for all classifications.

For the following cities: ALBANY; BEND; COOS BAY; EUGENE; GRANTS PASS; KLAMATH FALLS; MEDFORD; ROSEBURG

All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone I pay for all classifications.

All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone III pay for all classifications.

* IRON0029-013 07/04/2022

	Rates	Fringes
IRONWORKER (Reinforcing and Structural).....	\$ 41.62	31.72

LABO0737-005 06/01/2022

	Rates	Fringes
Laborers: (Mason Tender-Cement/Concrete).....	\$ 38.79	16.85

LABO0737-031 06/01/2022

	Rates	Fringes
Laborers:		

GROUP 1.....	\$ 34.98	16.85
GROUP 2.....	\$ 36.25	16.85

LABORER CLASSIFICATIONS

GROUP 1: Asphalt Spreader

GROUP 2: Grade Checker

PAIN0055-022 07/01/2020

	Rates	Fringes
PAINTER		
BRUSH, ROLLER AND SPRAY.....	\$ 25.94	13.34

PLUM0598-007 06/01/2019

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 50.47	32.17

SUOR2009-075 11/23/2009

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 23.50	9.27
CEMENT MASON/CONCRETE FINISHER...	\$ 21.13	8.90
LABORER: Common or General.....	\$ 21.05	4.38
LABORER: Fence Erection.....	\$ 23.88	7.45
LABORER: Flagger.....	\$ 19.31	5.31
LABORER: Pipelayer.....	\$ 20.52	4.51
LINE CONSTRUCTION: Groundman....	\$ 31.36	7.27
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 22.77	7.90
OPERATOR: Broom/Sweeper.....	\$ 32.31	6.43
OPERATOR: Excavator.....	\$ 30.12	6.23
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 27.59	2.96
TRUCK DRIVER: Dump Truck.....	\$ 23.79	5.95
TRUCK DRIVER: Off the Road Truck.....	\$ 31.81	6.33

TRUCK DRIVER: Water Truck.....\$ 26.12 6.53

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number,

005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination

- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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LIST OF DRAWINGS

PART 1 GENERAL

1.1 SUMMARY

This section lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

1.2 CONTRACT DRAWINGS

Contract drawings are as follows:

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
GENERAL				
G-001	COVER SHEET AND LOCATION MAPS	MDG-1-0-0/669		
G-002	SHEET INDEX	MDG-1-0-0/670		
G-101	GENERAL SITE PLAN	MDG-1-0-0/671		
G-102	POWERHOUSE STAGING AND STORAGE BETWEEN MAIN UNITS 4 AND 5 EL. 287 AND NEAR PUMP WORK AREA EL. 235	MDG-1-0-0/672		
G-103	POWERHOUSE DELIVERY ROUTE	MDG-1-0-0/673		
STRUCTURAL				
S-001	GENERAL NOTES AND ISOMETRICS	MDP-1-5-17/1		
SD101	CONCRETE DEMOLITION	MDP-1-5-17/2		
S-101	GUARDRAIL PLAN, SECTION AND DETAIL	MDP-1-5-17/3		
S-102	PLAN	MDP-1-5-17/4		
S-201	ELEVATION	MDP-1-5-17/5		
S-501	DRAINAGE PUMP SEISMIC BRACE DETAILS	MDP-1-5-17/6		
S-502	DRAINAGE PUMP SEISMIC BRACE DETAILS	MDP-1-5-17/7		

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
MECHANICAL				
MD101	EXISTING DRAINAGE AND UNWATERING PUMPS DEMO SHEET	MDP-1-3-17/1		
MD201	DRAINAGE PUMP AND DISCHARGE PIPE DEMO SHEET	MDP-1-3-17/2		
MD202	UNWATERING PUMPS AND DISCHARGE PIPE DEMO SHEET	MDP-1-3-17/3		
MD203	PVC DRAINAGE HEADER DEMO SHEET	MDP-1-3-17/4		
MD204	PENSTOCK ELEVATION VIEWS DEMO SHEET	MDP-1-3-17/5		
MD401	MISC. PIPING FOR MAIN UNIT BAYS SECTIONS & DETAILS	MDP-1-3-17/6		
MD402	UNWATERING PIPE DEMO	MDP-1-3-17/7		
MD403	STATION SERVICE DRAFT TUBE DRAINS DEMO	MDP-1-3-17/8		
M-101	PLAN VIEW EL. 235 DRAINAGE AND UNWATERING PUMPS	MDP-1-3-17/9		
M-102	PLAN VIEW EL. 207 GALLERY VALVES	MDP-1-3-17/10		
M-201	DRAINAGE PUMP AND PIPING ELEVATION VIEWS	MDP-1-3-17/11		
M-202	UNWATERING PUMPS AND PIPING ELEVATION VIEWS	MDP-1-3-17/12		
M-203	PENSTOCK ELEVATION VIEWS	MDP-1-3-17/13		
M-401	UNWATERING PIPE DETAILS	MDP-1-3-17/14		
M-402	DRAFT TUBE SCROLL CASE AND EQUALIZER VALVES	MDP-1-3-17/15		
M-403	STATION SERVICE DRAFT TUBE DRAINS	MDP-1-3-17/16		
M-501	MECHANICAL DETAILS	MDP-1-3-17/17		
M-502	MECHANICAL DETAIL COLLECTION BAFFLE	MDP-1-3-17/18		
M-601	POWERHOUSE VALVE SCHEDULE	MDP-1-3-17/23		
M-901	UNWATERING PUMPS ISOMETRIC	MDP-1-3-17/19		
M-902	MECHANICAL PHOTOS 1	MDP-1-3-17/20		
M-903	MECHANICAL PHOTOS 2	MDP-1-3-17/21		

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
M-904	MECHANICAL PHOTOS 3	MDP-1-3-17/22		
ELECTRICAL				
E-001	LEGENDS AND ABBREVIATIONS	MDP-1-6-17/88		
ED101	UNWATERING PUMP MOTOR EQUIPMENT DEMOLITION PLAN	MDP-1-6-17/89		
ED201	UNWATERING PUMP MOTOR EQUIPMENT DEMOLITION	MDP-1-6-17/90		
ED601	DEMOLITION CABLE AND CONDUIT SCHEDULE	MDP-1-6-17/91		
ED602	DEMOLITION SP2C CONTROLS WIRING	MDP-1-6-17/92		
ED801	DEMOLITION CABLE AND CONDUIT SCHEDULE	MDP-1-6-17/93		
E-101	UNWATERING PUMP MOTOR EQUIPMENT PLAN EL. 235.5	MDP-1-6-17/94		
E-102	PLAN: CONTROL ROOM LAYOUT EL. 305	MDP-1-6-17/95		
E-201	UNWATERING PUMP MOTOR MCC ELEVATION VIEW	MDP-1-6-17/96		
E-501	SQO2C PLC ENCLOSURE DETAIL	MDP-1-6-17/97		
E-502	UNWATERING PUMP MOTOR OPERATION DETAILS	MDP-1-6-17/98		
E-601	SQO2 UNWATERING PUMP MOTOR CONTROL CENTER ONELINE DIAGRAM	MDP-1-6-17/99		
E-602	ELECTRICAL BLOCK DIAGRAM	MDP-1-6-17/100		
E-603	PUMP CONTROL DIAGRAM PUMP MOTOR CONTROLLER SCHEMATIC	MDP-1-6-17/101		
E-604	PUMP CONTROL DIAGRAM BACKUP CONTROLS AND POWER SUPPLY	MDP-1-6-17/102		
E-605	PUMP CONTROL DIAGRAM DISCRETE PLC I/O	MDP-1-6-17/103		
E-606	PUMP CONTROL DIAGRAM PLC ANALOG INPUTS	MDP-1-6-17/104		
E-607	PUMP CONTROL DIAGRAM PLC ANALOG RTD INPUTS	MDP-1-6-17/105		
E-608	PUMP CONTROL DIAGRAM CONTROL RELAY WIRING	MDP-1-6-17/106		
E-801	INSTALL CABLE AND CONDUIT SCHEDULE	MDP-1-6-17/107		

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
E-802	HMI SCREEN LAYOUT DETAILS	MDP-1-6-17/108		

1.2.1 Use Of Government Prepared Contract CAD Electronic Files

- a. No Resource (R)("For Information Only") drawings are available on CAD.
- b. The Contractor assumes all risks associated in using electronic CAD drawings.
- c. Electronic copies of CAD drawings are only available in Bentley DGN format.
- d. The contract drawings shall govern if there are any discrepancies between the electronic copy and the contract drawing. The Contractor shall promptly notify the Contracting Officer of any discrepancies. The Government will not be responsible to correct the electronic CAD drawing.

1.3 RESOURCE DRAWINGS (R)

These R drawings are included with the drawings for information only. The Government does not warrant the accuracy of the R drawings. The Government recommends that the Contractor verify the accuracy of R drawings.

Resource (R) drawings are as follows:

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RESOURCE				
R-001	MECHANICAL NEW PIPING DIAGRAM	MDP-4-3-0/1		
R-002	POWERHOUSE - MECHANICAL UNWATERING & DRAINAGE PUMPS ASSEMBLY	MDP-1-3-9/1		
R-003	DRAINAGE PUMP DISCHARGE MODIFICATION PIPING DETAILS	MDP-1.11-3-9/1		
R-004	DRAINAGE PUMP DISCHARGE MODIFICATION BAFFLE DETAIL	MDP-1.11-3-9/2		
R-005	STATION SERVICE UNITS EMBEDDED UNWATERING AND DRAINAGE PIPING	MDP-2-3-8/8		
R-006	EMBEDDED PIPING FISH COLLECTION SYSTEM PLANS AND SECTIONS	MDP-2-3-8/24		
R-007	EMBEDDED PIPING STATION SERVICE BAY TAILRACE DECK	MDP-2-3-8/25		

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
R-008	POWERHOUSE CONCRETE OUTLINE STA. SERVICE BAY - BLDG. INTERIOR PLAN - EL. 176.0	MDP-2-4-0/33		
R-009	POWERHOUSE CONCRETE OUTLINE STA. SERVICE BAY - BLDG. INTERIOR SECTIONS	MDP-2-4-0/38		
R-010	POWERHOUSE - MECHANICAL EMBEDDED PIPING STA. SERVICE BAY SUMP PUMP ROOM	MDP-2-3-8/9		
R-011	POWERHOUSE CONCRETE OUTLINE STATION SERVICE BAY - BLDG. INTERIOR SECTIONS	MDP-2-4-0/35		
R-012	POWERHOUSE CONCRETE OUTLINE STA. SERVICE BAY BLDG. INTERIOR SECTIONS	MDP-2-4-0/34		
R-013	POWERHOUSE-MECHANICAL EMBEDDED PIPING SUBSTRUCTURE OF MAIN UNITS NO. 3 TO 14 INCL. - PLAN	MDP-2.1-3-8/30		
R-014	POWERHOUSE - MECHANICAL EMBEDDED PIPING MISC, PIPE AND FITTINGS - DETAILS	MDP-2.1-3-8/36		
R-015	POWERHOUSE-MECHANICAL EMBEDDED PIPING MISCELL. VIEWS, SECTIONS AND DETAILS	MDP-2.1-3-8/33		
R-016	POWERHOUSE MISCELLANEOUS METALWORK INTERIOR HANDRAILS-SH.3 UNWATERING SUMP	MDP-2.1-5-0/133		
R-017	POWERHOUSE MECHANICAL STATION SERVICE PENSTOCKS ASSEMBLY & DETAILS	MDP-2.1-5-11/1		
R-018	POWERHOUSE MECHANICAL STATION SERVICE PENSTOCKS DETAILS	MDP-2.1-5-11/2		
R-019	MECHANICAL - NEW PIPING DIAGRAM	MDP-2.2-3-9/43		
R-020	POWERHOUSE-MECHANICAL PIPING ARRANGEMENT MISC. PIPING & EQUIPMENT MAIN UNIT BAYS-SECTS. & DETAILS	MDP-2.2-3-9/44		
R-021	POWERHOUSE - MECHANICAL PIPING ARRANGEMENT MISC. PIPING IN PIPE GALLERY PLAN - SECTIONS & DETAILS	MDP-2.2-3-9/45		
R-022	POWERHOUSE - MECHANICAL SCHEMATIC PIPING DIAGRAM UNWATERING SYSTEM	MDP-9-3-9/1		
R-023	MECHANICAL UNWATERING DISCHARGE SYSTEM, MODIFICATIONS	MDP-9-3-9/2		
R-024	MECHANICAL UNWATERING DISCHARGE SYSTEM MODIFICATIONS	MDP-1-3-0/66		

SHEET NUMBER	DESCRIPTION	FILE NUMBER	Rev. Num.	Date
R-025	MECHANICALS PIPING DETAILS	MDP-1-3-0/67		
R-026	EMBEDDED PIPING POWER HOUSE UNWATERING HEADER	V-9240		
R-027	EMBEDDED PIPING MAIN UNIT BAYS - HEADWALLS	V-9243-A		
R-028	ALLIS-CHALMERS MOTOR PART 1	51-802-480		
R-029	ALLIS-CHALMERS MOTOR PART 2	FD-22625		
R-030	BRG. ASSEMBLY - LINE SHAFT 12 SV - 2	A-15776		
R-031	BRG. HSG. - LINE SHAFT 12 SV-1	A-8836		
R-032	POWERHOUSE STRUCTURAL PLANS E. 254.0, 215.0 & 207.0	MDP-1-4-0/9		
R-033	POWERHOUSE - MECHANICAL PIPING ARRANGEMENT UNWATERING & DRAINAGE PUMPS PLANS & DETAILS	MDP-3-3-9/1		
R-034	STATION SERVICE DRAINAGE SUMP DRAINAGE PUMP & DISCHARGE LINE INSTALLATION DETAILS	819-1		
R-035	MCNARY POWERHOUSE MECHANICAL OIL SKIMMER & SUMP - PLANS	MDP-1-3-0/87		
R-036	MCNARY POWERHOUSE MECHANICAL SUMP PIPING - ISOMETRIC DETAILS	MDP-1-3-0/88		
R-037	MCNARY POWERHOUSE MECHANICAL SUMP PIPE ROUTING - ISOMETRIC DETAILS	MDP-1-3-0/89		
R-038	MCNARY POWERHOUSE MECHANICAL SUMP PIPE ROUTE 1 - PLAN & SECTIONS	MDP-1-3-0/90		
R-039	MCNARY POWERHOUSE MECHANICAL SUMP PIPE ROUTE 2 - PLAN & SECTIONS	MDP-1-3-0/91		
R-040	MCNARY POWERHOUSE MECHANICAL SUMP PIPE ROUTE 3 - PLAN & SECTIONS	MDP-1-3-0/92		
R-041	LIGHTING CONDUIT STA. SERVICE BAY - BLDG. INTERIOR EL. 176, 223.5, 235.5 AND ABOVE	MDP-2-6-2D1/1		
R-042	LIGHTING CONDUIT STA. SERVICE BAY - BLDG. INTERIOR TRANSVERSE SECTION-PIER A-2	MDP-2-6-2D1/2		
R-043	EMBEDDED PIPING SUBSTRUCTURE OF MAIN UNITS NO.3 TO 14 INCL.- MISC. SECTIONS	MDP-2.1-3-8/32		
R-044	EMBEDDED PIPING INSPECTION TUNNEL SECTIONS & DETAILS	MDP-2.1-3-8/38		

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GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 VETERANS EMPLOYMENT EMPHASIS FOR U.S. ARMY CORPS OF ENGINEERS CONTRACTS

In addition to complying with the requirements outlined in FAR Part 22.13, FAR Provision 52.222-38, FAR Clause 52.222-35, FAR Clause 52.222-37, DFARS 222.13 and Department of Labor regulations, U.S. Army Corps of Engineers (USACE) contractors and subcontractors at all tiers are encouraged to promote the training and employment of U.S. veterans while performing under a USACE contract. While no set-aside, evaluation preference, or incentive applies to the solicitation or performance under the resultant contract, USACE contractors are encouraged to seek out highly qualified veterans to perform services under this contract. The following resources are available to assist USACE contractors in their outreach efforts:

Federal Veteran Employment Information
<http://www.fedshirevets.gov/index.aspx>

Department of Labor Veterans Employment Assistance
<http://www.dol.gov/vets/>

Department of Veterans Affairs-VOW to Hire Heroes Act
<http://benefits.va.gov/vow/>

Army Wounded Warrior Program -
<http://wct.army.mil/modules/employers/index.html>

U.S. Chamber of Commerce Foundation-Hiring Our Heroes
<http://www.hiringourheroes.org/>

Guide to Hiring Veterans - Reference Material
<https://www.dol.gov/sites/dolgov/files/VETS/files/Employer-Guide-to-Hiring-Veteran>

PART 2 PRODUCTS (NOT USED)

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ATTACHMENTS:

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SECTION 01 11 01.00 28

SUPPLEMENTARY REQUIREMENTS

PART 1 GENERAL

The work covered by this section of the specifications consists of work common to more than one section of these TECHNICAL SPECIFICATIONS.

1.1 REFERENCES

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

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 41 (2008) Moisture-Cured Polyurethane Primer or Intermediate Coat, Micaceous Iron Oxide Reinforced, Performance-Based

SSPC SP 1 (2015) Solvent Cleaning

SSPC SP 16 (2010) Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Property Management Plan; G, C

Equipment List; I, C

Pre-Construction On-Site Inspection Report; I, C

Air Purity Control Program; I, C

Project Superintendent; I, C

SD-07 Certificates

Key Personnel Substitution; G, C

SD-11 Closeout Submittals

Training Manuals; G, C

1.3 DEFINITIONS

a. Qualified Person.

As defined in EM 385-1-1; "DEFINITIONS", unless otherwise specified.

b. F.O.B.

An abbreviation for free on board, which means that a vendor or consignor will deliver goods on a railroad car, truck, vessel, or other conveyance without any expense to the purchaser or consignee.

1.4 FIELD VERIFICATION OF SITE CONDITIONS

Field verify all elevations, dimensions, and coordinates of existing features indicated on the contract drawings that affect new construction. Any deviations shall be updated as per SECTION 01 78 00.00 28, CLOSEOUT SUBMITTALS, paragraphs WORKING AS-BUILT DRAWINGS.

1.4.1 Pre-Construction On-Site Inspection

Prior to start of on-site work, prepare a [Pre-Construction On-Site Inspection report](#) of existing conditions, with the Contracting Officer (KO). Document existing site conditions prior to Construction by digital photographs, and/or videos along with a descriptive narrative report. Submit to the KO within five (5) calendar days after completion, and in all cases, prior to start of on-site work.

1.5 TOUCH-UP PAINT

a. When connecting new to existing piping, touch-up paint on existing piping to remain. Existing piping is coated with toxic metals based paint. See SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL, and SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION for requirements related to toxic metals based paint (including removal, handling, disposal).

b. Prepare surface to receive touch-up paint per paragraph "Surface Preparation", below. Coat per paragraph "Coating Application".

1.5.1 Surface Preparation

a. Remove loose paint: Remove all loose coatings and those not adhered to the pipe surface.

b. Test paint: Using a ketone solvent soaked rag, wipe existing paint on surfaces to be touched up. If the existing paint is removed by the ketone, the coating is vinyl based and should be touched up with a vinyl paint system as specified in paragraph "Coating Application." If the existing paint is not removed by the ketone, the coating is not vinyl based and should be touched up with Paint System

23-D as specified in paragraph "Coating Application."

c. Clean surface: Clean surfaces to be painted before applying paint. Remove deposits of grease or oil in accordance with **SSPC SP 1**, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flash point above 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned.

d. Surface Preparation:

1. Prepare surfaces prior to paint application using **SSPC SP 16** brush blasting, or other appropriate method.

2. Surfaces shall be dry at the time of surface preparation. Roughen all surfaces to receive paint (including existing coatings, as applicable).

3. Feather edges of existing coatings. For vinyl coatings feather edges by rubbing with steel wool soaked in vinyl paint thinner.

4. Prior to the deposition of any detectable moisture, contaminants, or corrosion, all surfaces shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. See paragraph "Coating Application".

1.5.2 Coating Application

Apply coatings over prepared surfaces per Manufacturer's written instructions. Confirm color with the KO prior to purchase. Procure all coating materials (paints, thinners/solvents in a given paint system) from the same coating manufacturer. Apply each coat in accordance with the manufacturer's written instructions. Comply with the manufacturer's recommendations regarding mixing and thinning requirements, pot life requirements, dry film thickness per coat and minimum and maximum dry time between coats.

a. Vinyl coating: Overcoat vinyl coatings with Formula V-766E paint. Coat to a minimum Dry Film Thickness of 6 mils.

b. Non-vinyl coating: Overcoat all non-vinyl coatings with Paint System No. 23-D, **SSPC Paint 41**. It must be a 3-coat system plus an additional stripe coat applied by brush to all edges, corners, welds, fasteners, and other surface irregularities. Allow the stripe coat to dry as recommended by the manufacturer, prior to the application of the first full coat.

1.6 REGULAR CLEANUP AND DEBRIS DISPOSAL

With the exception of materials specifically indicated or specified to be salvaged for reuse in construction, or turned over to the Government, all wastes and demolished materials shall become the property of the Contractor and shall be removed from the job site daily in accordance with Federal, State, and local regulations. The Contractor shall furnish waste containers. All small waste containers provided by the contractor shall be emptied daily, large bin containers shall be emptied when full or once a

week.

1.7 GOVERNMENT-FURNISHED PROPERTY

Submit a [Property Management Plan](#) in accordance with FAR Clause 52.245-1 Government Property.

1.8 EQUIPMENT LIST

Furnish a complete list of all equipment to be used on the Project 30 days prior to commencement of on-site work. Submit a revised list in the event of change of equipment. Lists shall include rented equipment as well as lease-purchase or sale-leaseback equipment. The initial list and the revised lists shall indicate dates equipment is assigned to or removed from the Project and adequate identification or description of each item of equipment including manufacturer's name (abbreviated), model number, manufacturer's serial number, year of manufacture, and Contractor's assigned serial or record number.

1.9 TESTING OF EQUIPMENT

Before any machinery or mechanized equipment is put to use on the job, it shall be inspected and tested by a qualified person and determined to be in safe operating condition. Cranes or derricks shall be tested by the Contractor or a qualified testing agency in accordance with [EM 385-1-1](#). Equipment shall be large enough to safely handle proposed picks or tasks without exceeding the crane rating established by these tests.

1.10 DISPOSITION OF REMOVED MATERIALS AND EQUIPMENT

Unless otherwise specified in other sections of the specifications, all existing equipment removed and not reinstalled shall become the property of the Contractor, removed from the Project site, and disposed of in a legal manner. Materials that cannot be removed daily may be temporarily stored on-site at an approved area. Salvaged materials shall not be sold on the project site.

1.11 PROTECTION AND RESTORATION OF EXISTING FACILITIES

Reference FAR 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements (Apr 1984).

1.12 PROTECTION OF POWERHOUSE FLOORS

a. Care shall be taken to prevent damage to all floors and curbs within the Powerhouse. Protection shall include a continuous layer of oil-impervious kraft paper over the existing floor surface with joints of the kraft paper joined with an appropriate tape. In addition, tongue and groove 3/4-inch-thick Oriented Strand Board (OSB) plywood shall be installed over the craft paper at all work and storage areas. Plywood joints shall be fastened to ensure edges of plywood sheets are, and remain, flush with each other and do not pose a tripping hazard during execution of this work. Minimum nominal 2"x4" wood shall be installed along existing curb features within the contractor work areas and along perimeters of the work areas. Wood used for curb protection shall be secured in place without anchoring into the existing floors or curbs.

b. Pipe trenches shall remain accessible even if covered. All

designations relating to fire protection equipment that get covered shall be marked on the temporary floor covering. Provide additional blocking and wood supports when required. Also suitably protect other surfaces of work. Damage to floors or curbs caused by the Contractor's operations shall be repaired at no additional cost to Government. Repairs shall match the surrounding area in material type, color, texture, and surface finish and are subject to approval. Work in the powerhouse shall not start until floor and curb protection is in place.

1.13 AIR PURITY CONTROL IN THE POWERHOUSE

Take all necessary precautions to maximize the control, and prevention, of all dust and fumes created by operations under this contract from escaping into the powerhouse. To the maximum extent possible, all dust and dirt shall be removed by vacuum cleaning. At least 30 calendar days prior to commencement of work in the powerhouse, submit for approval, in writing, a proposed [Air Purity Control Program](#). Air Purity Control Program shall include, but not be limited to, the following:

- (a) Adequate isolation and ventilation of air arcing, welding, burning, and grinding operations.
- (b) Provision of exhaust ducts that shall discharge outside the powerhouse structure where mechanical ventilation is used.
- (c) Controlled operation of power driven tools.
- (d) Furnishing and removing of oiled sawdust or other dust preventatives in areas that cannot be properly rendered free from excessive dusting by vacuum cleaning or other methods.
- (e) Vacuum cleaning of spaces within the work areas where dust accumulates.
- (f) Air-, electrical-, or battery-driven equipment may be used inside the powerhouse.
- (g) Internal-combustion engine powered equipment will not be permitted to operate inside the powerhouse unless exhausted to the exterior except for short periods of time (not to exceed 15 minutes in a 2 hour window) to unload materials and equipment.

Depending upon the Contractor's plant, equipment, and methods of operation, additional provisions for satisfactory air purity control will be required and shall be included in the proposed Air Purity Control Program.

1.14 DISCONNECTED OIL LINES

Anytime an oil line is disconnected by the Contractor due to work performed under this contract it shall be the Contractor's responsibility to cap the line. Oil line cap shall be rated at 125% of the pressure in the line. Contractor shall notify the KO that an oil line has been disconnected, and then document by KO witness that the disconnected oil line has been sealed to ensure no transfer of oil or water from or into the sealed line.

1.15 TRAINING

a. Provide the services of authorized start-up engineers (Manufacturer's Representatives) as necessary to provide training in programming, operation and maintenance of equipment installed under this contract. Provide training for operators and maintenance personnel prior to project operation of the newly installed equipment.

b. Provide two, eight-hour class sessions; one class for operators and maintenance personnel and one for system managers and engineers. Each class session shall include approximately 6 employees. The Government will provide for the training location.

c. In addition, provide one, eight-hour class session for approximately 6 employees to cover training requirements of SECTION 25 05 11.00 28 CYBERSECURITY, and SECTION 40 94 43.00 28 PROCESS CONTROL - PROGRAMMABLE LOGIC CONTROLLERS (PLC).

d. Submit [training manuals](#) and documentation for approval 60 calendar days prior to scheduled classes. Furnish sufficient training materials at the training classes for all students plus a minimum of three (3) copies for project files. Where audio/visual materials are used in training classes, three (3) copies of such materials shall be furnished to the Project for use in future training.

e. Training shall include hands-on training for all Project personnel in training sessions. Each attendee shall operate all controls and systems installed, or updated, as part of work on this contract.

f. It shall be the Contractor's responsibility to coordinate the training sessions with the Project to ensure minimum conflicts with ongoing Project work.

1.15.1 Digital Recording

Film the first training session of each equipment with independent function. Filmed sessions must cover all new equipment installed. Filming is not required for equipment with redundant functions; i.e. only one Unwatering Pump Motor is necessary. Two (2) copies of the filmed sessions will be provided to the Government on DVD. DVD's will have profession labels on both the DVD case and on the DVD. Labels will include the equipment covered on that training disc. Recordings will use at a minimum MPEG-2 format with a resolution of no less than 720 X 480 pixels at 29.92 frames per second. Different recording formats may be proposed by the Contractor but require approval before the Government will accept them.

1.16 [PROJECT SUPERINTENDENT](#)

The Contractor's Project Superintendent shall be on the worksite during performance of work on this contract. The Project Superintendent is required on the worksite, at all times work is being performed, until work on this contract is completed and accepted. Assign a competent superintendent as per FAR Clause 52.236-6 "Superintendence by the Contractor". Submit Superintendent name and contact information prior to start of on-site construction.

1.17 KEY PERSONNEL SUBSTITUTION

If the Contractor plans on replacing any Key personnel (Project Superintendent, CQC System Manager, or CQC staff Members) they must have the approval of the Contracting Officer. Personnel shall possess the qualifications that meet or exceed those stated in this contract for the position of the individual they are replacing. Submit qualifications of new personnel at least 15 calendar days in advance of date of replacement.

1.18 POST AWARD MEETINGS

1.18.1 Pre-Work Meeting

Within fourteen (14) calendar days after receipt of Notice to Proceed, attend a Pre-Work Meeting. Senior Level members of the Contractor's staff involved with this contract shall participate in this meeting to discuss the overall contract requirements. **The Government will lead this meeting** and take the meeting minutes.

1.18.2 Pre-Initial Project Schedule On-Site Schedule Review

See SECTION 01 32 01.00 28 PROJECT SCHEDULE, paragraph "Pre-IPS Submission On-Site Schedule Review" for information.

1.18.3 On-Site Coordination Meeting

a. Within 45 calendar days after receipt of Notice to Proceed, the Contractor shall attend a Coordination meeting at the Project site. Key members of the contractor staff shall attend this meeting including the Quality Control (QC) System Manager, Site Safety and Health Officer (SSHO) and any other members determined by the Government to be required.

b. Topics will include, but not be limited to the following:

1. General Project overview and sequencing of work.
2. Contractor orientation to Drainage and Unwatering Systems and operations.

c. Anticipate 8 hours for the On-Site Coordination Meeting.

1.18.3.1 Minutes

Contractor is responsible for taking the meeting minutes. Send minutes electronically within 48 hours of the meeting to the Government's Project Engineer, Quality Assurance Representative, and Resident Engineer.

1.18.4 Pre-Construction Meeting

Coordinate with the Contracting Officer and establish the date of the Pre-Construction Meeting. The meeting will be held at the Project site at least one (1) week prior to mobilizing to the job site. **The Contractor shall lead the Pre-Construction Meeting** discussing the Contractor's plan on executing the work at the project site, schedule, required clearances and timeframe for them, and plan for implementing safety and quality control. The Government will have key members from the Project staff to discuss environmental and clearance issues. Key members of the contractor staff shall attend this meeting including the Quality Control (QC) System

Manager, Site Safety and Health Officer (SSHO) and any other members determined by the Government to be required.

1.18.4.1 Minutes

Contractor is responsible for taking the meeting minutes and shall send them electronically within 48 hours of the meeting to the Government's Project Engineer, Quality Assurance Representative, and Resident Engineer.

1.18.4.2 Demobilizing And Remobilizing

Anytime the Contractor demobilizes from the site and remobilizes at a later date, another Pre-Construction Meeting shall be held and shall follow the requirements listed above.

1.18.5 RMS Orientation Meeting

a. An RMS (Resident Management System) Orientation Meeting will be held within Fifteen (15) calendar days after receipt of Notice to Proceed. See SECTION 01 45 01.00 28 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM) for additional information. Orientation meeting will be at District Headquarters, and may occur in conjunction with, but not at the same time as, the Pre-Work meeting. Coordinate meeting date and time with the Contracting Officer a minimum of 7 calendar days prior to the meeting.

b. At a minimum, the Contractor's RMS-CM Administrator and QC system manager shall attend the RMS Orientation meeting. A Government Representative will lead the orientation. Anticipate the following at the meeting:

1. Allow for a maximum 4 hour duration.
2. Cover the following topics, at a minimum, in RMS Contractor Mode (CM):
 - i. Contractor use of RMS (CM) system.
 - ii. Contractor Data.
 - iii. Quality Control Reports.
 - iv. Submittals.
 - v. RFIs.
 - vi. Payment.
3. Receive a follow-up handout/guide for reference on the above items.

c. Contractor employees shall bring a computer with Wi-Fi capability (to gain access to the Internet), with RMS pre-loaded.

d. The RMS Orientation Meeting is required for Contractors with no prior RMS experience. The RMS Orientation Meeting, is optional, but may be requested, for all other Contractors.

1.19 WEEKLY PRODUCTION MEETINGS

During all fabrication and onsite construction work, hold a weekly production meeting to brief the Government on the status of the project.

a. Use the attached "Weekly Meeting Agenda" and discuss all elements of this agenda.

b. Provide a three (3) week 'look ahead'. The "Look-Ahead" shall be generated in P6 and then copied into Excel for more detail (see look-ahead examples at the end of this section).

1. Describe all planned construction activities, on-site and off-site over the next three (3) weeks.

2. ENSURE these activities align to the overall construction SCHEDULE submitted under PROJECT SCHEDULE.

3. RECORD any changes to the Project Schedule AND INCLUDE IN the next scheduled update.

c. Key members of the Contractor's staff including the Quality Control System Manager and the SITE SAFETY AND HEALTH OFFICER shall attend.

d. The Quality Control System Manager shall discuss all QC aspects outlined in SECTION 01 45 04.00 28 CONTRACTOR QUALITY CONTROL.

e. The Government reserves the right to require any person from the Contractor's staff such as the Project Manager, Engineer, Scheduler or Key Subcontractor Personnel to attend the meeting.

1.19.1 Construction Progress Photos

a. During on site construction activities record construction progress with weekly progress photographs. Submit digital photographs weekly for use at the WEEKLY PRODUCTION MEETING. Photographs provided are for unrestricted use by the Government.

1. Photos shall be submitted at the end of each work week.

2. Furnish digital photographs, Utilize JPEG file format for all photograph and image files.

3. Provide full-color photos with photo resolution of not less than 4 megapixels and not more than 12 megapixels. Photos shall show the sequence and progress of work.

4. Take a minimum of 20 digital photographs each week throughout the entire project.

b. Ensure that the photographs are digitally dated. Log shall be furnished for each photograph that records the following information:

1. Photograph number (the specific format should be tied to the filename of the electronic photograph).

2. Date the photograph was taken.

3. A brief description of the location, what the photograph

depicts, and the orientation of the view.

1.19.2 Minutes

The Contractor shall be responsible for taking the meeting minutes and shall send them electronically within 24 hours of the meeting to the Government's Project Engineer, Quality Assurance Representative, and Resident Engineer.

1.20 ADDITIONAL MEETINGS

Record the minutes of all meetings, including all conference calls, that occur between the Contractor and Government. Send minutes electronically within 24 hours of the meeting to the Contracting Officer for concurrence. E-mail subject line shall include project name and meeting topic.

1.21 PARTNERING

1.21.1 General

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractors by informally partnering this contract. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance with the intent to achieve a safe completion of the work - within budget, on schedule, and in accordance with plans and specifications. This partnership would be bilateral in makeup and participation will be totally voluntary. If Partnering is pursued, meetings would be held as identified in the following paragraph.

1.21.2 Partnering Meetings

Within 30 calendar days of receipt of Notice to Proceed, the initial partnering meeting will be scheduled, if the meeting is requested by the Contractor. The Contractor's key personnel will attend a face-to-face partnering meeting (typically one day in duration) together with key Government personnel, to discuss project goals and communication. Follow-up meetings will be held periodically, as required, throughout the duration of the contract, as agreed to by the Contractor and the Government. The Government will facilitate the meeting.

1.22 RED ZONE MEETING

a. Within one (1) month of completing the project or when the project is 80 percent completed, the Contractor shall set up and lead a Red Zone meeting. The Contractor shall contact the Contracting Officer to Schedule this meeting. The Government's representative will include the Contracting Officer, key personnel from the Project, Project Engineer, Quality Assurance Representative, and Resident Engineer. The key people from the Contractor shall be, at a minimum, the Project Superintendent, Quality Control System Manager, Scheduler, key subcontractors personnel, and Project Manager.

b. The purpose of this meeting is to develop an overall schedule for all activities required by both the Government and Contractor and to complete the project through commissioning and final acceptance. The Government will come prepared with all their activities, key dates, and durations for all work required by the Government to complete the

project. The Contractor shall provide the same information for all of their activities. The Contractor's scheduler shall input all of this information into the Contractor's project schedule during the meeting.

c. This schedule shall be updated weekly, or as needed, based on the information from the weekly production meetings for both the Government and Contractor activities.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

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Weekly Meeting agenda template

Schedule -

- Work scheduled over the next week
- Three week look ahead
- Overall Schedule Review

Submittals Review-

- Submittal Register
- Submittals approved by QC
- Outstanding Submittals
- RFI's
- Letters

Coordination -

- Clearances required over the next week, include the following:
 - A description of the work to be performed under the Clearance.
 - Determine the correct energy isolation points needed to perform the work safely.
 - Physical barriers, protective grounds, piping blanks, or bulkheads that shall be used, including locations.
 - Determine the procedure and method of testing for stored energy if applicable.
 - The date and time the Clearance shall be required.
 - The estimated length of time the system or equipment shall be out of service and the time to return the system or equipment to service in an emergency.

Coordination issues

Safety-

- Review of AHA's for ongoing work
- Pending AHA's
 - Required for new work
 - Status of Gov't approval
- Safety issues

QC -

- Preparatory meetings
 - Held over last week- status of meeting minutes
 - Required over the next week
- Initial meetings over the next week
- Follow up over the next week
- Rework list
- Review Deficiency tracking log

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3 Week Look Ahead			Three Week Look Ahead					02-Mar-15 10:02																			
Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	Physical %	Total Float	Critical	2015													016					
									S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	
Total		32d	32d	26-Feb-15	11-Apr-15		194d																				
3 Week Look Ahead		32d	32d	26-Feb-15	11-Apr-15		194d																				
Preparatory & Admin		5d	5d	26-Feb-15	02-Mar-15		311d																				
0001	Dive Operations	5d	5d	26-Feb-15	02-Mar-15	0%	311d	<input type="checkbox"/>																			
Preconstruction		20d	20d	26-Feb-15	25-Mar-15		167d																				
Design & Submittals		20d	20d	26-Feb-15	25-Mar-15		162d																				
0002	Tests, Insp, and Verifications	20d	20d	26-Feb-15	25-Mar-15	0%	162d	<input type="checkbox"/>																			
Procurement		0d	0d				0d																				
Fabrication & Machining		0d	0d				0d																				
Pre-Work Coordination		0d	0d				0d																				
Field Work		16d	16d	26-Feb-15	19-Mar-15		210d																				
Unit A		0d	0d				0d																				
Unit B		0d	0d				0d																				
Unit C		16d	16d	26-Feb-15	19-Mar-15		210d																				
Unit C Pre-Rehab Inspections		0d	0d				0d																				
Unit C Box #1 Removal		13d	13d	26-Feb-15	16-Mar-15		205d																				
0006	Remove Box 1 Screen	2d	2d	26-Feb-15	27-Feb-15	0%	93d	<input checked="" type="checkbox"/>																			
0007	Remove Box 2 Screen	2d	2d	02-Mar-15	03-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0008	Remove Box 3 Screen	2d	2d	04-Mar-15	05-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0009	Screen Slot 1 Measurement	1d	1d	06-Mar-15	06-Mar-15	0%	205d	<input type="checkbox"/>																			
0010	Install shafts 21-24	4d	4d	09-Mar-15	12-Mar-15	0%	205d	<input type="checkbox"/>																			
0011	Pressure Wash Slot 2	1d	1d	13-Mar-15	13-Mar-15	0%	205d	<input type="checkbox"/>																			
0012	Pressure Wash Slot 3	1d	1d	16-Mar-15	16-Mar-15	0%	205d	<input type="checkbox"/>																			
Unit C Box #2 Removal		10d	10d	06-Mar-15	19-Mar-15		100d																				
0013	Lower Lifting Beam & Attach	2d	2d	06-Mar-15	09-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0014	Raise Screen to Deck & Support	1d	1d	10-Mar-15	10-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0015	Fuel Removal	1d	1d	11-Mar-15	11-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0016	Fuel Screen Inspect & Measure	1d	1d	12-Mar-15	12-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0017	Separate Widget from Screen	1d	1d	13-Mar-15	13-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0018	Haul Screen to Laydown	1d	1d	16-Mar-15	16-Mar-15	0%	103d	<input type="checkbox"/>																			
0019	Remove Box 4 Screen	2d	2d	16-Mar-15	17-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
0020	Remove Box 5 Screen	2d	2d	18-Mar-15	19-Mar-15	0%	93d	<input checked="" type="checkbox"/>																			
Unit C Box #3 Removal		0d	0d				0d																				
Unit C Fuel Screen Field Modifications		14d	14d	26-Feb-15	17-Mar-15		103d																				
0039	Position Screen 1 on Slab	1d	1d	26-Feb-15	26-Feb-15	0%	116d	<input type="checkbox"/>																			
0040	Position Screen 2 on Slab	1d	1d	17-Mar-15	17-Mar-15	0%	103d	<input type="checkbox"/>																			
Unit C Wagner Horn Plugs Installation		0d	0d				0d																				
Unit C Fish Screens Installatin		0d	0d				0d																				
Unit C Fish Screen Slot Closure		0d	0d				0d																				
Unit D		0d	0d				0d																				
Unit D Pre-Rehab Inspections		0d	0d				0d																				
Unit D Screen #1 Removal		0d	0d				0d																				

Actual Work

Remaining Work

Critical Remaining Work

Summary

Milestone

Page 1 of 3

TASK filter: 3 Week Look Ahead.

© Oracle Corporation

 Actual Work
 Critical Remaining Work
 ▼ Summary
 Remaining Work
 ◆ Milestone

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SECTION 01 14 00.10 28

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- 1.2 SUBMITTALS
- 1.3 SITE CONDITIONS AND OPERATIONAL RESTRICTIONS
 - 1.3.1 Operation of Valves and other Government Equipment
 - 1.3.2 Other Contractors
- 1.4 EMPLOYEE TRAINING AND IDENTIFICATION SUMMARY
- 1.5 PROJECT SECURITY
 - 1.5.1 Contractor Vehicle Access
 - 1.5.2 Identification of Employees
 - 1.5.3 ELEVATOR USE
- 1.6 DELIVERY OF EQUIPMENT
- 1.7 USE OF POWERHOUSE BRIDGE CRANES
 - 1.7.1 Crane Operators
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PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

ATTACHMENTS:

Security Badge Form

-- End of Section Table of Contents --

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SECTION 01 14 00.10 28

PROJECT SITE RESTRICTIONS

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Access To Automated Information Systems; G SLE

Employee Training And Identification Summary; I C

Elevator Protection Plan; G, C

SD-07 Certificates

Crane Operator Qualifications; G, C

1.3 SITE CONDITIONS AND OPERATIONAL RESTRICTIONS

See also, SECTION 01 14 00.20 28 WORK AND OPERATIONAL RESTRICTIONS.

1.3.1 Operation of Valves and other Government Equipment

The Government will adjust and/or operate all Government valves, equipment, and related items until released to the Contractor for replacement and/or upgrades.

1.3.2 Other Contractors

- a. Other Contractors will be working in the Powerhouse during Contractor work on this project. Expect additional coordination related to work and activities on or near El. 287. Other coordination may be required. Anticipate coordination to include, but not be limited to

the following:

1. Delivery of supplies and equipment to the Powerhouse.
 2. Possible interferences on, or near, the Tailrace deck.
 3. Use of bridge cranes.
 4. Powerhouse main floor storage areas.
 5. Elevator use.
 6. Additional related items.
- b. Coordination of contract work is required as part of this contract. No allowance will be made for damage or extra compensation because of the required cooperation.
- 1.4 **EMPLOYEE TRAINING AND IDENTIFICATION SUMMARY**
- a. Provide a spreadsheet containing the following information for all Contractor and Subcontractor personnel working on the Project site:
1. Employee name.
 2. Employee photo ID Type Issued: Proximity Card #*** (for Gate/Door Access) OR Photo ID Only.
 3. Date Photo ID Issued.
 4. Date Photo ID Returned.
 5. All applicable employee training that has been completed. Include all training from Section 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS, 01 14 00.90 28 INTEGRATING ANTITERRORISM (AT) AND OPERATIONS SECURITY (OPSEC), and other as specified.
- b. Submit EMPLOYEE TRAINING AND IDENTIFICATION SUMMARY prior to beginning of Contractor on-site work. Update and resubmit within 48 hours of any changes.

1.5 PROJECT SECURITY

The Project site is a secured area and access onto the Project is restricted. The security measures affect all of the Contractor's vehicles and personnel. There will be delays when entering Projects due to locked gates, vehicle inspections, and personnel checks. Inspections and checks may include inspection of tool boxes, brief cases, lunch boxes, and other containers.

1.5.1 Contractor Vehicle Access

Project access roads on both sides of the dams are secured with locked gates. All vehicles that pass through the locked gates will be subject to being searched. No privately owned vehicles (POV's) will be allowed through locked gates. Only Contractor's work vehicles and equipment that are essential to the conduct of the work will be allowed in the work areas. All Contractor vehicles shall display suitable permanent or temporary identification.

1.5.2 Identification of Employees

Government Project personnel will provide the Contractor's personnel with identification badges as they arrive on site. Complete the Security Badge Form (attached to the end of this SECTION). Submit the completed form to the Contracting Officer at least five (5) business days prior to the employee arrival to work on the Project site. Upon issuance of official badges, the Contractor shall be responsible for requiring each employee engaged on the work to display identification at all times. All prescribed identification shall immediately be delivered to the Quality Assurance Representative for cancellation upon the release of the employee or project completion. If required by the Contracting Officer, employees will be photographed by the Government. Employees who fail to submit to being photographed will not be allowed on the project site.

Every Contractor employee (prime or subcontractor) shall have a hard hat meeting the requirements of **EM 385-1-1**. Hardhats shall display the Prime Contractor name, subcontractor name, and the employee's name. Contractor employee hardhats shall **not** be white with red markings. It shall be the responsibility of the Project Superintendent to enforce this requirement.

1.5.3 ELEVATOR USE

a. The powerhouse elevator is available for Contractor use for personnel and small tools, only. Protect the interior of the elevator from damage that may occur during use. Submit an **elevator protection plan**, that details what means and methods will be used to protect the elevator from damage.

b. Elevator may be used, when available. Elevator capacity shall not be exceeded. Elevator use is at Contractors' own risk. The Government does not guarantee operation, or availability, of the elevator.

1.6 DELIVERY OF EQUIPMENT

Contractor shall be responsible for delivery and receipt of all materials and equipment. Government personnel will not be available to assist the Contractor in these activities. All Contractor deliveries are restricted to the South side of the Project. See SECTION **01 55 10.00 28** CONTRACTOR WORK, ACCESS AND STORAGE AREAS, paragraph GOVERNMENT ROADWAYS AND DECK ACCESS RESTRICTIONS for additional information.

1.7 USE OF POWERHOUSE BRIDGE CRANES

The Government's bridge cranes within the powerhouse will be available for the work within the working load and movement limits of the cranes. There are 2 bridge cranes, each mounted on two trolleys. Each trolley has a 175 ton main hoist and one 30 ton auxiliary hoist. The bridge cranes will be available for use by the Contractor at such times as not required for other maintenance and repair work performed by Government personnel, or other Contractors. The Government will furnish electric power, lubrication, and normal maintenance including adjustments without cost to the Contractor. Provide the KO (Contracting Officer) at least one Government work week notice in advance each time use of the cranes are desired.

1.7.1 Crane Operators

The Contractor shall furnish qualified bridge crane operators for their operations. Each operator, in addition to meeting the requirements of SECTION 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS, shall have had at least 3-years experience on a bridge crane of equivalent capacity and characteristics. Submit [Crane Operator Qualifications](#) for each operator in the form of an affidavit signed by the operator and the Contractor. The affidavit shall include a complete record of all related work with particular emphasis on experience directly related to operation of a bridge crane handling comparable loads. Before any operator is approved they shall spend at least 1 hour in training on the cranes under the direct supervision of a Government operator. The Contractor's crane operators may be retested at any time. The Contractor shall ensure that the crane operators have current (within the previous 12 months) physical or medical examinations with emphasis on hearing, eyesight, and cardiovascular conditions. Submit dates of physical exams to the Contracting Officer along with qualifications.

1.7.2 Use of the Cranes

The Contractor shall be liable for all damage, due to fault or negligence, incurred while the cranes are operated by the Contractor's crane operators.

1.7.3 Riggers

Only qualified riggers shall be used in preparing loads for lifting and in attaching such loads to the cranes. All personnel performing rigging shall meet requirements of SECTION 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS. A Government operator will check them for knowledge of hand signals. Hand held portable radios may be used but only on non-Government frequencies.

1.8 [ACCESS TO AUTOMATED INFORMATION SYSTEMS](#)

All Contractor employees (U.S. citizens and Non- U.S. citizens) working under this contract (to include grants, cooperative agreements and task orders) who require access to Automated Information Systems (AIS), (stand alone computers, network computers/systems, e-mail, sensitive data areas such as the Control Room) shall, at a minimum, be designated into an ADP-III position (non-sensitive) in accordance with DoD 5220-22-R, Industrial Security Regulation. The investigative requirements for an ADP-III position are a favorable National Agency Check (NAC), SF-85P, Public Trust Position. Have each applicable employee complete a SF-85P and 2 FBI form 258 Finger Print cards to submit to the Security Officer within three (3) working days after award of any contract or task order, and submitted prior to the individual being permitted access to an AIS. Contractors that have a commercial or government entity (CAGE) Code and Facility Security Clearance through the Defense Security Service shall process the NACs and forward visit requests/results of NAC to the Security Officer. For those Contractors that do not have a CAGE Code or Facility Security Clearance, the Security Office will process the investigation in coordination with the Contractor and contract employees.

The phone number for the Security Office is: 509.527.7141

The address for the Security Office is:

Security Officer

Emergency Management Office
Walla Walla District, COE
201 North Third Avenue
Walla Walla, WA 99362

1.9 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer.

1.10 WORK SCHEDULES

1.10.1 Contractor's Work Schedule

At the Pre-Work Meeting, furnish a schedule of number of working days per week, shifts per day, and hours per shift for contract work. Furnish notification of any change of schedule of regular work hours, overtime work hours, and shifts of work crews and personnel at the site. This notification shall be provided a minimum of 48 hours prior to any schedule change to allow suitable scheduling of Government personnel and inspection. Exception to this requirement may be allowed in case of schedule change due to emergency conditions.

1.10.2 Government's Work Schedule

a. The maintenance crews at the dam work from 6:30 a.m. to 5:00 p.m., Monday through Thursday. Crews and staff do not work on weekends and Federal holidays. If a Federal holiday falls on a Friday, the crews and staff do not work on the preceding Thursday. A powerhouse operator is at the site 24 hours a day, 7 days a week, including Federal holidays but is not available to assist the Contractor.

b. If the Contractor requires support/assistance outside of the hours or days stated above, the Contractor must make a formal written request to the Contracting Officer at least 14 calendar days prior to the date that support/assistance is needed. The Government will provide requested support/assistance using overtime for non-holiday Fridays and Saturdays from 6:30 a.m. to 5:00 p.m. when requested in advance. The Government will not guarantee support/assistance for any other days or times. If the requested support/assistance is unapproved, the Government will work with the contractor to fulfill the support/assistance request as soon as reasonably achievable to suit both parties.

c. Submit an estimated number of days requiring government support/assistance outside of normal working hours with preliminary project schedule, and subsequent project schedules throughout the duration of the project.

d. Below are the Federal holidays and Thursdays before a Federal holiday that fall on a Friday that the maintenance crews are not scheduled to work:

YEAR	DAY	DATE
2023	Monday	2 January

YEAR	DAY	DATE
2023	Monday	16 January
2023	Monday	20 February
2023	Monday	29 May
2023	Monday	19 June
2023	Tuesday	4 July
2023	Monday	4 September
2023	Monday	9 October
2023	Thursday	9 November
2023	Friday	10 November
2023	Thursday	23 November
2023	Monday	25 December

YEAR	DAY	DATE
2024	Monday	1 January
2024	Monday	15 January
2024	Monday	19 February
2024	Monday	27 May
2024	Wednesday	19 June
2024	Thursday	4 July
2024	Monday	2 September
2024	Monday	14 October
2024	Friday	11 November
2024	Thursday	28 November
2024	Wednesday	25 December

1.11 USE OF WALLA WALLA DISTRICT PARKS

Special consideration for the use of the Walla Walla District Camping Grounds **will not** be given to the Contractor if camping at these sites. The Contractor's crew may not use Government parking lots near McNary Lock

and Dam for RV parking.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used) -- End of Section --

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US Army Corps
of Engineers
Walla Walla District

U.S. Army Corps of Engineers, Northwestern
Division, Walla Walla District
Request for Access to Field Projects

Contractor/Visitor Information

Project

Date of Request

PERSONAL INFORMATION:

Last Name:

First Name:

M. I.:

U. S. Citizen

Phone Number (Office/Mobile)

EMPLOYMENT INFORMATION:

Company Name:

Company Phone Number

Company Site Supervisor

Contact Phone Number

Contract Name or Purpose of Visit

Access Begin Date

Access End Date

FOR USACE USE ONLY:

USACE POC

POC Phone Number

POC Signature

ID Card Only

Access Badge

Existing Badge

If YES, Badge #

Requested Area of Access

Access Period

Hours Access Required

"I have read and/or been briefed on the Project Security and Safety Guidelines and understand my responsibilities and as a badge/key holder. I have received the access card/key issued to me."

Printed Name:

Signature

Date

Chief of Operations Approval:

Printed Name:

Date

Signature

Key Series	Key Number
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

This section to be filled out by Project Security:

Card Number

Date Returned:

Photo ID:

Date Issued:

Date Expired:

Signature

Access for Foreign Nationals: Security Clearance for foreign nationals to attend a site visit or to perform onsite work requires a minimum of four weeks. Please send documentation by email (.pdf files are preferred) to Walla Walla District Security Office.

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SECTION 01 14 00.20 28

WORK AND OPERATIONAL RESTRICTIONS

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 - 1.1.1 Remaining Contract Work
- 1.2 GENERAL REQUIREMENTS
 - 1.2.1 Coordination for Adult Fish Passage Impacts
- 1.3 PHASE 1 - DRAINAGE SYSTEM AND MAIN TURBINE UNIT VALVE UPGRADES
 - 1.3.1 Phase 1 Work Sequencing Requirements
 - 1.3.2 Phase 1 Work Restrictions
- 1.4 PHASE 2 - UNWATERING SYSTEM UPGRADES
 - 1.4.1 Phase 2 Work Sequencing Requirements
 - 1.4.2 Phase 2 Work Restrictions
- 1.5 PHASE 3 - STATION SERVICE TURBINE UNIT VALVE UPGRADES
- 1.6 MAIN UNIT OUTAGE REQUIREMENTS
 - 1.6.1 Main Unit Outage Scheduling
- 1.7 STATION SERVICE UNIT OUTAGE REQUIREMENTS
 - 1.7.1 Station Service Unit Outage Scheduling

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section Table of Contents --

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SECTION 01 14 00.20 28

WORK AND OPERATIONAL RESTRICTIONS

PART 1 GENERAL

This SECTION contains Work Restriction requirements and information. If conflicts are found between this SECTION and other areas of the Plans and Specifications, notify the Contracting Officer (KO).

NOTE:

a. Due to blockage in the Drainage header (between Main Units 7 and 8), Draft Tube Drain Valve pits for Main Turbine Units (Main Units) 7-14 are currently flooded and not available for Contractor access. Blockage in the Drainage Header must be removed prior to access to these areas. See SECTION 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL for additional information.

b. A maximum of two (2) Main Units will be removed from service for Main Unit Drainage and Equalizer Valve upgrades, prior to Drainage Header blockage removal. Blockage must be completely removed before additional Main Units will be removed from service, for work on this contract.

c. See **Sheet M-901** for Unwatering Pump Isometric. Includes overall configuration of Unwatering and Drainage System piping and pumps.

d. See **Sheet M-601** for Powerhouse Valve Schedule.

1.1 WORK PHASE REQUIREMENTS

Work on this Contract shall be complete, as specified and required, in the identified Phases. See Contracting Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK, for additional information.

a. Phase 1 - Drainage System and Main Turbine Unit Valve Upgrades.

b. Phase 2 - Unwatering System Upgrades.

c. Phase 3 - Station Service Turbine Unit Valve Upgrades.

1.1.1 Remaining Contract Work

All work not associated with a specific time period or work phase, shall be scheduled by the Contractor and included in the accepted Project Schedule. See SECTION 01 32 01.00 28 PROJECT SCHEDULE for additional information.

1.2 GENERAL REQUIREMENTS

The following requirements apply to all work on this Contract:

a. Prior to removing any of the following from service, all valves, parts, equipment, etc. required to upgrade and return each component to service, must be on-site and accepted for installation by the

Contracting Officer (KO):

1. Main Turbine Units (Phase 1).
 2. Station Service Turbine Units (Phase 3).
 3. All or part of the Drainage pump system, including intake and discharge piping, and valves (Phase 1).
 4. All or part of the Unwatering pump system, including intake and discharge piping, and valves (Phases 1 and 2).
- b. The following restrictions apply to work on, and/or use of, upgraded Fishway Drain Flush Line Piping:
1. Required piping upgrades shall occur outside of the Adult Fish Passage Work Window (Phase 1).
 2. Fishway Drain Flush Line Piping upgrades must be complete prior to use for routing of Unwatering and/or Drainage Sump discharge flows.
 3. Restrictions apply to routing of Unwatering and/or Drainage Sump discharge flows through upgraded Fishway Drain Flush Line Piping. See paragraph "Phase 2 Work Restrictions" for additional information.
- c. Contractor access to and/or work in the Drainage Sump is restricted to the Phase 1 timeframe. Contractor access to and/or work in the Unwatering Sump is restricted to the Phase 2 timeframe.
- d. Temporary pumping, and temporary power are responsibilities of the Contractor and will not be provided by the Government. See SECTION 02 24 10.02 28 DEWATERING, paragraph DEWATERING OF WORK AREAS for additional information.
- e. Contractor shall **NOT** remove Government equipment from service, and/or adjust Government equipment or valves, unless approved, in writing, by the KO.

1.2.1 Coordination for Adult Fish Passage Impacts

The adult fish passage season occurs from 1 March through 31 December, annually. Deviations to powerhouse unit priority or any work that affects operation of fish pumps, or creates noise within 100 feet of a fish ladder requires coordination via a Memorandum of Coordination (MOC) a minimum of 3 weeks prior to impacts to operations. Coordinate anticipated impacts with the KO.

1.3 PHASE 1 - DRAINAGE SYSTEM AND MAIN TURBINE UNIT VALVE UPGRADES

Complete the following required work during Phase 1 - Drainage System and Main Turbine Unit Valve Upgrades:

- a. All work related to Drainage System upgrades, including, but not limited to the following:
 1. Drainage pump, and related piping and valve upgrades.

2. Drainage sump work.
 3. All Drainage header upgrades, repairs, and related work. Includes Drainage header blockage removal, and Drainage header point repair, if needed.
 4. All Cleanout Sump upgrades, including concrete removal, pump replacement, and cleanout and valve upgrades.
- b. Fishway Drain Flush Line piping upgrades.
 - c. Upgrades/replacements of all Unwatering Pumps, as shown and specified.
 - d. Replacement of Unwatering Pump #3 **motor**. Temporary power required. See SECTION 02 24 10.02 28 DEWATERING, paragraph DEWATERING OF WORK AREAS, for Temporary Power information.
 - e. Unwatering Pump Inlet Valves and Piping Upgrades. See Sheet M-401 for reference. Includes 14" Isolation Gate Valves and related piping on the inlet side of the Unwatering Pumps.
 1. **NOTE:** Does NOT include suction pipes inside Unwatering Sump.
 - f. **ALL** Main Unit Draft Tube Drain Valves, Draft Tube Drain Valve Tees, Scroll Case Drain Valves, and Equalizer Valves replacements and refurbishments.
 1. **NOTE:** See paragraph MAIN UNIT OUTAGE REQUIREMENTS for additional information.
- 1.3.1 Phase 1 Work Sequencing Requirements
- The following tasks have sequencing requirements and must be completed in the order as specified. List may not be all inclusive:
- a. **Cleanout Sump concrete removal** must be completed prior to Drainage Header Blockage Removal.
 - b. **Drainage Header Blockage Removal** must be completed prior to the following:
 1. Access to Draft Tube Drain Valve Pits for Main Units 7-14.
 2. Removal of additional Main Units as specified in paragraph GENERAL.
 3. Removal of 8" PVC Drainage Header and reconnection of 6" Drain Pipes to original Header in EL. 207 Gallery. **See also item "Drainage Header Pipe Point Repair" below.**
 - c. **Drainage Header Pipe Point Repair** (if needed) must be completed prior to removal of 8" PVC Drainage Header and reconnection of 6" Drain Pipes to original Header in EL. 207 Gallery.
 - d. **Draft Tube Drain Valve, and Draft Tube Drain Valve Tee replacement** must be completed prior to replacement of Scroll Case Drain Valve and Equalization Valve upgrades, for each Main Unit.
- 1.3.2 Phase 1 Work Restrictions

The table below lists Phase 1 Work items with specific restrictions. List is not necessarily in sequence (unless identified as such), is not inclusive of all required work, and may not reflect all restrictions found in the Plans and Specifications. Refer to the plans and specifications

for additional information. Plan sheet references are for information only and do not include all related Plan sheets.

WORK ITEM	MAX. DRAINAGE SUMP WSE	MAX. UNWATERING SUMP WSE	OTHER RESTRICTIONS
Cleanout Sump concrete removal, EL 176 fmsl. See sheets SD101 and S-101.	N/A	N/A	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements".
Remove Drainage Header Check valve in Cleanout Sump. See Sheet MD402, Section A2.	EL 172 fmsl	N/A	
Drainage Header Blockage Removal	EL 172 fmsl	N/A	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements", and paragraph GENERAL.
Install New Drainage Header Clean out in Cleanout Sump. See Sheets M-202, M-401.	EL 172 fmsl	N/A	
Drainage Header Pipe Point Repair.	EL 172 fmsl Verify required elevation.	N/A	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements". Option Work. See SECTION 33 01 30.72 28 DRAINAGE HEADER POINT REPAIR for additional information. Required Drainage Sump WSE dependent on elevation of damaged pipe.

WORK ITEM	MAX. DRAINAGE SUMP WSE	MAX. UNWATERING SUMP WSE	OTHER RESTRICTIONS
Remove 8" PVC Drainage Header; Reconnect 6" Drain Pipes to original Header in EL. 207 Gallery. See Sheets MD203, M-402 detail A1.	N/A	N/A	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements".
Drainage Pump and Upper Discharge Piping replacement. Install drainage sump baffle box, and seismic bracing on Drainage Pump intake pipe. See Sheets S-201, MD101, MD201, M-101, M-201.	Empty Drainage Sump	N/A	Requires temporary pumping of Drainage Sump inflows into Unwatering Sump.
Fishway Drain Flush Line Piping upgrades. See Sheets MD202, M-202	N/A	N/A	Required piping upgrades shall occur outside of the Adult Fish Passage Work Window. See paragraph GENERAL REQUIREMENTS for additional restrictions.
Unwatering Pumps Inlet Valves and Piping upgrades. Sheets MD402, M-401. See paragraph PHASE 1 - DRAINAGE SYSTEM AND MAIN TURBINE UNIT VALVE UPGRADES for additional information.	EL 176 fmsl	EL 177 fmsl*	No additional Main Units unwatered during this work. Does not include piping in Unwatering Sump.

WORK ITEM	MAX. DRAINAGE SUMP WSE	MAX. UNWATERING SUMP WSE	OTHER RESTRICTIONS
Unwatering Pump and Motor Upgrades. See Sheets MD202, M-201, M-202.	N/A	N/A	Minimum of two (2) Unwatering Pumps must be operational at all times. Replacement of Unwatering Pump #3 motor. Temporary power required. See SECTION 43 23 31.13 28 POWERHOUSE UNWATERING PUMPS for additional information.
Main Turbine Unit Draft Tube Drain Valve, and Draft Tube Drain Valve Tee Replacement See Sheets MD203, MD401, M-402.	N/A	EL 177 fmsl*	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements". Unwatering Sump WSE restriction applies to Draft Tube Drain Valve and Draft Tube Drain Valve Tee replacement, only. No additional Main Units unwatered during Draft Tube Drain Valve, or Draft Tube Drain Valve Tee replacement.
Main Turbine Unit Scroll Case Drain Valve Replacement, and Equalizer Valve Upgrades. See Sheets MD203, MD401, M-102, M-402.	N/A	N/A	Sequence requirements. See paragraph "Phase 1 Work Sequencing Requirements".

NOTES:

* Unwatering Sump WSE requirements limit Main Unit unwatering.

TABLE DEFINITIONS:

1. WSE: Water Surface Elevation.
2. fmsl: Feet Mean Sea Level.
3. N/A: Not Applicable.

1.4 PHASE 2 - UNWATERING SYSTEM UPGRADES

Complete all remaining Unwatering System work during Phase 2 - Unwatering System Upgrades. Required work includes, but is not limited to the following:

- a. All work related to the Unwatering System Isolation Valve replacement, the 90 degree bend immediately downstream of the valve, and installation and removal of Unwatering Discharge Plug in the tailrace. See Contracting Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK for coordination requirements.
- b. All Unwatering System discharge piping and valve replacement and upgrades.
- c. All Unwatering suction piping upgrades, Unwatering sump concrete removal, and related sump work.
- d. Replacement of remaining Unwatering Pump motors.
- e. All Electrical Upgrades impacting the Unwatering System, including upgrades to the Motor Control Center (MCC).

1.4.1 Phase 2 Work Sequencing Requirements

The following sequencing requirements must be completed as specified. See Contracting Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK, for additional information. List may not be all inclusive:

- a. **Unwatering System Isolation Valve Replacement, and 90 degree bend immediately downstream,** must be completed prior to the following:
 1. Replacement of Unwatering Pump Discharge Piping.
 2. Replacement of Unwatering Pump inlet suction pipes in Unwatering Sump.

1.4.2 Phase 2 Work Restrictions

- a. The table below lists Phase 2 work items with specific restrictions. List is not necessarily in sequence (unless identified as such), is not inclusive of all required work, and may not reflect all restrictions found in the Plans and Specifications. Refer to the plans and specifications for additional information. Plan sheet references are for information only and do not include all related Plan sheets.

- b. **NOTES:**

1. Unwatering Pump #3 must be operational at all times during the Phase 2 timeframe. Temporary power may be required.
2. Use of upgraded Fishway Drain Flush Line Piping to reroute Unwatering and/or Drainage Sump discharge flows, shall NOT occur during the Oregon Fish Ladder outage, with one exception.
 - i. Rerouting of sump flows during the Oregon Fish Ladder outage will be required for replacement of the Unwatering System Isolation Valve, and adjacent 90 degree bend downstream of the

valve. Dates for this work must be coordinated with the KO. See Contracting Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK for additional information.

WORK ITEM	MAX. UNWATERING SUMP WSE	OTHER RESTRICTIONS
<p>Unwatering System Isolation Valve Replacement.</p> <p>Includes replacement of 90 degree bend immediately downstream of Valve.</p> <p>See Sheets MD202, M-202.</p>	N/A	<p>Sequence requirements. See paragraph "Phase 2 Work Sequencing Requirements".</p> <p>All work must be completed as identified in Contracting Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK. Includes installation and removal of Unwatering Discharge Plug in the tailrace.</p> <p>Requires Unwatering Sump discharge flows to be routed through upgraded Fishway Drain Flush Line Piping.</p>
<p>Unwatering Pump Discharge Piping replacement/upgrades.</p> <p>See Sheets MD202, M-202.</p>	N/A	<p>Sequence requirements. See paragraph "Phase 2 Work Sequencing Requirements".</p> <p>Requires Unwatering Sump discharge flows to be routed through upgraded Fishway Drain Flush Line Piping.</p> <p>Temporary Pumping may be required.</p>
<p>Unwatering Pump inlet suction pipes replacement (in Unwatering Sump). Includes required concrete modifications.</p> <p>See Sheets MD202, MD402, M-202, M-401</p>	Empty	<p>Sequence requirements. See paragraph "Phase 2 Work Sequencing Requirements".</p> <p>Requires the following:</p> <ol style="list-style-type: none"> 1. Temporary pumping of Unwatering Sump in-flows to Drainage Sump. 2. Reconfiguration of Unwatering Pumps to pull from Drainage Sump and discharge through upgraded Fishway Drain Flush Line Piping.

WORK ITEM	MAX. UNWATERING SUMP WSE	OTHER RESTRICTIONS
Remove existing, and install new Unwatering System MCC (SQ02), Controls cabinet (SQ02C), and all related electrical work. See Sheets ED101, ED201, E-101, E-201, E-501.	N/A	Requires Temporary power to new Unwatering Pump Motors prior to removing MCC from service.

TABLE DEFINITIONS:

1. WSE: Water Surface Elevation.
2. N/A: Not Applicable.

1.5 PHASE 3 - STATION SERVICE TURBINE UNIT VALVE UPGRADES

Complete all work related to Station Service Turbine Unit drain valve upgrades, including, but not limited to the following. Plan sheet references are for information only and do not include all related Plan sheets.

- a. Replacement of Draft Tube Drain Valves, and Draft Tube Drain Valve Tee. See Sheets MD403, M-403.
- b. Replacement of Penstock Drain Valves, and rerouting of Penstock Drain piping. See Sheets MD204, M-203.

1.6 MAIN UNIT OUTAGE REQUIREMENTS

Main Unit outages are required for Main Turbine Unit Valve Upgrades (Phase 1 work). The following requirements apply to Main Unit Outages for work on this contract:

- a. Main Units will be unwatered, prepared for Contractor work, rewatered, and returned to service by the Government.
- b. Each Main Unit will be Out of Service one time only for work on this contract. All required work for the Out of Service Main Unit must be completed, commissioned, and accepted by the Government during this time.
- c. A maximum of 2 (two) Main Units will be Out of Service at any time for work on this contract. Out of Service includes all of the following:
 1. Government Unwatering and preparation of Main Unit for Contractor work (anticipate 4 Government work days duration per Main Unit). See SECTION 01 14 00.10 28 PROJECT SITE RESTRICTIONS, paragraph "Government's Work Schedule" for Government Work Days

information.

2. Contractor removal, installation, upgrade, and commissioning of all Draft Tube Drain valves, Draft Tube Drain valve tees, Scroll Case Drain valves, and Equalizer valves for the Out of Service Main Unit.

3. Government acceptance of Contractor work and Government verification Main Unit is ready to return to service.

4. Government Rewatering of Main Unit and return to service (anticipate 4 Government work days duration per Main Unit).

d. Main Units will be taken out of service in non sequential, adjacent pairs that share Draft Tube Drain valve pits (Main Units 1 & 2; Main Units 3 & 4; Main Units 5 & 6; Main Units 7 & 8; Main Units 9 & 10; Main Units 11 & 12; Main Units 13 & 14). The Government will determine the order Main Unit pairs are removed from service, and will notify the Contractor a minimum of 14 calendar days prior to the next scheduled Main Unit outage.

e. Up to 2 Main Units may be unwatered prior to start of the following activities, but Main Unit unwatering will **not** be allowed **during** any of the following:

1. Draft Tube Drain Valve, and/or Draft Tube Drain Valve tee replacement.

2. Unwatering Pumps Inlet Valves and Piping replacement.

3. When a controlled WSE is required in the Unwatering Sump.

4. When Contractor personnel are in the Unwatering Sump.

f. The Government will unwater and prepare one Main Unit for Contractor work at a time. Two Main Units will **not** be prepared simultaneously.

g. Unwatering of one Main Unit and rewatering of another may occur simultaneously.

h. Main Units are critical to Project operation. Once a Main Unit is removed from service, the Contractor must work expeditiously on valve replacements and upgrades in order to return the Main Unit to service with minimal delay.

1.6.1 Main Unit Outage Scheduling

a. Coordinate Main Unit Outage dates a minimum of 21 calendar days prior to anticipated start of the Out of Service period, for each Main Unit. Conduct this coordination during Government's typical scheduled work days.

b. The Government will start to unwater the Main Unit pairs contingent upon the following:

1. Outage dates have been coordinated as required.

2. All parts and equipment required to be replaced or upgraded

during the coordinated outage (of the applicable pair of Main Units), is on-site, and accepted for installation by the KO.

3. No more than one Main Unit is currently Out of Service for work on this contract. See paragraph MAIN UNIT OUTAGE REQUIREMENTS, subparagraph c. At no time will more than 2 Main Units be Out of Service for work on this contract.

1.7 STATION SERVICE UNIT OUTAGE REQUIREMENTS

Station Service Turbine Unit (Station Service Unit) outages are required for Station Service Turbine Unit Valve Upgrades (Phase 3 work). The following requirements apply to Station Service Unit Outages for work on this contract:

a. Station Service Units will be unwatered, prepared for Contractor work, rewatered, and returned to service by the Government.

b. A maximum of 1 (one) Station Service Unit will be Out of Service at any time for work on this contract. Out of Service includes all of the following phases:

1. Government Unwatering and preparation of Station Service Unit for Contractor work (anticipate 4 Government work days duration per Station Service Unit).

2. Contractor removal, installation, upgrade, and commissioning of all Penstock Drain Valves and piping, Draft Tube Drain Valves, and the Draft Tube Drain Valve Tee for Out of Service, Station Service Unit.

3. Government acceptance of Contractor work and Government verification Station Service Unit is ready to return to service.

4. Government Rewatering of Station Service Unit and return to service (anticipate 4 Government work days duration per Station Service Unit).

c. Each Station Service Unit will be Out of Service one time, only, for work on this contract. All required Station Service Unit work must be completed, commissioned, and accepted by the Government during this time.

d. The Government will determine the order Station Service Units are removed from service, and will notify the Contractor a minimum of 14 calendar days prior to Station Service Unit availability for Contractor work.

e. Station Service Units are critical to the Project operation. Once a Unit is removed from service, the Contractor must work expeditiously on valve replacements and upgrades in order to return the Station Service Unit to service with minimal delay.

1.7.1 Station Service Unit Outage Scheduling

a. Coordinate Station Service Unit Outage dates a minimum of 21 calendar days prior to anticipated start of each Station Service Unit Out of Service period. Conduct this coordination during Government's typical scheduled work days.

b. The Government will start to unwater the Station Service Unit contingent upon the following:

1. Outage dates have been coordinated as required.
2. All parts and equipment required to be replaced or upgraded during the coordinated outage (of the applicable Station Service Unit), is on-site, and accepted for installation by the KO.
3. No Station Service Units are Out of Service for work on this contract. See paragraph STATION SERVICE UNIT OUTAGE REQUIREMENTS, subparagraph b. At no time will more than 1 Station Service Unit be Out of Service for work on this contract.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

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INTEGRATING ANTITERRORISM (AT) AND OPERATIONS SECURITY (OPSEC)

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- 1.6 DOD FACILITY REQUIREMENTS (COMMON ACCESS CARD NOT REQUIRED)
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PART 2 PRODUCTS (NOT USED)

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SECTION 01 14 00.90 28

INTEGRATING ANTITERRORISM (AT) AND OPERATIONS SECURITY (OPSEC)

PART 1 GENERAL

The work covered by this section of the specifications consists of work common to more than one section of these TECHNICAL SPECIFICATIONS. This contract does not require access to or handling of classified material. This contract requires access to secured and restricted areas, sensitive information, or equipment. Secured area is considered any location where on-site work is performed by Contractor employees. The restricted areas, sensitive information, or equipment consists of everything inside the security fence at the project.

1.1 REFERENCES

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

U.S. ARMY (DA)

AR 190-13 (2011) The Army Physical Security Program

Army Directive 2014-05 (2014) Policy and Implementation
Procedures for Common Access Card
Credentialing and Installation Access for
Uncleared Contractors

Website for Department of the Army Regulations:
<http://armypubs.army.mil/>

Federal Acquisition Regulations (FAR)

FAR 52.204-9 (2015) Personal Identity Verification of
Contractor Personnel

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. The designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Anti Terrorism (AT) Level 1; I, C

iWATCH training; I, C

Level 1 OPSEC training; I, C

Pre-Screen Candidates Using E-Verify Program; I, C

Biographical Information; G, C

1.3 BIOGRAPHICAL INFORMATION SUBMITTAL

a. **Submit Biographical Information to the COR via email as a password protected pdf file or using the DoD SAFE site for all personnel requiring unescorted access or requiring access to government information systems. See paragraph "ACCESS AND GENERAL PROTECTION/SECURITY POLICY AND PROCEDURES" for additional information and details on items to submit.**

b. Submit a 4025, only, into RMS when biographical information submittal is sent by DoD SAFE.

1.4 AT LEVEL 1 TRAINING

All contractor employees, including all associated sub-contractor employees, requiring access to government facilities and controlled access areas shall complete **Anti Terrorism (AT) Level 1** awareness training within 30 days after Notice to Proceed, and annually thereafter until project completion. Submit certificates of completion for each employee to the contracting officer representative (COR) or to the contracting officer (if a COR is not assigned), within 5 calendar days after initial completion of training or annual refresher.

The contractor shall retain employee training certificates for the duration of the contract and maintain a current roster. The roster shall contain the names of employees who have completed the training along with their most recent training completion date. The contractor shall update the roster and resubmit to the contracting officer no later than 5 calendar days after completion of refresher training or a new employee completes certification.

AT Level I awareness training can be completed in approximately two (2) hours and is available at the following website:

<http://jko.jten.mil/courses/at11/launch.html>

1.5 ACCESS AND GENERAL PROTECTION/SECURITY POLICY AND PROCEDURES

All contractor employees, including all associated sub-contractor employees, shall comply with all applicable facility access and security policies and procedures. Local facility policies and procedures shall be provided by a government representative.

The contractor shall provide all information required for background checks to meet facility access requirements. Background checks will be performed by Walla Walla District Security Office. Contractor workforce must comply with all personal identity verification requirements of **FAR 52.204-9**, Personal Identity Verification of Contractor Personnel: <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=48:2.0.1.1.1.2.1.28>) as directed by DOD and/or local policy.

For each individual that will be working at this site, submit an excel spreadsheet containing the individual's full name and date of birth to satisfy the information required to conduct the background check. The COR will provide a copy of the excel spreadsheet to be used at the Pre-work meeting. Background check must be approved for an individual before they can access the site.

In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FPCON) at any facility change, the Government may require changes in contractor security matters or processes.

1.6 DOD FACILITY REQUIREMENTS (COMMON ACCESS CARD NOT REQUIRED)

Contractor employees, including all associated sub-contractor employees, shall comply with adjudication standards and procedures using the National Crime Information Center Interstate Identification Index ([NCIC-III](#)) and Terrorist Screening Database (TSDB) ([Army Directive 2014-05 / AR 190-13](#)), applicable facility and area access security policies and procedures (provided by a government representative, as NCIC and TSDB are available).

1.7 SUSPICIOUS ACTIVITY REPORTING TRAINING

Contractor employees, including all associated sub-contractor employees, are required to complete suspicious activity reporting training online. All [iWATCH training](#) videos are available on the internet at the link provided below.

a. iWATCH videos

Website:

<https://www.nww.usace.army.mil/Business-With-Us/Contracting/AT-OPSEC-for-Contractors>

This training is to inform employees of the types of behavior to watch for and instruct employees to report suspicious activity to the security representative. This training shall be completed within 30 calendar days of Notice to Proceed and within 30 calendar days of new employees commencing performance with the results reported to the COR or to the contracting officer (if a COR is not assigned), NLT 5 calendar days after the completion of the training.

1.8 CONTRACTS THAT REQUIRE OPSEC TRAINING

All new contractor employees, including all associated sub-contractor employees, will complete Level I OPSEC Training within 30 calendar days of their reporting for duty. Additionally, all employees must complete annual OPSEC awareness training until project completion. The contractor shall submit [Level 1 OPSEC training](#) certificates of completion for each affected employee, to the COR or to the contracting officer (if a COR is not assigned), within 5 calendar days after completion of training.

OPSEC awareness training is available at the following website: <https://securityawareness.usalearning.gov/opsec/index.htm> or it can be provided by the OPSEC Officer in presentation form which will be documented via memorandum.

1.9 EMPLOYEE ESCORT

All contractor employees, including all associated sub-contractor employees, who are not in possession of the appropriate security clearance or access privileges, will be escorted in sensitive or restricted areas and/or areas where they may be exposed to classified and/or sensitive materials.

1.10 PRE-SCREEN CANDIDATES USING E-VERIFY PROGRAM

The Contractor must pre-screen Candidates using the E-verify Program (<http://www.uscis.gov/e-verify>) website to meet the established employment eligibility requirements. The Vendor must ensure that the Candidate has two valid forms of Government issued identification prior to enrollment to ensure the correct information is entered into the E-verify system. Additional time may be required for foreign nationals to pre-screen.

An initial list of verified/eligible Candidates must be provided to the contracting officer, no later than 30 business days after receipt of Notice to Proceed.

*When contracts are with individuals, the individuals will be required to complete a Form I-9, Employment Eligibility Verification, with the designated Government representative. This Form will be provided to the Contracting Officer and shall become part of the official contract file.

Submit pre-screening results to the COR via email as a password protected pdf file.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

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DIVISION 01 - GENERAL REQUIREMENTS

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DRAIN VALVES, AND EQUALIZER VALVES UPGRADES
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PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01 22 00.00 28

MEASUREMENT AND PAYMENT

PART 1 GENERAL

In each instance, the contract price for an item shall constitute full compensation for furnishing all plant, labor, equipment, and materials, and for performing all operations required to complete the work included in the item as herein specified, or as otherwise approved.

1.1 RETAINAGE OF PAYMENT

Retainage in the amount of 10 percent of original contract award amount will be withheld until the final submittals, listed below, have been approved by the Government. The 10 percent retainage for final submittals will start once the Contractor has earned 90 percent of the original contract value. See SECTION 01 78 00.00 28 "CLOSEOUT SUBMITTALS" for additional information.

FINAL SUBMITTALS

- a. Final Shop Drawings.
- b. Final As-built Drawings.
- c. Final Record Drawings.
- d. Return of Government Issued Items.
- e. Final Operation and Maintenance Manuals and Parts Catalogs.
- f. Final Spare Parts submission.
- g. Complete all required training.

1.2 CLIN 0001 DRAINAGE HEADER SYSTEM REHABILITATION

"Drainage Header System Rehabilitation" will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0001, "Drainage Header System Rehabilitation", which price and payment shall be full compensation for all work required for rehabilitation of the Drainage Header System, complete, as specified and approved. Items included with this item shall include, but not be limited to the following:

- a. Cleanout Sump modifications at El 176, including the following:
 1. Concrete removal.
 2. Cleanout Sump Pump replacement.
 3. Valve and cleanout upgrades.
- b. Drainage Header blockage removal.
- c. Upgrades and reconnection of the Drainage system to the original Drainage Header (to include piping, valves, and all related items).
- d. Removal of Temporary Drainage header and related items.

1.3 CLIN 0002 UNWATERING PUMP AND DRAINAGE PUMP SYSTEM REHABILITATION

"Unwatering Pump and Drainage Pump System Rehabilitation" will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0002, "Unwatering Pump and Drainage Pump System Rehabilitation", which price and payment shall be full compensation for all work required for rehabilitation of the Unwatering Pump and Drainage Pump System, complete, as specified and approved. Items included with this item shall include, but not be limited to the following:

a. Unwatering Pump System Refurbishment and upgrades including the following:

1. Furnishing and installation of new Unwatering Pump.
2. Refurbishment and installation of existing Unwatering Pumps (one to become a spare).
3. Replacement of Unwatering Pump motors.
4. Upgrades to inlet and discharge piping, valves, and related items.
5. Replacement of Lubrication System.
6. Required concrete removal in Unwatering Sump.
7. Removal, testing for hazardous waste, and disposal of approximately 15 cubic yards of debris from the Unwatering sump. See SECTION 02 41 00.01 28 DEMOLITION for additional details.

b. Drainage Pump System Upgrades including the following:

1. Replacement of existing Drainage Pump.
2. Upgrades to inlet and discharge piping, valves, and related items.
3. Removal, testing for hazardous waste, and disposal of approximately 5 cubic yards of debris from the Drainage sump. See SECTION 02 41 00.01 28 DEMOLITION for additional details.

c. Replacement of MCC and other electrical work.

d. All Contractor supplied temporary power, and pump capacity.

e. Installation and removal of Unwatering Discharge Plug in the tailrace.

f. All testing and commissioning of refurbished and newly installed items.

g. Training of Project personnel on refurbished and newly installed equipment and all related costs.

1.4 CLIN 0003 EL 207 GALLERY - SCROLL CASE DRAIN VALVES, DRAFT TUBE DRAIN VALVES, AND EQUALIZER VALVES UPGRADES

"EL 207 Gallery - Scroll Case Drain Valves, Draft Tube Drain Valves, and

Equalizer Valves Upgrades" will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0003, "EL 207 Gallery - Scroll Case Drain Valves, Draft Tube Drain Valves, and Equalizer Valves Upgrades", which price and payment shall be full compensation for all work required for upgrades to all Scroll Case Drain Valves, Draft Tube Drain Valves, and Equalizer Valves, complete, as specified and approved. Items included with this item shall include, but not be limited to the following:

- a. Removal of existing and installation of new Scroll Case and Draft Tube drain valves.
- b. Refurbishing of Equalizer Valves.
- c. Removal of existing and installation of new Draft Tube Drain valve pit access ladders.
- d. Furnishing new spare Equalizer Valves.

1.5 CLIN 0004 STATION SERVICE UNITS - DRAIN VALVE UPGRADES

"Station Service Units - Drain Valve Upgrades" will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0004, "Station Service Units - Drain Valve Upgrades", which price and payment shall be full compensation for all work required for upgrades to all Station Service Unit Drain valves and related Station Service items, complete, as specified and approved. Items included with this item shall include, but not be limited to the following:

- a. Removal of existing and installation of new Draft Tube Drain Valves.
- b. Removal of existing and installation of new Penstock Drain Valves and rerouting of Penstock Drain piping.
- c. Removal of existing and installation of new Draft Tube Drain Valve pit access ladder.

1.6 CLIN 0005 DRAINAGE HEADER POINT REPAIR (OPTIONAL)

"Drainage Header Point Repair (Optional)" will be measured for payment as the number of lineal feet (LF) for Drainage Header Point Repair. Payment will be made at the unit price for CLIN No. 0005, "Drainage Header Point Repair (Optional)", which price and payment shall be full compensation for all work required for Drainage Header Point Repair, complete, as specified and approved. See SECTION 33 01 30.72 28 DRAINAGE HEADER POINT REPAIR, for additional information.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

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

AACE INTERNATIONAL (AACE)

AACE 29R-03 (2011) Forensic Schedule Analysis

AACE 52R-06 (2006) Time Impact Analysis - As Applied in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (2017) Project Schedules

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G, C
Preliminary Project Schedule; G, C
Initial Project Schedule; G, C
Periodic Schedule Update; G, C

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

2.1.1 Government Default Software

The Government intends to use Primavera P6.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system.

2.1.2.2 Other Than Primavera

If the contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15, SCHEDULES FOR CONSTRUCTION CONTRACTS. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate the Contractor is being reasonable if requested by the Contracting Officer.

3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the

disapproval of the preliminary, initial or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Limit durations of all non-procurement activities to 10 workdays or 15 calendar days.

3.3.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.3.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

- a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).
- b. Submission, review and acceptance of features that require design completion.
- c. Submission of mechanical/electrical/information systems layout drawings.
- d. Material Procurements.
- e. Long procurement activities.
- f. All Main Unit Turbine Outage dates.
- g. All Station Service Unit Turbine Outage dates.
- h. Start and completion date of each Main Unit Draft Tube Drain Valve replacement.

- i. All Definable Features of Work.
- j. Completion dates, constraints, and limited work windows as described in Clause 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984).
- k. Submission and approval of O & M manuals.
- l. Submission and approval of as-built drawings.
- m. Submission and approval of DD1354 data and installed equipment lists.
- n. Controls testing.
- o. Performance Verification testing.
- p. Other systems testing, if required.
- q. Government's pre-final inspection.
- r. Correction of punch list from Government's pre-final inspection.
- s. Final inspection.

3.3.5 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.6 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in [ER 1-1-11](#). This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: <http://rms.usace.army.mil>.

The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)

Field	Activity Code	Length	Description
6	PHAS	2	Phase of work
7	CATW	1	Category of work
8	FOW	20	Feature of work*
*Some systems require that FEATURE OF WORK values be placed in several activity code fields. The notation shown is for Primavera P6. Refer to the specific software guidelines with respect to the FEATURE OF WORK field requirements.			

3.3.6.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

3.3.6.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

- a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.
- b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE).

3.3.6.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities cannot have more than one Work Area Code.

Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

3.3.6.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the

Government's modification numbering system. An activity can have only one Modification Number Code.

3.3.6.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

3.3.6.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are procurement phase and construction phase. Each activity can have only one Phase of Work code.

- a. Code proposed fast track construction phases proposed to allow filtering and organizing the schedule by fast track design and construction packages.
- b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.3.6.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

3.3.6.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the approved QC plan.

An activity can have only one Feature of Work Code. Definable Feature of Work is defined in Section 01 45 04.00 28 CONTRACTOR QUALITY CONTROL.

3.3.7 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.3.7.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal and Work Restriction Calendar(s) and assign to seasonally or work restricted activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated days provided in the contract clause TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

3.3.9 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.3.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default

mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.11 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic. Lags are limited to 5 workdays.

- a. Leads (negative lags) are prohibited.
- b. Start to Finish (SF) relationships are prohibited.

3.3.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.3.16 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to

allow for proper schedule management.

3.3.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete.

3.3.18 Cost Loading of Closeout Activities

Cost load closeout activities in accordance with the retainage of payment for final submittals as specified in Section 01 22 00.00 28 "MEASUREMENT AND PAYMENT."

3.3.19 Anticipated Adverse Weather

Paragraph applicable to contracts with clause entitled TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Reflect the number of anticipated adverse weather delays allocated to a weather sensitive activity in the activity's calendar.

3.3.20 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

- a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.
- b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The schedule data, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Submit a PDF version of the [Preliminary Project Schedule](#), defining the Contractor's planned operations, at a summary level, a minimum of 1 week prior to the Pre-work meeting. Provide hardcopy versions of the Preliminary Project Schedule, for distribution at the Pre-work meeting. The Preliminary Project Schedule shall include NTP, major design activities, major preconstruction submittals (to include APP, EPP, and CQC), mobilization, construction/installation, testing/commissioning, demobilization.

3.4.2 Initial Project Schedule Submission

Submit the [Initial Project Schedule](#) (IPS) for approval within Sixty (60) calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.2.1 Pre-IPS Submission On-Site Schedule Review

- a. Coordinate with the Contracting Officer and establish the date of the Pre-IPS On-Site Schedule Review. Schedule Review to occur at the Project site within 14 calendar days after the Pre-Work meeting and prior to submission of the Initial Project Schedule.
- b. Key members of the Contractor staff shall attend this meeting including Project Manager, Project Superintendent, Project Scheduler, and any other members determined by the Government to be required.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress.

- a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject to the approval of the Government at the meeting.
- b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Current Project Schedule Data

Provide the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g. .xer). Also include the Narrative Report and all required Schedule Reports. Label submittals indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings. In addition, Contractor shall e-mail a copy to the Contracting Officer's Representative.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

- a. Identify and discuss the work scheduled to start in the next update period.
- b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.
- c. A description of current and anticipated problem areas or delaying factors and their impact and an explanation of corrective actions taken or required to be taken.
- d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.
- e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.
- f. Identify and discuss out-of-sequence work.

3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings

this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.5.4 Gantt Chart

The Gantt Chart is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.5.4.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated

schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete [Periodic Schedule Update](#) of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than Four (4) work days after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on industry standard [ACE 52R-06](#). Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time

impact.

3.8.3 Forensic Schedule Analysis (Retrospective Analysis)

Prepare an analysis for approval by the Contracting Officer based on industry standard [AAACE 29R-03](#).

3.8.4 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.5 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.6 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule

Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and/or may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

3.11 TRANSFER OF SCHEDULE DATA INTO RMS-CM

Import the schedule data into the RMS-CM. This data is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and matching electronic export from RMS-CM of the application for progress payment.

3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

If Primavera P6 is being used, request a backup file template (.xer) from the Government, if one is available, prior to building the schedule. The following settings are mandatory and required in all schedule submissions to the Government:

- a. Activity Codes must be Project Level, not Global or EPS level.
- b. Calendars must be Project Level, not Global or Resource level.
- c. Activity Duration Types must be set to "Fixed Duration & Units".
- d. Percent Complete Types must be set to "Physical".
- e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.
- f. Set Schedule Option for defining Critical Activities to "Longest Path".

- g. Set Schedule Option for defining progressed activities to "Retained Logic".
- h. Set up cost loading using a single lump sum labor resource. The Price/Unit must be \$1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" selected.
- i. Activity ID's must not exceed 10 characters.
- j. Activity Names must have the most defining and detailed description within the first 30 characters.
- k. Resource IDs and names must be unique to the contractor and project.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 33 00

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-- End of Section Table of Contents --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

The Contracting Officer (KO) may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Make certain that each submittal is complete and in sufficient detail to easily determine contract compliance.

- a. Use the same units of weights and measures as the contract drawings.
- b. Contractor's Quality Control (CQC) System Manager shall check and approve all items prior to submittal and stamp, sign, and date indicating action taken.
- c. Clearly identify any proposed variations from the contract requirements.
- d. Include drawings; literature (catalog cuts, diagrams, operating charts or curves); test reports; samples; O&M manuals (including parts list); certifications; warranties; and other necessary information.
- e. Obtain submittal approval prior to acquiring the covered material or equipment.

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

ERDC/ITL TR-19-6

(Aug 2019) A/E/C Graphics Standard,
Release 2.1

ERDC/ITL TR-19-7

(Aug 2019) A/E/C CAD Standard - Release 6.1

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required to be approved prior to commencing work on site. Submittals required prior to the start of the next major phase of the construction on a multi-phase contract. Schedules or tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Unless otherwise specified testing must have been completed within three (3) years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Safety Data sheets concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.2 Reviewing Authority

Office or designated person to review submittal.

1.2.2.1 Action Elements for Submittal Review

AE	Architect/Engineer
C	Engineering & Construction Division, Construction Branch
CS	Cybersecurity, Electrical Design Lead
DDC	Walla Walla District Dive Coordinator, Safety Office
A	Engineering & Construction Division, Structural Design "Architectural"
ECC	Operation's Division, Environmental Compliance Coordinator
ECCS	Operation's Division, Environmental Compliance Coordinator and Safety Officer
OPC	Operation's Division, Pesticide Coordinator
EL	Engineering & Construction Division, Electrical Design
GT	Engineering & Construction Division, Geotechnical Design
H	Engineering & Construction Division, Hydraulic Design
ME	Engineering & Construction Division, Mechanical Design
ST	Engineering & Construction Division, Structural Design

TL	Engineering & Construction Division, Technical Lead
HDC	Hydroelectric Design Center
GE	Engineering & Construction Division, General Engineering
GS	Engineering & Construction Division, Geospatial
PMP	Project Management Division, Planning
SO	Safety Office
SLE	Security Law Enforcement Officer
EOC	Engineering Design, Project Operations and Construction
CERL	Construction Engineering Research Laboratory
EC	Engineering and Construction

1.2.3 Work

As used in this SECTION, on- and off-site construction and/or fabrication required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

G - This code is for submittals requiring government approval that were listed in the original government-generated specs.

I - This code is used for both Government-generated submittals and Contractor-generated submittals. This code is reserved for submittals that don't require approval, e.g. test reports.

1.3.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire system must be checked, and other items as designated by the KO. Government approval is required for any variations from the Solicitation or Accepted Proposal and other items as designated by the KO. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.2 Information Only (I)

Submittals not requiring Government approval will be for information only (FIO).

1.4 CAD FILE REQUIREMENTS

The following applies to all CAD File submittals for this Contract, unless otherwise noted:

a. Furnish CAD files in the latest version of Bentley DGN format, for all CAD Files submitted by the Contractor in performance of this contract.

b. Unless otherwise noted, all CAD Files shall meet A/E/C CAD and Graphic Standards, as follows:

1. Compliant with the A/E/C CAD Standard [ERDC/ITL TR-19-7](#), A/E/C Graphics Standard [ERDC/ITL TR-19-6](#).

c. CAD Files shall have presentation graphics which can be edited by Bentley software (with the exception of photographs). Presentation graphics typically consist of drawing elements such as lines, arcs, shapes, text, and their attributes (e.g., color, width, line style).

d. If CAD files are developed in a format other than the specified Bentley software, furnish the following:

1. The converted CAD files in Bentley DGN format, in compliance with all specified CAD file requirements.
2. The original CAD files in their native file format.

e. In addition to CAD files, submit an ADOBE .pdf of each CAD File. The pdfs and the CAD files shall be identical.

f. Submit files using the DoD SAFE (Secure Access File Exchange) website as directed by the Contracting Officer.

1.4.1 CAD File Requirements for Design Drawings Created After Award.

In addition to the requirements listed above, when the Contractor prepares design drawings for requirements stated in the contract, for a modification, or as part of a Value Engineer Change Proposal, the following requirements apply:

a. Electronic files shall be .dgn format with element types that can be edited (i.e. no attached raster files, .dxf, or .dwg file formats will be accepted). The Contractor shall use the furnished Walla Walla District title block border and seed files to match AEC CAD standard for all drawings with the appropriate firm name included within the title block.

b. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Drawing files with external references or special fonts are not acceptable. All displayed graphic elements on all levels of the drawing file shall be part of the project drawing image. The drawing file shall not contain any graphic element that is not part of the drawing image.

c. Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

d. Design drawings may be prepared more like shop drawings to minimize construction submittals after final designs are approved. Therefore, the Contractor is encouraged to prepare and submit with the design drawings, appropriate connection, fabrication, layout, and product specific drawings.

e. The Contractor-originated drawings will be used as the basis for the record drawings. Shop drawings included as design documents shall comply with the same drawing requirements such as drawing form, sheet size, layering, lettering, and title block used in design drawings.

f. All final Contractor-originated design drawings shall be signed,

dated, and bear the seal of the registered architect or the registered engineer of the respective discipline. This seal shall be the seal of the Designer of Record for that drawing, and who is professionally registered for work in that discipline. Application of the electronic seal and signature accepts responsibility for the work shown thereon.

1.4.2 USACE CAD/BIM Technology Center

The USACE CAD/BIM Technology Center hosts all standard content for USACE. This content can be accessed through the CAD/BIM Technology Center website, <https://cadbimcenter.erdc.dren.mil>.

1.5 PREPARATION

1.5.1 Transmittal Form

The attached sample transmittal form (ENG Form 4025) is in RMS and shall be completed in RMS 3.0 Contractor Mode. Use ENG Form 4025 for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form.

Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5.2 Identifying Submittals

When submittals are provided by either the Prime Contractor or subcontractor, the Prime Contractor is responsible to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

- a. Project title, location, and date.
- b. Contract number.
- c. Date of the drawings and revisions.
- d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier Contractor associated with submittal.
- e. Section number of the specification section by which submittal is required.
- f. Submittal description (SD) number of each component of submittal.
- g. When a resubmission, add a number suffix on submittal description, for example, submittal 18 would become 18.1, to indicate the resubmission.
- h. Product identification and location in project.

The sequence of submission of drawings shall be such that all information is available for checking each drawing when it is received. Contract number and project shall be shown directly above the revision space on all drawings submitted. Drawing details and notes shall be of such quality and clarity and of sufficient definition and line weight as to permit sharp and totally legible scanning. All items shall be adequately identified to show where they will be used, and shall be referenced to applicable contract drawings and specification section.

All shop drawings submitted on a single transmittal (ENG form 4025) shall pertain to only one (1) specification section. Computed weights of all items shall be indicated on the shop drawings. Where drawings are submitted for either one (1) assemblies consisting of more than one (1) piece of equipment, or two (2) systems consisting of numerous components dependent one on the other for matching or compatible characteristics, complete information shall be submitted on all such related components at the same time.

1.5.3 Format For Electronic Submittals

The PDF file name of all submittals shall include the contract and transmittal number.

a. example: 19C0005 01 35 29.10 28-1 Item 1, 5

b. re-submittal example: 19C0005 01 35 29.10 28-1.1 Item 1, 5

All electronic submittals shall be in color and digitally searchable. All pages in the file shall be oriented so that no rotation or manipulation to view is needed.

1.5.4 Format for SD-02 Shop Drawings

All shop drawings prepared by the Contractor for this contract shall be formatted to American National Standards Institute (ANSI D).

a. All shop drawings shall have a title block prepared by the Contractor independent of any Contract Drawing. Include a revision block.

b. Title block shall include project title, sheet description, sheet number, contract number and issue date.

c. Revision block shall contain revision mark, revision description, date of revision.

d. Each Sheet shall have a unique number.

e. Each sheet shall have the Contractor Firm name on it.

f. CAD requirements for Shop Drawings include the following:

1. CAD file(s) meeting requirements of paragraph "CAD File Requirements" in this SECTION.

2. An Adobe .pdf copy of the corresponding CAD file(s). The pdfs and CAD files shall be identical.

3. Shop drawing format does not need to comply with A/E/C CAD and

Graphic Standards.

1.5.4.1 Shop Drawing Submittals

Shop Drawing Submittals are required as follows:

1. As shown and specified in the plans and specifications during design and Construction.
2. As specified in SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS, paragraph FINAL SHOP DRAWINGS.

1.5.5 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

- a. Present product data submittals for each section as required. Include table of contents, listing page and catalog item numbers for product data.
- b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains. Mark out all product data not pertaining to the product being submitted.
- c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.
- d. Provide all software code, user interfaces, logic and graphic information, manuals, documentation, etc. in English, only.
- e. Provide product data in English dimensions. Where product data are included in preprinted catalogs with Metric units only, submit English dimensions on separate sheet.
- f. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.
- g. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the KO. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.
- h. Collect required data submittals for each specific material, product, unit of work, or system into a single submittal. Mark the

submittal to clearly indicate what choices, options, and portions of the product offering will be incorporated into the work. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

i. Submit manufacturer's instructions prior to installation.

1.5.6 Format of SD-04 Samples

a. Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

(1) Sample of Equipment or Device: Full size.

(2) Sample of Materials Less Than 2 by 3 inches built up to 8-1/2 by 11 inches.

(3) Sample of Materials Exceeding 8-1/2 by 11 inches: Cut down to 8-1/2 by 11 inches and adequate to indicate color, texture, and material variations.

(4) Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

(5) Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.

(6) Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

(7) Sample Panel: 4 by 4 feet.

(8) Sample Installation: 100 square feet.

b. Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three (3) units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

c. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use.

d. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

e. When color, texture or pattern is specified by naming a particular manufacturer and style, include one (1) sample of that manufacturer and style, for comparison.

1.5.7 Format of SD-05 Design Data and SD-07 Certificates

Provide design data and certificates formatted for 8-1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

1.5.8 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

a. Provide reports formatted for 8-1/2 by 11 inches paper in one complete file.

b. Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.5.9 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When the submittal includes a document which is to be used in the project or become part of the project record, other than as a submittal, do not apply Contractor's approval stamp to the document, but to a separate sheet accompanying the document.

1.6 QUANTITY OF SUBMITTALS

The quantities listed below are for all submittals except for the closeout quantities of submittals required in SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS.

1.6.1 Electronic Copies

Each submittal shall be submitted in PDF format, unless otherwise noted, through RMS CM and via e-mail to the COR and the transmittal mailbox for the Lower Snake River Resident Office:

LSCRO.Submittals@usace.army.mil

Submittal files too large to send via e-mail shall be submitted using the DoD SAFE (Secure Access File Exchange) website as directed by the Contracting Officer.

1.6.2 Hard Copies (HC)

In addition to the electronic submission required for all submittals, hard copies shall also be submitted for submittals designated with a (HC) in the submittal title or as specifically designated by type of submittal or as stated in the technical specification for that given submittal.

submittal title example: Draft O&M Manuals and Parts Catalogs (HC)

1.6.2.1 Hard Copy Submittals

SUBMITTALS WITH AN HC DESIGNATED REQUIRE A HARD COPY SUBMISSION IN THE QUANTITIES DISCUSSED BELOW:

Submit two (2) paper copies of all (HC) designated submittals to the address below, unless otherwise noted. Each copy shall be sent with the ENG Form 4025.

District Commander

ATTN: CENWW-EC-C
Walla Walla District Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362-1876

1.6.3 Official Receipt of Transmittals

Official receipt of a transmittal that is sent electronically begins the business day after the Government receives that transmission by e-mail or through the Safe Access File Exchange website as directed by the Contracting Officer.

Official receipt of the transmittal that also requires a hard copy submission only begins when the Government receives the hard copy and not the electronic submission.

1.6.4 Number of Samples SD-04 Samples

ALL SD-04 SUBMITTALS REQUIRE A HARD COPY SUBMISSION IN THE QUANTITIES DISCUSSED BELOW:

- a. Submit two (2) samples, or two (2) sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to Contractor.
- b. Submit one (1) sample panel. Include components listed in technical section or as directed.
- c. Submit one (1) sample installation.
- d. Submit one (1) sample of non-solid materials, for example paint.
- e. Submit to address shown in paragraph "Hard Copy Submittals" above.

1.6.5 Number of Copies of SD-10 Operation and Maintenance Data

SD-10 SUBMITTALS WITH AN HC DESIGNATED REQUIRE A HARD COPY SUBMISSION IN THE QUANTITIES DISCUSSED BELOW:

Submit in compliance with SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS.

Submit one (1) copy each to the following addresses with remainder sent to the District office address. See paragraph "Hard Copy Submittals":

Lower Snake/Columbia Resident Office
PO Box 70
Umatilla, OR 97882

Operations Project Manager
ATTN: Tech Section
McNary Project Office
P.O. Box 1230
Umatilla, OR 97882-1230

USAED Portland District
Hydroelectric Design Center (HDC)
ATTN: Designer
333 S.W. First Avenue, 8th Floor

Portland, OR 97204-3495

1.7 INFORMATION ONLY SUBMITTALS

Approval of the KO is not required on information only submittals. The following list applies to all for information only submittals:

- a. The Contractor is not relieved from the obligation to furnish material conforming to the plans and specifications.
- b. The KO reserves the right to require the Contractor to resubmit any item found not to comply with the contract, and is not prevented from requiring removal and replacement of nonconforming material incorporated in the work.
- c. Does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.8 VARIATIONS REQUESTS

Variations from contract requirements require Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.8.1 Considering Variations

Discussion with KO prior to submission will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP). Specifically point out variations from contract requirements in transmittal letters. Failure to point out variations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.8.2 Proposing Variations

When proposing a variation / variations, deliver written request to the KO, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed variations requested by the Contractor. Set forth in writing the reason for any variations and annotate such variations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

1.8.3 Warranting That Variations Are Compatible

When delivering a variation for approval, Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.8.4 Review Schedule Is Modified

In addition to the normal submittal review period, a period of Ten (10) working days will be allowed for consideration by the Government of submittals with variations.

1.9 SUBMITTAL REGISTER

The Submittal Register will be loaded into RMS by the Government. A copy of the Submittal Register is attached to the end of this SECTION with the following fields filled in:

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal. The Contractor is responsible for maintaining the submittal register in accordance with SECTION 01 45 01.00 28 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE(RMS CM)

1.9.1 Use Of Submittal Register

Submit submittal register with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.9.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract:

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.9.3 Approving Authority Use of Submittal Register

Update the following fields in the Government-furnished submittal register program:

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

1.9.4 Contractor Action Codes

DESIGN BID BUILD SUBMITTALS			
Submittal Classifications shown in UFGS Sections	Submittal Classification	Corresponding SpecsIntact Submittal Register Code which is populated in the SI Submittal Register. Software Limitations: (The software shows one character delineation in the SpecsIntact Submittal Register)	RMS - The following Submittal Classifications are populated in RMS when the SpecsIntact Submittal Data File is pulled into RMS)
G	Submittal requires Government Approval	G	GA
I	Submittal is For Information Only (FIO)	I	FIO
S	Submittal is for documentation of Sustainable requirements	S	S/FIO

1.9.5 Contractor Action Code and Action Code

Entries for columns (j) and (o), are to be used as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.9.6 Copies Delivered to the Government

Deliver a PDF copy of the submittal register, updated by Contractor, to Government with each invoice request.

1.10 SCHEDULING

Schedule, and submit concurrently, submittals covering component items forming a system or items that are interrelated. Submit all related certifications along with the pertinent drawings. No delay, damages, or time extensions will be allowed for time lost due to late submittals.

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.
- b. Submittals called for by the contract documents will be listed in the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the KO does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."
- c. Re-submit register, and update monthly, with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."
- e. Allow the Government Thirty (30) calendar days to review submittals and for each resubmittal. The 30-day period shall commence at date of receipt of transmittals from the Contractor by the Government and the period shall end at date of signature of Approving Authority on the ENG Form 4025.

Within Fifteen (15) calendar days of receipt of Notice To Proceed provide, for approval by the KO, the following schedule of submittals in the Project Schedule submittal:

- a. A schedule of shop drawings and technical submittals required by the specifications and drawings. Indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date.
- b. A separate schedule of other submittals required under the contract but not listed in the specifications or drawings. Schedule will indicate the contract requirement reference; the type or title of the submittal; the Contractor's anticipated submission date and the approved need date (if approval is required).

See SECTION 01 32 01.00 28 PROJECT SCHEDULE, paragraph PRELIMINARY PROJECT SCHEDULE SUBMISSION, for additional information.

1.11 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Government, the KO will:

- a. Note date on which submittal was received from QC system Manager.
- b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph "Review Notations" along with markings appropriate for action indicated.

The Government will provide the appropriate review notation for submittals, upon completion of review. The official response will only be through RMS.

1.11.1 Review Notations

KO review will be completed within Thirty (30) calendar days after date of receipt of submittal. Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked with an action code of "A" are "approved" or "accepted" and authorize the Contractor to proceed with the work covered.
- b. Submittals marked with an action code of "B" are "accepted as noted on drawing", "accepted except as noted on drawing", and authorize the Contractor to proceed with the work covered once they make the changes to the submittal provided they take no exception to the corrections.
- c. Submittals marked with an action code of "C" are "accepted as noted, resubmission required", and authorize the Contractor to proceed with the work covered provided they take no exception to the corrections. The Contractor shall resubmit with appropriate changes to address the Government notations.
- d. Submittals marked with an action code of "E" are "disapproved", "not accepted", and indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved or accepted.
- e. Submittals marked with an action code of "F" are Submittals marked "receipt acknowledge" and will indicate submittal has been received but not necessarily reviewed by the Government. Comments to these submittals may or may not be provided; however the Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract.
- f. FIO submittals marked with an action code of "FX" are Submittals marked as "does not comply as noted with contract requirements" and indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes for Government approval or acceptance. No work shall proceed

for this item until resubmittal is received.

1.12 DISAPPROVED OR REJECTED SUBMITTALS

Make corrections required by the KO. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.13 APPROVED/ACCEPTED SUBMITTALS

The KO's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist. The Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

After submittals have been approved or accepted by the KO, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.14 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not to be construed to change or modify any contract requirements. Before submitting samples, assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved. Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at their expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at their expense, if so requested. Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service. Samples of various materials or equipment delivered on-site or in place may be taken by the KO for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements. Approval of the Contractor's samples by the KO does not relieve the Contractor of their responsibilities under the contract.

1.15 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.16 STAMPS

Stamps used by the CQC system manager on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACT NUMBER
CONTRACTOR
(Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attach sheets(s)
SIGNATURE: _____
TITLE: CQC SYSTEM MANAGER
DATE: _____

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

U.S. Army Corps of Engineers (USACE) TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.				DATE	TRANSMITTAL NO.
SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)					
TO:		FROM:		CONTRACT NO.	
SPECIFICATION SEC. NO. (Cover only one section with each transmittal)		PROJECT TITLE AND LOCATION		THIS TRANSMITTAL IS FOR: (Check one) <input type="checkbox"/> FIO <input type="checkbox"/> GA <input type="checkbox"/> DA <input type="checkbox"/> CR <input type="checkbox"/> DA/CR <input type="checkbox"/> DA/GA	
ITEM NO. (See Note 3)	DESCRIPTION OF SUBMITTAL ITEM (Type size, model number/etc.)	SUBMITTAL TYPE CODE (See Note 8)	NO. OF COPIES	CONTRACT DOCUMENT REFERENCE	
				SPEC. PARA. NO.	DRAWING SHEET NO.
a.	b.	c.	d.	e.	f.
REMARKS			I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.		
			NAME OF CONTRACTOR		SIGNATURE OF CONTRACTOR
SECTION II - APPROVAL ACTION					
ENCLOSURES RETURNED (List by item No.)		NAME AND TITLE OF APPROVING AUTHORITY		SIGNATURE OF APPROVING AUTHORITY	
				DATE	

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.
3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.
4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.
5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.
6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing the detailed reason for the variation.
7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.
8. When submittal items are transmitted, indicate the "Submittal Type" (SD-01 through SD-11) in column c of Section I.
Submittal types are the following:

SD-01 - Preconstruction	SD-02 - Shop Drawings	SD-03 - Product Data	SD-04 - Samples	SD-05 - Design Data	SD-06 - Test Reports
SD-07 - Certificates	SD-08 - Manufacturer's Instructions	SD-09 - Manufacturer's Field Reports	SD-10 - O&M Data	SD-11 - Closeout	
9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:

A -- Approved as submitted.	F -- Receipt acknowledged.
B -- Approved, except as noted on drawings. Resubmission not required.	X -- Receipt acknowledged, does not comply with contract requirements, as noted.
C -- Approved, except as noted on drawings. Refer to attached comments. Resubmission required.	G -- Other action required (<i>Specify</i>)
D -- Will be returned by separate correspondence.	K -- Government concurs with intermediate design. (<i>For D-B contracts</i>)
E -- Disapproved. Refer to attached comments.	R -- Design submittal is acceptable for release for construction. (<i>For D-B contracts</i>)
10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

SUBMITTAL REGISTER

CONTRACT NO.
W912EF22R0015

TITLE AND LOCATION

MNA Powerhouse Drainage_Unwatering_Equalization System Rehab

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASS SIF CATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 11 01.00 28	SD-01 Preconstruction Submittals														
			Property Management Plan	1.7	G C												
			Equipment List	1.8	I C												
			Pre-Construction On-Site	1.4.1	I C												
			Inspection Report														
			Air Purity Control Program	1.13	I C												
			Project Superintendent	1.16	I C												
			SD-07 Certificates														
			Key Personnel Substitution	1.17	G C												
			SD-11 Closeout Submittals														
			Training Manuals	1.15	G C												
		01 14 00.10 28	SD-01 Preconstruction Submittals														
			Access To Automated	1.8	G SLE												
			Information Systems														
			Employee Training And	1.4	I C												
			Identification Summary														
			Elevator Protection Plan	1.5.3	G C												
			SD-07 Certificates														
			Crane Operator Qualifications	1.7.1	G C												
		01 14 00.90 28	SD-01 Preconstruction Submittals														
			Anti Terrorism (AT) Level 1	1.4	I C												
			iWATCH training	1.7	I C												
			Level 1 OPSEC training	1.8	I C												
			Pre-Screen Candidates Using	1.10	I C												
			E-Verify Program														
			Biographical Information	1.3	G C												

SUBMITTAL REGISTER

CONTRACT NO.
W912EF22R0015

TITLE AND LOCATION

MNA Powerhouse Drainage_Unwatering_Equalization System Rehab

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 32 01.00 28	SD-01 Preconstruction Submittals														
			Project Scheduler Qualifications	1.3	G C												
			Preliminary Project Schedule	3.4.1	G C												
			Initial Project Schedule	3.4.2	G C												
			Periodic Schedule Update	3.6.2	G C												
		01 35 10.00 28	SD-01 Preconstruction Submittals														
			Safe Practices Manual	1.6	G DDC												
			Emergency Management Plan	1.6	G DDC												
			Dive Personnel Qualifications	1.6	G DDC												
			Dive Station Equipment	1.6	G DDC												
			Certifications and Certificates for Air Quality														
			Dive Plan	1.7	G DDC												
			Activity Hazard Analysis (AHA)	1.7	G DDC												
			Safe Clearance	1.8	G DDC												
			SD-06 Test Reports														
			Underwater Video	2.1	I C												
		01 35 29.10 28	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7	G C												
			Activity Hazard Analysis (AHA)	1.8	G C												
			Safe Clearance	1.9	I C												
			Authorized Individuals	1.9	I C												
			Standard Lift Plan	1.7.2.2	G C												
			Critical Lift Plan	1.7.2.3	G C												
			Lead Compliance Plan	1.7.2.7	G ECC												

SUBMITTAL REGISTER

CONTRACT NO.
W912EF22R0015

TITLE AND LOCATION

MNA Powerhouse Drainage_Unwatering_Equalization System Rehab

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASS SIF CATION REVIEW OR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 29.10 28	State licensed Journeyman Electrician	1.7.2.7.2	I C												
			Asbestos Hazard Abatement Plan	1.7.2.8	G ECC												
			Crane Wheel And Outrigger Loading Diagram And Deck Protection For Outriggers	1.13.5	G ST												
			SSHO And Alternate SSHO	1.6.1.1	G C												
			Competent Person Qualifications	1.6.1.2	G C												
			Sump Access Safety Plan	1.7.2.1.1	G C												
			SD-06 Test Reports														
			Monthly Exposure Reports	1.4	I C												
			Notifications and Reports	1.13	I C												
			Accident Reports	1.13.2	I C												
			LHE Inspection Reports	1.13.3	I C												
			SD-07 Certificates														
			Crane Operators/Riggers	1.6.1.3	I C												
			Confined Space Entry Permit	1.10.1	I C												
			Hot Work Permit	1.10.1	I C												
			Certificate of Compliance	1.13.4	I C												
			License Certificates	1.15	I C												
			Radiography Operation Planning	1.15.1	G C												
			Work Sheet														
		01 45 04.00 28	SD-01 Preconstruction Submittals														
			Contractor Quality Control (CQC) Plan	3.2	G C												
		01 55 10.00 28	SD-01 Preconstruction Submittals														

SUBMITTAL REGISTER

CONTRACT NO.
W912EF22R0015

TITLE AND LOCATION

MNA Powerhouse Drainage_Unwatering_Equalization System Rehab

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	CLASSIFICATION GOVT OR CLASS / REVIEW OR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 55 10.00 28	Transport Loading Diagrams	1.5	G ST												
			Dust Control Plan	1.11	I C												
		01 57 20.00 28	SD-01 Preconstruction Submittals														
			Environmental Protection Plan	1.6	G ECC												
			SD-06 Test Reports														
			TCLP Testing	3.3.2	I ECC												
			TCLP Testing - Unwatering Sump	3.4	I ECC												
			Debris														
			TCLP Testing - Drainage Sump	3.4	I ECC												
			Debris														
			SD-07 Certificates														
			Notification to The Recycler	3.3.2	I ECC												
			Notification To The Disposal Site	3.4	I ECC												
			Recycling Facility	3.3.2	I ECC												
			Disposal Facility	3.4	I ECC												
		01 78 00.00 28	SD-10 Operation and Maintenance														
			Data														
			Draft O&M Manuals and Parts	3.6.1	G C												
			Catalogs														
			Final Operation And Maintenance	3.6.1	G C												
			Manuals and Parts Catalogs (HC)														
			SD-11 Closeout Submittals														
			Spare Parts	2.1	G C												
			Final Shop Drawings	3.1	G C												
			Working As-Built Drawings	3.2.1	I C												
			Final As-Built Drawings	3.3	G C												

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		01 78 00.00 28	Record Drawings	3.4	G GS												
			Government Issued Items	3.7	G C												
		01 91 00.00 28	SD-01 Preconstruction Submittals														
			Equipment Commissioning	1.5.1	G C												
			Testing Plan and Schedule														
			Commissioning Agent's	1.6.1	G C												
			Qualifications														
		02 24 10.02 28	SD-01 Preconstruction Submittals														
			Dewatering Plan	1.5	G ME												
		02 41 00.01 28	SD-07 Certificates														
			Demolition Plan	1.4.1	G C												
			Notification	1.3	G C												
		02 83 33.01 28	SD-01 Preconstruction Submittals														
			Qualified Personnel	1.5	G SO												
			SD-03 Product Data														
			Metal Binding Product	3.1.1	G ECC												
			Manufacturer's Product Data	3.1	G ECC												
			Sheet														
			SD-06 Test Reports														
			Test Results	1.3.2	G SO												
			SD-07 Certificates														
			Testing Laboratory	1.3.2	G SO												
			Salvaged Material Containing	3.2.2.1	I ECC												
			Contaminated Waste														
			Copies of Notifications	3.2.2.1	I ECC												
		03 30 70.00 28	SD-01 Preconstruction Submittals														

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		03 30 70.00 28	Concrete Removal and Disposal Plan	3.4.1	I ST												
			Core Drilling Procedure	3.4.4	I ST												
			Concrete Imaging Report	3.4.4	I ST												
			Grout Pads	3.5.5	I ST												
			SD-03 Product Data														
			Non-shrink grout	2.1	I ST												
			Epoxy Adhesive Grout	2.2	I ST												
			Dry Packaged Concrete	2.3	I ST												
			Mortar	2.5	G ST												
			Reinforcing Steel Bar	2.4	I ST												
			Skim Coat	3.4.10	G ST												
			SD-06 Test Reports														
			Sump Investigation	3.6	I ST												
		05 05 20.00 28	SD-01 Preconstruction Submittals														
			Installer Qualifications	1.6.1.1	G ST												
			Anchor Installation Submittal	1.5.2	G ST												
			Anchor Design Submittal	1.5.1	G ST												
			SD-03 Product Data														
			Non-Shrink, Non-Metallic Grout	3.1.3	G ST												
			SD-06 Test Reports														
			Inspections Report	3.3.4	G ST												
			SD-08 Manufacturer's Instructions														
			Non-Shrink, Non-Metallic Grout	3.1.3	G ST												
		05 50 14.00 28	SD-02 Shop Drawings														
			Detail Drawings	1.3.1	G ST												

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		05 50 14.00 28	Welding Procedures	2.4.2.1.1	G ST												
			Welding Repair Plan	2.5.4	I ST												
			SD-03 Product Data														
			Filler Metal	2.4.2.1.3	I ST												
			SD-06 Test Reports														
			Tests, Inspections, and Verifications	2.5	I ST												
			Welding Procedures Qualified	2.4.2.1.1	G ST												
			SD-07 Certificates														
			Welding Qualifications	1.3.2	I ST												
			Application Qualification for Steel Studs	2.4.2.2.1	I ST												
			Weld Inspection Log	2.5.3.1	I ST												
			Certified Welding Inspector	2.5.3.1	I ST												
			Nondestructive Testing Personnel	2.5.3.2.1	I ST												
		06 82 14.00 28	SD-02 Shop Drawings														
			Installation Drawings	1.3	G ST												
			Installation Drawings	2.1.1	G ST												
			SD-03 Product Data														
			FRP Pipe and Tube	2.1.2	I ST												
			Railings/Guards	2.1.2	G ST												
			Anchorage Materials	2.1.2	G ST												
			Adhesives	2.1.2	I ST												
			Resins	2.1.2	I ST												
			Hardeners	2.1.2	I ST												
			SD-05 Design Data														

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		06 82 14.00 28	Structural Performance Of Guardrails	2.1.4	I ST												
			SD-06 Test Reports														
			Ultraviolet Test Reports	2.1.3	I ST												
			Thermal Expansion Test Reports	2.1.3	I ST												
			Flame Spread Test Reports	2.1.3	I ST												
		13 48 00.01 28	SD-01 Preconstruction Submittals														
			Grout Foundation	1.5	G ST												
			SD-02 Shop Drawings														
			Equipment Detail Drawings	1.5	G ST												
			Systems Detail Drawings	1.6	G ST												
			SD-05 Design Data														
			Structural Design Calculations for Seismic Restraints of Equipment	1.5	G ST												
			Structural Design Calculations for Seismic Restraints of Systems	1.6	G ST												
			Pipe Support Materials	2.1	G ME												
			Piping Supports	2.1.3	G SE												
		22 11 00.01 28	SD-01 Preconstruction Submittals														
			Identification Tags	3.4.1	G C												
			Valve Operator Color Schedule	2.2.1	G ME												
			SD-02 Shop Drawings														
			Piping Drawings	1.5	G ME												
			SD-03 Product Data														
			Resilient Seat Wedge Gate	2.2.1	G ME												
			Isolation Valves														

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		22 11 00.01 28	Silent Check Valves	2.2.3	G ME												
			Double Wafer Check Valve	2.2.4	G ME												
			Unwatering Discharge Plug	2.2.5	G ME												
			Ball Valves	2.2.6	I ME												
			Equalizer Valve Packing	2.2.2.1	I ME												
			Spare Equalizer Valves	2.2.2	I ME												
			Miscellaneous Piping Materials	2.3	I ME												
			SD-06 Test Reports														
			Water Piping Test Plan	3.2.2.1	G ME												
			Discharge Piping Weld Test	3.3	I ME												
		25 05 11.00 28	SD-01 Preconstruction Submittals														
			Account Level Permissions	1.8.1	G CS												
			Listing (Encrypted)														
			Sensitive Data Protection Plan (Encrypted)	1.3.1	G CS												
			SD-02 Shop Drawings														
			Network Diagram (Encrypted)	2.4	G CS												
			System Data Flow Diagram (Encrypted)	2.4	G CS												
			SD-03 Product Data														
			Pre-Design Software Listing (Encrypted)	2.1	G CS												
			Pre-Design Hardware Listing (Encrypted)	2.2	G CS												
			Complete Software Listing (Encrypted)	2.1	G CS												

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		25 05 11.00 28	Complete Hardware Listing (Encrypted)	2.2	G CS												
			Ports, Protocols, and Services List (Encrypted)	2.3	G CS												
			Certificate Protection Status (Encrypted)	1.13	G CS												
			Backup Software (Encrypted)	2.7.1	I CS												
			SD-05 Design Data														
			Network Configuration Files (Encrypted)	1.14	G CS												
			Deviations from the STIGs (Encrypted)	3.2	G CS												
			SD-06 Test Reports														
			SCAP Tool Scan (Encrypted)	3.2	G CS												
			Antivirus/Antimalware Scan (Encrypted)	2.1.1	G CS												
			SD-07 Certificates														
			Contractor Personnel Qualifications	1.5	G CS												
			SD-11 Closeout Submittals														
			Vulnerability Resolution Report (Encrypted)	1.7	G CS												
			Comprehensive Password List (Encrypted)	2.5	G CS												
			Comprehensive Passphrase List (Encrypted)	2.5	G CS												

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		25 05 11.00 28	Comprehensive Account List (Encrypted)	2.6	G CS												
			Initial Backups (Encrypted)	2.7	G CS												
			BIOS Protection Passwords (Encrypted)	1.11	G CS												
			BIOS Protection Passphrases (Encrypted)	1.11	G CS												
		26 05 00.00 28	SD-03 Product Data														
			Cable Tray	2.1	G EL												
			Liquid-tight Flexible Steel Conduit	2.2.1	I EL												
			Rigid Steel Conduit	2.2.2	I EL												
			Fittings	2.2.3	I EL												
			Outlet Boxes, Pull Boxes, And Junction Boxes	2.3	I EL												
			SD-05 Design Data														
			Cable Tray Design	2.1	G EL S												
			SD-10 Operation and Maintenance Data														
			Operation and Maintenance Manual	3.4	G EL												
			SD-11 Closeout Submittals														
			Data for Arc Flash Study	1.8	G EL												
		26 05 19.00 28	SD-03 Product Data														
			Installation Instructions	3.1	G EL												
			Medium-voltage power cable	2.1	G EL												
			Low-voltage power cable	2.2	G EL												

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		26 05 19.00 28	Multiconductor control cable	2.3	G EL												
			Single-conductor control cable	2.4	G EL												
			Instrumentation cable	2.5	G EL												
			Grounding conductor	2.6	G EL												
			Ethernet cable	2.7	G EL												
			Wire and Cable	Part 2	G EL												
			SD-05 Design Data														
			Cable and conduit schedule	3.2	G EL												
			SD-06 Test Reports														
			Production Test Reports	3.3.5	G EL												
			Field Test Reports	3.3.5	G EL												
			Continuity Tests	3.3.3.4.2	G EL												
			SD-10 Operation and Maintenance Data														
			Cable and conduit schedule	3.2	G EL												
		26 08 00.00 28	SD-06 Test Reports														
			Acceptance tests and inspections	3.1	G EL												
			SD-07 Certificates														
			Qualifications	1.3.1	G EL												
			Acceptance test and inspections procedure	1.3.3	G EL												
		26 20 00.02 28	SD-03 Product Data														
			Circuit Breakers	2.6.1	I EL												
			Panelboards	2.6	I EL												
			Transformers	2.4	G EL												

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		26 20 00.02 28	SD-10 Operation and Maintenance Data														
			Operation and Maintenance Data	1.4	G EL												
		26 24 19.00 28	SD-02 Shop Drawings														
			Motor Control Center Equipment Drawings	2.1	G EL												
			SD-03 Product Data														
			Motor Control Center Equipment	1.4	G EL												
			Motor Control Center Equipment	2.1	G EL												
			Spare Parts	1.5.2	G EL												
			SD-06 Test Reports														
			Factory Test Procedures	2.7	G EL												
			Factory Test Results	2.7.1.4	G EL												
			Final Test Reports	3.2.1	G EL												
			Acceptance Tests	3.2.1	G EL												
			SD-07 Certificates														
			Motor Control Center Certification	2.7.1.4	G EL												
			SD-11 Closeout Submittals														
			Warranty	3.3	G EL												
			Manufacturer's Instructions	3.3	G EL												
		26 29 01.00 28	SD-02 Shop Drawings														
			Motors	2.2	G EL												
			SD-03 Product Data														
			Motor Curves	2.2.5	G EL												
			Duty Cycle	2.2.2.3	G EL												
			Motors	2.2	G EL												

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		26 29 01.00 28	Antireverse Device	2.2.3.3	I EL												
			Resistance Temperature Devices	2.3	G EL												
			Vibration Sensors	2.4	G EL												
			Hour meter	2.2.7.7.1	G EL												
			SD-06 Test Reports														
			Factory Tests	2.7	G EL												
			Field Tests	3.2	G EL												
			Acceptance Checks And Tests	3.2	G EL												
			SD-10 Operation and Maintenance														
			Data														
			Instructions	2.2	G EL												
		27 21 10.00 28	SD-01 Preconstruction Submittals														
			Fiber Test Plan	3.3.2	G EL												
			Quality Control Plan	1.7	G EL												
			Cable Installation Plan	3.2	G EL												
			SD-03 Product Data														
			Manufacturer's Catalog Data	1.3	G EL												
			Manufacturer's Catalog Data	1.3	G EL												
			Material And Equipment List	1.4	G EL												
			Material And Equipment List	1.4	G EL												
			SD-06 Test Reports														
			Fiber Test Report	3.3.3.2	G EL												
			SD-07 Certificates														
			Fiber Optic Systems	1.6	G EL												
			Qualifications	1.6	G EL												
			SD-08 Manufacturer's Instructions														

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		27 21 10.00 28	Installation Procedures	3.1	G EL												
			SD-10 Operation and Maintenance Data														
			Operations And Maintenance Manuals	1.3	G EL												
		33 01 30.16 28	SD-01 Preconstruction Submittals														
			Cleaning Procedures	3.1	G ME												
			SD-06 Test Reports														
			Documentation Of CCTV Inspection	3.2.1.2	G ME												
			SD-07 Certificates														
			Disposal Plan	1.2.1	G C												
			CCTV Technician's Qualifications	1.4.1	G C												
		33 01 30.72 28	SD-01 Preconstruction Submittals														
			Contractor Quality Control (CQC) Plan	1.5.2	G C												
			Sequence Of Liner Installation	3.2.1	G ME												
			Disposal Of Process Water	1.7.1.1	I C												
			SD-03 Product Data														
			Lubricant	2.2.1	I ME												
			Fabric Tube	2.2.2	I ME												
			CIPP Product Data	2.2.2.3	G ME												
			Catalyst	2.2.2.3	I ME												
			Raw Resin Data	2.2.2.3	I ME												
			Flexible Membrane	2.2.2.3	I ME												
			SD-05 Design Data														

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
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			Final PLC Ladder Logic Program	2.1.3.2	I EL												

SUBMITTAL REGISTER

CONTRACT NO.
W912EF22R0015

TITLE AND LOCATION						CONTRACTOR											
MNA Powerhouse Drainage_Unwatering_Equalization System Rehab																	
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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
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		40 94 43.00 28	HMI Program	2.2.2	G EL												
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		40 94 43.00 28	Numeric Display	2.4.13	G EL												
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CONTRACTOR

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		40 94 43.00 28	SD-10 Operation and Maintenance Data														
			Operation And Maintenance Manual	3.9	G EL												
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		43 21 39.01 28	SD-01 Preconstruction Submittals														
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DIVING

PART 1 GENERAL

1.1 GENERAL

a. This section covers the general requirements for contract diving operations to be performed as specified within this contract. Perform diving in accordance with the latest edition of the U.S. Army Corps of Engineers Safety and Health Requirements Manual [EM 385-1-1](#), Section 30: DIVING OPERATIONS in accordance with Clause ACCIDENT PREVENTION (52.236-13) and elements of the following references: [29 CFR 1910](#), Subpart T, the latest edition of [NAVSEA SS521-AG-PRO-010](#) U.S. Navy Diving Manual inclusive of all other references listed therein, [NWW QMS 16001](#), Appendix Q Diving Safety Program, [CPL 02-00-151](#) OSHA Instruction on Commercial Diving Operations, and the latest edition of [ADCI](#) International Consensus Standards for Commercial Diving and Underwater Operations.

b. All diving operations shall be considered incidental to the work specified elsewhere herein. No separate payment for diving work will be made.

c. See SECTION [01 55 10.00 28](#) CONTRACTOR WORK, ACCESS AND STORAGE AREAS for Boat Restricted Zone information.

1.2 ANTICIPATED DIVING ENVIRONMENT

Diving area in or near the South shore off the tailrace deck. Flows in the tailrace have not been verified, but are anticipated to be less than 1 knot during dive operations. See paragraph "Unit Outage" for additional information. Tailwater eddies and turbine boil may create currents and also affect diving. Water is anticipated to be very cloudy with poor visibility. The Anticipated Diving Environment consists of the following:

- a. Depth less than 20 feet.
- b. Water temperature less than 40 degrees F (hot water dive suits required when temperatures are less than 50 degrees F).
- c. Water velocity less than 1 knot.
- d. Visibility less than 5 feet.
- e. There are no penetration dives required.

1.2.1 Unit Outage

- a. To slow tailrace velocities and create a safer diving environment the Government will take the following units out of service: One Station Service Unit, Main Units 1 through 3, and the appropriate fish pumps, during diving operations. One of the station service units will be online at all times. In addition, fishway entrance operation near the

dive site will be altered to mitigate the impact on dive operations.

- b. Unit outages require coordination between the Government and Contractor and will be discussed during the pre-work meeting. Anticipate a 30 calendar advance notice required to remove Station Service or Main Units from service.

1.2.2 Water Surface Elevations

Tailwater water surface elevations (WSE) range from approximately El 262 fmsl (feet mean sea level) to El 270 fmsl during January and February. Tailwater elevations will vary depending on river flow, and can fluctuate on an hourly basis. River flow and project operations impact tailwater eddies and currents which may develop in and near the work area.

1.2.3 Water Temperatures

Historical data for the last 10 years in the January to February time frame, shows minimum daily tailrace water temperatures dropping below 35 degrees Fahrenheit beginning in January and continuing through February, on average. Tailrace water temperatures during this period ranged from approximately 33 degrees F, to 43 degrees F.

1.3 DIVE OPERATION NOTIFICATION

- a. Dive operations in the tailrace require Turbine Unit and fish ladder entrance outages. Coordinate dive dates with the Government a minimum of 30 calendar days prior to anticipated start of dive operations. See SECTION 01 14 00.10 28 PROJECT SITE RESTRICTIONS, paragraph "Government's Work Schedule" for additional information.
- b. All dive submittals must be submitted for review 30 Government working days prior to commencement of dive work. Dive work may not commence until all dive submittals have been reviewed and accepted by the District Dive Coordinator (DDC).

1.4 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

Comply with the current edition and all changes posted on the web as of the effective date of this solicitation.

NWW QMS 16001 Safety and Health Management Systems
(CE-SOHS) Appendix Q Diving Safety Program

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

29 CFR 1910 Occupational Safety and Health Standards

CPL 02-00-151 OSHA Instruction 20 CFR Part 1910 SUBPART
T Commercial Diving Operations

U.S. NAVAL SEA SYSTEMS COMMAND (NAVSEA)

NAVSEA SS521-AG-PRO-010

(2016, rev. 7) U.S. Navy Diving Manual

ASSOCIATION OF DIVING CONTRACTORS INTERNATIONAL (ADCI)

ADCI

International Consensus Standards for
Commercial Diving and Underwater
Operations, most current edition

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Safe Practices Manual; G DDC

Emergency Management Plan; G DDC

Dive Personnel Qualifications; G DDC

Dive Station Equipment Certifications and Certificates for Air
Quality; G DDC

Dive Plan; G DDC

Activity Hazard Analysis (AHA); G DDC

Safe Clearance; G DDC

SD-06 Test Reports

Underwater Video; I C

1.6 DIVING SUBMITTALS

Submit the following:

- a. Safe Practices Manual as required for diving in EM 385-1-1, Section 30.A.15.
- b. Emergency Management Plan as required for diving in EM 385-1-1, Section 30.A.18.
- c. Dive personnel qualifications as required for diving in EM 385-1-1, Section 30.A.05-09.
- d. Dive Station Equipment Certifications and Certificates for Air Quality as required for diving in EM 385-1-1, Section 30.F.05.

1.7 DIVE PLAN

Submit the Dive Plan and job-specific Activity Hazard Analysis (AHA) to the Contracting Officer for approval 30 calendar days prior to planned

dive date. See SECTION 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS paragraph ACTIVITY HAZARD ANALYSIS (AHA) for additional information. Diving will not be allowed without an approved Dive Plan.

1.8 LOCKOUT/TAGOUT (LOTO)-SAFE CLEARANCE OR HAZARDOUS ENERGY CONTROL (HEC) PROCEDURES

Submit a Safe Clearance plan for diving in accordance with requirements in SECTION 01 35 29.10 28 GOVERNMENTAL REQUIREMENTS paragraph LOCKOUT/TAGOUT (LOTO)-SAFE CLEARANCE OR HAZARDOUS ENERGY CONTROL (HEC) PROCEDURES.

1.9 SPECIAL SAFETY REQUIREMENTS

In addition to Safety and Health Requirements Manual, EM 385-1-1, comply with the requirements listed below. Paragraph numbers refer to EM 385-1-1.

- a. EM 385-1-1 Section 30 Surface - Supplied Air Operators, paragraph 30.D.03. Delete the following from the first sentence: "for any dive outside the no-decompression limits or deeper than 30m (100 ft)." A recompression chamber shall be required regardless of the depth of dive.
- b. EM 385-1-1 Appendix G.4, Walla Walla District minimum manning levels for non-penetrative dives is five (5) persons. Penetration dive minimum manning level is seven (7) persons.
- c. Unrestricted bottom time will not exceed 240 minutes.
- d. Hot water suits are required when water temperatures are below 50 degrees F. A waiver can be requested through the DDC.

PART 2 PRODUCTS

2.1 UNDERWATER VIDEO

Furnish an underwater video as a record of inspection. To be considered acceptable by the Contracting Officer, all features being demonstrated by video shall be clearly discernable. Incorporate date, time, diver (or ROV operator), and task description in the narrative of the video or by some other approved means. The final video product shall be in digital format: either MPEG-4 or Windows Media Video (WMV) format. Video final products shall be provided to the Contracting Officer as soon as practical upon completion of the applicable phase of work.

PART 3 EXECUTION

3.1 DIVE TEAM COMPOSITION AND DIVE EQUIPMENT

The dive team shall, at a minimum, be comprised of five members and consist of the following positions: a dive supervisor, a diver, a standby diver, and tender. No scuba diving will be permitted unless approved by the District Dive Coordinator (DDC). In addition to the dive team personnel addressed in the above references, minimum required chamber crew personnel shall be provided as diving operations dictate. If a crane is used, it must be operated by a certified crane operator who shall not be included as a member of the dive team. Only surface-supplied air diving equipment with 2-way voice communication shall be used for divers and standby divers. KM 17B diving helmets are not allowed for standby divers.

An independent reserve air system (bailout bottle) for all divers is required as specified by EM 385-1-1, paragraph 30, D, E, F. As a minimum, all diver surface air supply compressors, tanks, helmets, and other related equipment must comply with the requirements of EM 385-1-1, paragraph 30, D, E, F. The diver and the chamber operator will remain in the vicinity (within 30 minutes) of the dive chamber for at least two (2) hours following dives outside the no decompression limit.

3.2 CONTRACTOR FURNISHED DIVING SUPPORT EQUIPMENT

- a. A dual lock recompression chamber capable of recompression to a minimum of 165 feet of salt water (FSW) shall be required to be on-site and available for immediate use. Sufficient on-site chamber facilities shall be furnished to service multiple divers working simultaneously on differing recompression schedules, if necessary.
- b. A dive vessel or a floating or suspended dive platform shall be furnished from which diving operations will be staged. If a dive support vessel is used, no live boating will be permitted. Approved man-basket(s) shall be provided for each working diver as needed. All necessary top-side equipment such as cranes, trucks, and personnel vehicles shall be furnished that are needed to accomplish all required dive work as well as all necessary underwater hand and power tools.

3.2.1 Boat Transportation

- a. Contractor shall supply safety boat and necessary crew, separate from dive vessel, for work in BRZ, in accordance with McNary Boat Restriction Zone Policy (SOP-OPS-004). No separate payment will be made for safety boat and crew.
- b. Provide boat transportation with qualified operator(s) for all personnel and Government inspectors. Boats shall be operated only by the qualified operator(s).
- c. Boat operator shall be equipped with a radio at all times to insure communications with Government personnel requesting transportation. Motorboat shall be equipped with all necessary safety equipment for day and night operations as determined by appropriate U.S. Coast Guard regulations and requirements of Corps of Engineers Safety Manual EM 385-1-1. Motorboat shall also be equipped with 2 engines in the event one fails.

3.3 CONTRACTOR SPECIAL EQUIPMENT

Underwater color video camera with appropriate lighting apparatus that is appropriate for the dive, topside video monitor and recorder will be required on all dives.

3.4 SPILL CONTAINMENT

All diving operations working from a floating plant in which hydraulic tools are used shall have a spill containment boom deployed in the immediate work area. This boom does not need to go around the entire floating plant, but only the potential spill areas. Absorbent tubes are not permissible. A spill containment boom shall have a 12-inch skirt and a 4-6-inch diameter float.

3.5 DIVING WORK DESCRIPTION

- a. Diving may be required to place and remove the Unwatering Discharge Plug on the Unwatering pump discharge located in the tailrace at approximately El 260 fmsl. See Sheet G-101 for approximate location of discharge.
- b. In order for the Unwatering system isolation valve to be replaced, the Discharge Plug must be installed to create a water tight seal and prevent tailwater from entering the Unwatering Pump Discharge pipe. See Sheet M-202 for location of isolation valve.
- c. Field verify the condition and depth of the discharge before installing plug. The plug and all associated components shall be turned over to the government after installation of the Unwatering system isolation valve.
- d. See SECTION 22 11 00.01 28 PIPING AND VALVES, paragraph "Unwatering Discharge Plug" for additional Discharge Plug information. See SECTION 01 14 00.20 28 WORK AND OPERATIONAL RESTRICTIONS, paragraph UNWATERING SYSTEM WORK WINDOW RESTRICTIONS for timing of this work.

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GOVERNMENTAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ANSI/ASSP Z359.0	(2018) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ANSI/ASSP Z359.1	(2020) The Fall Protection Code
ANSI/ASSP Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ANSI/ASSP Z359.3	(2019) Safety Requirements for Lanyards and Positioning Lanyards
ANSI/ASSP Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ANSI/ASSP Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ANSI/ASSP Z359.7	(2019) Qualification and Verification Testing of Fall Protection Products
ANSI/ASSP Z359.11	(2021) Safety Requirements for Full Body Harnesses
ANSI/ASSP Z359.12	(2019) Connecting Components for Personal Fall Arrest Systems
ANSI/ASSP Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ANSI/ASSP Z359.14	(2021) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ANSI/ASSP Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ANSI/ASSP Z359.18	(2017) Safety Requirements for Anchorage Connectors for Active Fall Protection

Systems

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

- ASSE/SAFE A10.34 (2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
- ASSE/SAFE A10.44 (2016) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
- ASSE/SAFE Z244.1 (2003; R 2014) Control of Hazardous Energy Lockout/Tagout and Alternative Methods

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME B30.20 (2018) Below-the-Hook Lifting Devices
- ASME B30.22 (2016) Articulating Boom Cranes
- ASME B30.26 (2015; R 2020) Rigging Hardware
- ASME B30.3 (2020) Tower Cranes
- ASME B30.5 (2018) Mobile and Locomotive Cranes
- ASME B30.8 (2015) Floating Cranes and Floating Derricks
- ASME B30.9 (2018) Slings

ASTM INTERNATIONAL (ASTM)

- ASTM F855 (2019) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- IEEE 1048 (2016) Guide for Protective Grounding of Power Lines
- IEEE C2 (2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 10 (2018; ERTA 1-2 2018) Standard for Portable Fire Extinguishers
- NFPA 241 (2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations
- NFPA 51B (2019; TIA 20-1) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4)
National Electrical Code

NFPA 70E (2021) Standard for Electrical Safety in
the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

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

10 CFR 20 Standards for Protection Against Radiation

29 CFR 1904 Recording and Reporting Occupational
Injuries and Illnesses

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1910.146 Permit-required Confined Spaces

29 CFR 1910.147 Control of Hazardous Energy (Lock Out/Tag
Out)

29 CFR 1910.333 Selection and Use of Work Practices

29 CFR 1910.1025 Lead

29 CFR 1915 Confined and Enclosed Spaces and Other
Dangerous Atmospheres in Shipyard
Employment

29 CFR 1915.89 Control of Hazardous Energy
(Lockout/Tags-Plus)

29 CFR 1926 Safety and Health Regulations for
Construction

29 CFR 1926.1400 Cranes and Derricks in Construction

29 CFR 1926.16 Rules of Construction

29 CFR 1926.62 Lead

29 CFR 1926.500 Fall Protection

49 CFR 173 Shippers - General Requirements for
Shipments and Packagings

CPL 2.100 (1995) Application of the Permit-Required
Confined Spaces (PRCS) Standards, 29 CFR
1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ANSI/ASSP Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be

responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 High Hazard Work Group Activities

High Hazard Work Group (HHWG) Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, underwater diving, and confined space entry. All HHWG work requires compliance with the Hazardous Energy Control Program.

1.2.8 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.9 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.10 Medical Treatment

Medical Treatment is treatment administered by a physician, or registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered personnel.

1.2.11 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.12 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.13 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their

ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.14 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ANSI/ASSP Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.15 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

- a. Death, regardless of the time between the injury and death, or the length of the illness;
- b. Days away from work (any time lost after day of injury/illness onset);
- c. Restricted work;
- d. Transfer to another job;
- e. Medical treatment beyond first aid;
- f. Loss of consciousness; or
- g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above.

1.2.16 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

1.2.17 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document any mishap that meets the criteria described in the Crane/Rigging Mishap Investigation Form, see attached.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G C

Activity Hazard Analysis (AHA); G C

Safe Clearance; I C

Authorized Individuals; I C

Standard Lift Plan; G C

Critical Lift Plan; G C

Lead Compliance Plan; G ECC

State licensed Journeyman Electrician; I C

Asbestos Hazard Abatement Plan; G ECC

Crane Wheel And Outrigger Loading Diagram And Deck Protection For Outriggers; G ST

SSHO And Alternate SSHO; G C

Competent Person Qualifications; G, C

Sump Access Safety Plan; G, C

SD-06 Test Reports

Monthly Exposure Reports; I C

Notifications and Reports; I C

Accident Reports; I C

LHE Inspection Reports; I C

SD-07 Certificates

Crane Operators/Riggers; I C

Confined Space Entry Permit; I C

Hot Work Permit; I C

Certificate of Compliance; I C

License Certificates; I C

Radiography Operation Planning Work Sheet; G C

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the SSHO. The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times, with the exception of temporary absences less than 24 hours discussed below, to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs including the following.

The SSHO shall be employed by the Prime Contractor. **The SSHO shall be assigned no other duties on this project.** The SSHO shall also meet the following requirements:

- a. A minimum of 5 years safety work on similar projects.
- b. 30-hour OSHA construction safety class or equivalent within the last 5 years.
- c. Provide documentation that shows the completion of a minimum of 8 hours of formal, on-line, or self-study safety and health related coursework each year during the last five (5) years.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.6.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the Contracting Officer for information in consultation with the Safety Office.

1.6.1.2.1 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.6.1.2.2 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04 and herein.

1.6.1.3 Crane Operators/Riggers

Provide Operators meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

a. If the Government authorizes the Contracting to operate any of its cranes, each crane operator needs to be approved. Approval consists of the crane operator spending at least one (1) hour demonstrating their capabilities to operate the Government Crane, under the direct surveillance of a Government operator. The operators may be retested at any time.

1.6.2 Personnel Duties

1.6.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.
- b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.
- c. Use OSHA's Form 300-A to log work-related injuries and illnesses

occurring on the project site for Prime Contractors and subcontractors. The Prime Contractor must post and maintain Form 300-A Summary of Work-Related Injury and Illnesses no later than February 1 and keep in place until April 30th, annually. Refer to 29 CFR 1904.32(b)(6).

- d. Maintain applicable safety reference material on the job site.
- e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.
- f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.
- g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.
- h. Ensure subcontractor compliance with safety and health requirements.
- i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).
- j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.
- k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.6.3 Meetings

1.6.3.1 Preconstruction Meeting

Refer to SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENT for additional requirements on the Preconstruction Meeting.

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction meeting. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and

Government review of AHAs to preclude project delays.

- c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin work until an APP is established that is acceptable to the Contracting Officer.

1.6.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, and foremen must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings Seven (7) calendar days in advance.

1.7 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written, site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. See attached Accident Prevention Plan Requirements Form for guidance when preparing the APP. The following conditions apply:

1. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A.
2. Must be job-specific and address any unusual or unique aspects of the project or activity for which it is written.
3. Must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific.
4. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process.
5. Describe innovative methods used to ensure and monitor safe work practices of subcontractors.
6. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.
7. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.
8. The APP must be signed by an officer of the firm (Prime

Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH).

9. The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer.

10. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the contracting Officer Fifteen (15) calendar days prior to the date of the preconstruction conference for acceptance. Work cannot precede without an accepted APP. Once reviewed and accepted by the contracting Officer, the APP and attachments will be enforced as part of the contract.

1. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

2. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager.

3. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard.

4. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

1.7.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in EM 385-1-1; Appendix A, including the following:

- a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated SSHO and other competent and qualified personnel to be used. Specify the duties of each position.
- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.7.2 Plans

Provide plans in the APP in accordance with the requirements outlined in [EM 385-1-1](#), Appendix A including the following:

1.7.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan that is compatible with NWWP 385-1-20 in accordance with [EM 385-1-1](#), applicable OSHA standards [29 CFR 1910](#), [29 CFR 1915](#), and [29 CFR 1926](#), OSHA Directive [CPL 2.100](#), and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.7.2.1.1 Sump Access Safety Plan

Develop a Sump Access Safety Plan for work in the Unwatering and Drainage Sumps. Water levels may change without warning.

1.7.2.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with [EM 385-1-1](#), Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

1.7.2.3 Critical Lift Plan- Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by [EM 385-1-1](#), Section 16.H.01, using Form 16-3. Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer Thirty (30) calendar days prior to critical lift. Comply with load testing requirements in accordance with [EM 385-1-1](#), Section 16.F.03.

In addition to the requirements of [EM 385-1-1](#), Section 16.H.02, the critical lift plan must include the following:

- a. For lifts of personnel, demonstrate compliance with the requirements of [29 CFR 1926.1400](#) and [EM 385-1-1](#), Section 16.T.
- b. Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.7.2.4 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ANSI/ASSP Z359.2. Be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.7.2.5 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ANSI/ASSP Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.7.2.6 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSE/SAFE Z244.1, and ASSE/SAFE A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.7.2.7 Lead Compliance Plan

Develop a site specific lead compliance plan in accordance with EM 385-1-1, 29 CFR 1910.1025 and 29 CFR 1926.62.

1.7.2.7.1 RCRA Metal Based Paint Removal And Disposal

a. See SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL, paragraph GENERAL, for items considered to have RCRA metal based paint.

b. See SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION, paragraph METAL BASED PAINT ABATEMENT, and SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL, for information on removal and disposal requirements.

1.7.2.7.2 Electrical Safety Precautions

For abatement areas where there are energized electrical items a journey man electrician shall be provided by the Contractor, see "a" below for

details.

- a. A State licensed Journeyman Electrician shall oversee and be in the abatement area while abatement work is performed to ensure the safety of abatement workers and to prevent damage to existing electrical equipment and systems.

1.7.2.8 Asbestos Hazard Abatement Plan

The safety and health aspects of asbestos work, prepared in accordance with all applicable Federal, State, and local laws and regulations, as well as specific requirements of this Contract. See SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION, paragraph GENERAL INFORMATION for potential asbestos locations. See SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION, for additional information on asbestos abatement.

1.7.2.9 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00.01 28 DEMOLITION and referenced sources.

1.7.2.10 COVID 19 Monitoring Plan

Include a site specific COVID-19 Monitoring Plan which addresses the following elements, as a minimum:

- a. Procedures for periodic sanitation inspections.
- b. Procedures for disinfecting project site to include high traffic areas, in accordance with current CDC guidelines.
- c. Site specific measures to practice social distancing while working on the project.
- d. Employee training on the signs, symptoms, and protection measures related to COVID 19, in accordance with CDC guidelines.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Submit the AHA for review at least 15 working days prior to the start of each activity task. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

The activity hazard analyses shall be developed using the Project Schedule as the basis for the activities performed. Any activities listed on the Project Schedule will require an AHA. The AHAs will be developed by the Contractor, supplier or subcontractor and provided to the Prime Contractor for submittal to the Contracting Officer. The Activity Hazard Analysis

Template is attached to the end of this SECTION. Electronic copy of the AHA may be downloaded from the following site.

<http://www.usace.army.mil/Portals/2/docs/AHA2.pdf>

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.8.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOV must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.9 LOCKOUT/TAGOUT (LOTO)-SAFE CLEARANCE OR HAZARDOUS ENERGY CONTROL PROGRAM (HECP) PROCEDURES

All Contractor work on site shall meet the requirements of "Safety and Occupational Health Office; Safe Clearance Program for the Control of Hazardous Energy, NWWP 385-1-20". A digital copy may be obtained at the web address shown below in paragraph, Safe Clearance Training. Safe Clearance procedures are used by Project and Contractor personnel to protect personnel, equipment and the environment as well as ensuring continuity of service. Any work performed by the Contractor that requires taking project operated equipment out of service shall be done only after a formal clearance is obtained through the Government. Violations will be reported to the Issuing Individual and violations may result in disciplinary action ranging from retraining to removal of safe clearance authorization.

For jobs with multiple tasks that require AHA's, prepare and submit an Activity Hazard Analysis (AHA) on the first feature of work that requires a clearance request. A comprehensive AHA is required for smaller jobs. AHA requirements will be verified at the Pre-Construction Meeting.

The following applies to LOTO and HECP procedures:

a. The Government will provide Safe Clearance Tags and will issue Isolation Locks to Contractor for clearances using the Government Safe Clearance Procedures. Provide personal safety locks, meeting OSHA standards, for use with the Government's safe clearance procedures. See NWWP 385-1-20, Chapter 6 - Locks and Tags, and Chapter 10 - Contractor Personnel for further guidance.

b. Government HECP procedures shall be used on equipment/systems owned by the Government. It shall also be used on all points interfacing with Government owned equipment/systems. In instances

where equipment is owned by the Contractor, not yet turned over to the Government, or equipment which is not tied into Government energy sources, the Contractor may use their own Lockout/Tagout Program. Contractor Programs shall be pre-approved by the Responsible Official.

c. Submit the names of **Authorized Individuals** to the Contracting Officer prior to the Pre-Construction Meeting. Project-specific training will be given by the Operations Chief or designee and will be approximately 30 minutes in length. Project-specific training will be provided for every contract and only to the Contractor's Authorized Individuals. The Authorized Individuals shall be required to brief their work crews and subcontractors of any project-specific clearance information. Training is only required once per year and is, with the exception of project-specific training, valid for every facility within the Walla Walla District. If the Responsible Official or Government designee determines that the Authorized Individual's knowledge of the HECF procedures are inadequate the Responsible Official may administer a retest. See NWWP 385-1-20 Chapter 5 - Training for further guidance.

1.9.1 Safe Clearance Training

Contractor, subcontractor, vendors and visitors shall take the appropriate level of HECF Procedure training commensurate with their job duties. Only HECF certificates generated from Walla Walla District or the project are acceptable.

Based on the scope of work and size of crew, have the appropriate number of Authorized Individuals trained to ensure that there are no delays. All Contractor personnel working in areas under a Safe Clearance shall be trained as Affected Persons. Any non-working personnel, vendors and visitors, that will be entering an area under Safe Clearance shall take Awareness Level training. Training and written tests for the modules below shall be completed on-line prior to commencing on-site work. Time estimates for training follow:

- a. Awareness Level Training: Approximately 1 hour (non-working personnel, vendors and visitors).
- b. Affected Persons: Approximately 2 hours in addition to Awareness Level training.
- c. Authorized Individuals: Approximately 3 hours in addition to Awareness Level training and Affected Personnel Training.

A copy of the Safe Clearance Program for the Control of Hazardous Energy (NWWP 385-1-20) can be found on the Walla Walla District Internet site at: <https://usace.dps.mil/sites/PUBS-NWW/OfficeMemorandums/Forms/PubsDisplay.aspx?id=%2Fsi>

All costs for this training shall be considered incidental to the work, and therefore, no additional payment will be made. Training is an annual requirement and will expire one year from completion date. Training is provided by Vivid Learning Systems and is available on line at <http://Hecp.vividlms.com>. Cost for the training is displayed on the home page. Submit the training completion certification a minimum of Seven (7) calendar days prior to the individual's arrival at site. Maintain training documentation on site, including the individual's name and date of training completion, in accordance with NWWP 385-1-20.

1.10 DISPLAY OF SAFETY INFORMATION

1.10.1 Safety Bulletin Board

Within one (1) calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by [EM 385-1-1](#), Section 01.A.07. Additional items required to be posted include:

- a. [Confined space entry permit](#).
- b. [Hot work permit](#).

1.10.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

- a. Date deficiency identified;
- b. Description of deficiency;
- c. Name of person responsible for correcting deficiency;
- d. Projected resolution date;
- e. Date actually resolved.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.13 [NOTIFICATIONS and REPORTS](#)

1.13.1 Mishap Notification

Notify the Contracting Officer after any mishaps, including recordable accidents, incidents, and near misses, as defined in [EM 385-1-1](#) Appendix Q. All mishaps shall be reported as soon as possible but not more than twenty four (24) hours afterwards to the KO per Section 01.D. In addition, any mishap occurring in any of the following high hazard areas shall be immediately reported to the KO. This includes electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or

rigging; fall from height (any level other than same surface); and underwater diving as covered in Section 01.D.05. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.13.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the USACE Accident Report Form 3394, and provide the report to the KO within Five (5) calendar day(s) of the accident. The KO will provide copies of any required or special forms.

b. Near Misses: Report all "Near Misses" to the KO, using local mishap reporting procedures, within 24 hrs. The KO will provide the Contractor the required forms. Near miss reports are considered positive and proactive Contractor safety management actions.

c. Conduct an accident investigation for any load handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident. Complete the attached LHE Accident Report (CRANE/RIGGING MISHAP INVESTIGATION) form and provide the report to the KO within Thirty (30) calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the KO. The KO will provide a blank copy of the accident report form.

1.13.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.13.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.L.20 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within Fifteen (15) calendar days in advance of planned lift.

1.13.5 Contractor's Cranes

a. Contractor's cranes and equipment furnished for this work shall conform to all applicable OSHA Requirements and EM 385-1-1. Submit

Crane Wheel and Outrigger Loading Diagram and Deck Protection for Outriggers submittal for approval at least Thirty (30) calendar days prior to using any crane rated 50 tons or more on any of the Project decks. The submittal shall provide the following information on a plan view sketch or drawing. A marked up Government-provided resource (R) contract drawing can also be used, if available.

1. Crane outrigger locations with dimensions from the center of each outrigger to identifiable project feature(s).
2. Dimensions of each outrigger.
3. Maximum load on each outrigger.
4. Outrigger pad deck protection dimensions and location. All outrigger pad deck protection shall be provided by the Contractor.
5. If cribbing material is used, show the cribbing material dimensions and location.

b. Include, in the submittal, the cribbing material properties, and calculations to verify the cribbing material's adequacy to carry the intended loads. To the greatest extent possible, place the outriggers over existing supports such as walls. Avoid placing the outriggers next to a wall or support. Under no circumstance shall an outrigger or cribbing be placed on metal grating. See Section 01 55 10.00 28 CONTRACTOR WORK, ACCESS AND STORAGE AREAS, paragraph GOVERNMENT ROADWAYS AND DECK ACCESS RESTRICTIONS for information on deck loading capacities.

1.14 HOT WORK

Activities involving burning, brazing, cutting, grinding, powder-actuated tools, soldering, sparks, thawing activities, welding, working with open flames, or any similar operation that is capable of initiating fires or explosions is considered HOT WORK.

Provide at least two (2), twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work." All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 60 minutes after completion of the task or as specified on the Hot Work Permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE AUTHORITY IMMEDIATELY.

Obtain services from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems, welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, vaults, etc.) that have the potential for flammable or explosive atmospheres.

1.15 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer

and Radiation Safety Office (RSO) for all specialized and licensed material and equipment proposed for use on the construction project. Maintain on-site records whenever licensed radiological materials or ionizing equipment are on government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.15.1 Radiography Operation Planning Work Sheet

Submit a Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. The Contracting Officer will review this worksheet and submit questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.15.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. The authorized representative will meet the Contractor at a designated location, ensure safety of the materials being transported, and will escort the Contractor to the job site and return upon completion of the work.

Provide a copy of all calibration records, and utilization records for radiological operations performed on the site.

1.15.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.15.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.15.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent

to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.15.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety officer (RSO) of any Radioactive Material use.

1.15.7 Schedule for Exposure or Un-shielding

Actual exposure of the radiographic film or un-shielding the source must not be initiated until after 5 p.m. on weekdays.

1.15.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.16 CONFINED SPACE ENTRY REQUIREMENTS.

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.16.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.16.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.16.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

1.16.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.17 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

- a. Hard Hat
- b. Long Pants
- c. Appropriate Safety Shoes
- d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon

written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on Project site.

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within Fourteen (14) calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4, "Changes" and FAR 52.236-2, "Differing Site Conditions."

3.2 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ANSI/ASSP Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.2.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ANSI/ASSP Z359.2 in the AHA.

3.2.2 Fall Protection Equipment and Systems

- a. Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.
- b. Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M, ANSI/ASSP Z359.0, ANSI/ASSP Z359.1, ANSI/ASSP Z359.2, ANSI/ASSP Z359.3, ANSI/ASSP Z359.4, ANSI/ASSP Z359.6, ANSI/ASSP Z359.7, ANSI/ASSP Z359.11, ANSI/ASSP Z359.12, ANSI/ASSP Z359.13, ANSI/ASSP Z359.14, and ANSI/ASSP Z359.15.

3.2.2.1 Fall Protection Anchors

- a. Provide all anchor points used for Fall Protection. Anchors shall be

left installed, and turned over to the Government at the completion of work on this project. All Fall Protection Anchor points shall meet requirements of ANSI/ASSP Z359.18-2017 or ANSI/ASSP Z359.6-2016, and be installed, tested, and labeled per manufacturer's instructions. All anchors shall be rated for a minimum 10,500 lb capacity.

- b. Install anchors directly over the area being accessed, to minimize potential swing and free fall. Where not possible/practical to install directly over the area being accessed, coordinate a suitable location with the KO. Install a minimum of two (2) overhead fall protection anchors above the following locations:

- 1. Each Draft Tube Drain Valve Pit.
- 2. Drainage Sump access hatch.
- 3. Unwatering Sump access hatch.

- c. Prior to anchor installation, perform the following:

- 1. Locate, and avoid, existing rebar or other embedded items during installation. Follow requirements in SECTION 05 05 20.00 28 POST-INSTALLED ANCHORS IN CONCRETE, paragraph EMBEDDED ITEMS for this work.
- 2. Confirm location of all anchor points with the KO.

3.2.2.2 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Section 21.O. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.2.2.3 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Prevention such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.2.3 Horizontal Lifelines (HLL)

Provide HLL in accordance with [EM 385-1-1](#), Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 ([29 CFR 1926.500](#)). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.2.4 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with [EM 385-1-1](#), Section 21.F.01 and [29 CFR 1926](#) Subpart M.

3.2.5 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of [EM 385-1-1](#), [ANSI/ASSP Z359.2](#), and [ANSI/ASSP Z359.4](#).

3.3 WORK PLATFORMS

3.3.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

- a. Scaffold platforms greater than [20 feet](#) in height must be accessed by use of a scaffold stair system.
- b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than [20 feet](#) maximum in height.
- c. An adequate gate is required.
- d. Employees performing scaffold erection and dismantling must be qualified.
- e. Scaffold must be capable of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.
- f. Stationary scaffolds must be attached to structural building

components to safeguard against tipping forward or backward.

g. Special care must be given to ensure scaffold systems are not overloaded.

h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

i. Scaffolding other than suspended types must bear on base plates upon wood mud sills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.

j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet.

k. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.3.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.4 EQUIPMENT

3.4.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.4.2 Load Handling Equipment (LHE)

- a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.
- b. Notify the Contracting Officer fifteen (15) working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards.
- c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
- d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.
- e. Under no circumstance must a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.
- f. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.
- g. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.
- h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- i. All employees must keep clear of loads about to be lifted and of suspended loads.
- j. Use cribbing when performing lifts on outriggers.
- k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- l. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.
- m. Maintain inspection records in accordance by EM 385-1-1, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

n. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

o. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.4.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.4.4 Explosives

Explosives must not be used or brought to the project site.

3.5 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.5.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective

equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.5.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State and Local requirements applicable to where work is being performed.

3.5.3 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.5.4 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

FOR OFFICIAL USE ONLY

CRANE AND/OR RIGGING ACCIDENT/INCIDENT NOTIFICATION				
Accident Category: <input type="checkbox"/> Crane Accident <input type="checkbox"/> Rigging Accident				
From District		To: Crane Working Group Attn: Steve Washington 441 G Street NW Washington, DC 20314 Steven.Washington@usace.army.mil		
Activity:				Report No (CESO):
Crane Serial No:	Class (I or II):	Accident Date:	Time: (24 hr format)	
Category of Service: <input type="checkbox"/> General Duty <input type="checkbox"/> Floating Plant		Crane Type: (see instructions)	Crane Manufacturer:	
Was Crane/Hoist used as part of a Critical Lift: <input type="checkbox"/> Yes <input type="checkbox"/> No		Was Critical Lift Plan Prepared? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please attach documentation.		
Location:		Weather:		
Crane Capacity:		Hook Capacity:	Weight of Load on hook:	
Fatality or Permanent Disability? <input type="checkbox"/> Yes <input type="checkbox"/> No Reported in ENLink? <input type="checkbox"/> Yes <input type="checkbox"/> No		Material/Property Cost Estimate:		
Accident Type: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"><input type="checkbox"/> Personal Injury, Lost time</div> <div style="width: 50%;"><input type="checkbox"/> Load Collision</div> <div style="width: 50%;"><input type="checkbox"/> Overload</div> <div style="width: 50%;"><input type="checkbox"/> Damaged Rigging Gear</div> <div style="width: 50%;"><input type="checkbox"/> Personal injury, Non-LT</div> <div style="width: 50%;"><input type="checkbox"/> Two Blocked</div> <div style="width: 50%;"><input type="checkbox"/> Dropped Load</div> <div style="width: 50%;"><input type="checkbox"/> Damaged Crane</div> <div style="width: 50%;"><input type="checkbox"/> Crane Collision</div> <div style="width: 50%;"><input type="checkbox"/> Damaged Load</div> <div style="width: 50%;"><input type="checkbox"/> Other: Specify _____</div> </div>				
Direct Cause of Accident: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> Improper Operation</div> <div style="width: 33%;"><input type="checkbox"/> Equipment Failure</div> <div style="width: 33%;"><input type="checkbox"/> Inadequate Visibility</div> <div style="width: 33%;"><input type="checkbox"/> Improper Rigging</div> <div style="width: 33%;"><input type="checkbox"/> Switch Alignment</div> <div style="width: 33%;"><input type="checkbox"/> Inadequate Communication</div> <div style="width: 33%;"><input type="checkbox"/> Track Condition</div> <div style="width: 33%;"><input type="checkbox"/> Procedural Failure</div> <div style="width: 33%;"><input type="checkbox"/> Other: Specify _____</div> </div>				
Chargeable to: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> Signal Person</div> <div style="width: 33%;"><input type="checkbox"/> Rigger</div> <div style="width: 33%;"><input type="checkbox"/> Operator</div> <div style="width: 33%;"><input type="checkbox"/> Maintenance</div> <div style="width: 33%;"><input type="checkbox"/> Management/Supervision</div> <div style="width: 33%;"><input type="checkbox"/> Other: Specify _____</div> </div>				
Crane Function: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 16.6%;"><input type="checkbox"/> Travel</div> <div style="width: 16.6%;"><input type="checkbox"/> Hoist</div> <div style="width: 16.6%;"><input type="checkbox"/> Rotate</div> <div style="width: 16.6%;"><input type="checkbox"/> Luffing</div> <div style="width: 16.6%;"><input type="checkbox"/> Telescoping</div> <div style="width: 16.6%;"><input type="checkbox"/> Other</div> <div style="width: 16.6%;"><input type="checkbox"/> N/A</div> </div>				
Is this accident indicative of a recurring problem? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, list ENLink Report Nos.: _____				
ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION, CORRECTIVE/PREVENTIVE ACTIONS TAKEN AND PHOTOS AS ENCLOSURE (1). Include probable cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions to be taken and to whom they were assigned.				
Preparer:	Phone:	E-mail:	Org:	Date:
Concurrences: (Include Code, Signature and Date)				
		Org:	Date:	
		Org:	Date:	
Certifying Official (Crane Accident Only):		Org:	Date:	

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Initial Details / Facts:

Site diagram/sketch (attach)

Photographs (attach)

CRANE AND RIGGING ACCIDENT/INCIDENT REPORT INSTRUCTIONS

This form is designed for fax transmission without a cover page or by e-mail and, with enclosures and signatures shall be the official document. Electronic submission will be accepted without signatures but the names of the preparer, concurring personnel, and certifying official (for crane accidents only) shall be filled in. The e-mail address is: Steven.Washington@usace.army.mil

1. Accident Category: Indicate either crane accident or rigging gear accident.
2. From: The District/POC that is responsible for reporting the accident.
3. Activity: The activity/location where the accident took place.
4. Report No.: The activity assigned accident number (CESO will assign a tracking number).
5. Crane Serial No.: The serial number(s) of the equipment involved.
6. Class: Identify the Class of Crane (Class I or II).
7. Accident Date: The date the accident occurred.
8. Time: The time (24 hour clock) the accident occurred (e.g., 1300).
9. Category of Service: General site activities or Floating Plant operations
10. Crane Type: The type of crane involved in the accident (select from this list)
 - TLL - Telescopic Boom Crane (Swing Cab)
 - TSS - Telescopic Boom Crane (Fixed Cab)
 - LB - Lattice Boom Crane
 - TWR - Tower Crane
 - OVR - Overhead Crane
 - ABC - Articulating Boom Crane
 - ABL - Articulating Boom Loader
 - OTHER - Describe
11. Crane Manufacturer: The manufacturer of the crane (e.g., Dravo, Grove, P&H), if applicable.
12. Was the crane or rigging gear being used in a Critical Lift (per 16.H)?
13. Was a Critical Lift Plan prepared? If so, attach this documentation.
14. Location: The detailed location where the accident took place (e.g., building 213, dry dock 5).
15. Weather: The weather conditions at time of accident (e.g., wind, rain, cold).
16. Crane Capacity: The certified capacity of the crane (e.g., 120,000 pounds), if applicable.
17. Hook Capacity: The capacity of the hook involved in the accident at the max radius of the operation, if applicable.
18. Weight of Load on Hook: If applicable, the weight of the load on the hook.
19. Fatality or Permanent Disability?: Check yes or no.
20. Material/Property Cost Estimate: Estimate total cost of damage resulting from the accident.
21. Reported in ENGLink? Self-explanatory.
22. Accident Type: Check all that apply.
23. Direct Cause of Accident: Check all that apply.
24. Chargeable to: Check all that apply.
25. Crane Function: Check all functions in operation at time of accident. Check N/A if a rigging gear accident.
26. Is this a recurring problem?: Check yes or no. Identify any other similar accidents.
27. Situation Description/Corrective Actions: Self-explanatory.
28. Preparer: Self-explanatory.
29. Concurrences: Self-explanatory.
30. Certifying Official (Crane Accidents Only): Self-explanatory.
31. Brief Description: No more than one paragraph summarizing the resultant incident.
32. Background and Detailed Description: Provide the relevant background in a descriptive timeline of preconditions leading up to the event, as well as a detailed description of the event.
33. Corrective Actions: List all short term and long term corrective actions that are taken to prevent recurrence of the incident. Short Term Corrective Actions are those actions taken that will allow return to work in short time frame. Long Term actions are more 'programmatic' in nature and typically include: process revision, changes in training, 'mistake proofing', etc.

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Form A-02 U.S. Army Corps of Engineers Accident Prevention Plan Checklist				Date of Inspection		
Location (Plant or Facility)			Contract Number			
Contractor Name			Project Name			
Inspector Name (Print)			Inspector Signature			
<i>This checklist serves as a guide only, it does not replace or eliminate the need to comply with the requirements set forth in Engineering Manual 385-1-1, Safety and Health Requirements Manual, dated 30 Nov 2014. The references included in this checklist correspond to the applicable sections of EM 385-1-1.</i>						
Item Description			Yes	No	N/A	Remarks (Any NO or N/A item)
a. Signature sheet						
1. Includes the name, title, signature, telephone number, and qualifications of the Plan Preparer (<i>Qualified person, i.e. corporate safety staff person, QC</i>)						
2. Includes the name, title, signature, telephone number, and qualifications of the Plan Approver (<i>e.g. owner, company president, regional vice president</i>) (HTRW activities require approval of a Certified Industrial Hygienist, a Certified Safety Professional may approve the plan for operations involving UST removal where contaminants are known to be petroleum, oils, or lubricants).						
3. Includes the name(s), title(s), signature(s), telephone number(s), and qualifications for Plan Concurrence (provide concurrence of other applicable corporate and project personnel (contractor)) (<i>e.g. Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional, project QC.</i>)						
b. Background information						
1. Includes the Contractor Name.						
2. Includes the Contract Number.						
3. Includes the Project Name.						
4a. Includes the Brief Project Description.						
4b. Includes a Discription of the Work to be Performed.						
4c. Includes the Location of the Project (map).						
4d. Includes the Equipment to be Used.						
4e. Includes the Anticipated High Risk Activities.						
5. Includes the Major Phases of Work Anticipated. (<i>Within these major phases of work identified, activities [includes Definable features of Work (DFOWs) and tasks] to be performed that will require an AHA shall be specifically highlighted. This information can then be used by QC, QA and Safety personnel to track AHA submittals. The AHAs for these activities, tasks of DFOWs are NOT submitted at this time (AHAs created/submitted at this time would not be activity-specific as they are intended to be). > See Sections 01.A.14 and 01.A.15.</i>)						

Form A-02 U.S. Army Corps of Engineers Accident Prevention Plan Checklist (cont'd)				Date of Inspection
Item Description	Yes	No	N/A	Remarks (Any NO or N/A item)
c. Statement of Safety and Health Policy.				
1. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. <i>(In addition to the corporate policy statement, a copy of the corporate safety program may provide a portion of the information required by the accident prevention plan.)</i>				
2. Includes Contractor's written safety program goals.				
3. Includes Contractor's written safety program objectives.				
4. Includes the Contractor Accident Experience <i>(Copy of OSHA 300 Forms, or equivalent documentation).</i>				
d. Responsibilities and Lines of Authority.				
1. Includes statement of the employer's ultimate responsibility for the implementation of his SOH program for his own employees, all sub-contractors and all others on the worksite (includes the strict enforcement of the program).				
2. Includes the identification and accountability of personnel responsible for safety and health at both the corporate and project level – including their resumes. Qualifications shall be in accordance with Section 01.A.17. <i>(Only official OSHA 30-Hour cards will be accepted or, if equivalent training is provided, appropriate instructor qualifications.)</i>				
3. Includes equivalent training to the OSHA 30-Hour classes is being presented as qualification, the training shall cover, as a minimum, the areas discussed in Appendix A, Section 3.d.3.(a-d).				
4. Includes the names of Competent (CP) and/or Qualified Person(s) (QP) and proof of competency/qualification to meet specific OSHA CP/QP requirements. <i>(Must include copies of proof of CP/QP).</i>				
5. Includes requirements and details of the employer's Risk Management Process. <i>(USACE uses the Activity Hazard Analysis (AHA) as part of a total risk management process. Contractors and other individual employer's may use the AHAs or their own version [Job Safety Analyses (JSAs), Job Hazard Analyses (JHAs), or similar Risk Management assessment tools]. These documents are considered equivalent to, and acceptable substitutes for, the USACE's AHA provided the data collected is the same as that required by the AHA.)</i>				
6. Includes requirements for initial activity-specific AHAs to be submitted and accepted at preparatory meetings, prior to work being performed;				
7. Includes requirements that no work by the Contractor shall be performed unless a designated Competent Person/SSHO is present on the job site.				
8. Includes policies and procedures regarding non-compliance with safety requirements (to include disciplinary actions for violation of safety requirements).				
9. Lines of authority.				
10. Includes written company procedures for holding managers and supervisors accountable for safety.				

Form A-02 U.S. Army Corps of Engineers Accident Prevention Plan Checklist (cont'd)				Date of Inspection
Item Description	Yes	No	N/A	Remarks (Any NO or N/A item)
e. Subcontractors and Suppliers.				
1. Includes the list of subcontractors and suppliers. <i>(If not known at the time of initial APP submittal, the contractor shall include the following statement in their initial APP: "The subcontractors for the following DFOWs/activities are not known at this time, but additional information will be submitted to the APP for acceptance prior to the start of any activities listed")</i>				
2. Includes safety responsibilities of subcontractors and suppliers.				
f. Training				
1. Includes requirements for new hire SOH orientation training at the time of initial hire of each new employee.				
2. Includes requirements for mandatory training and certifications that are applicable to this project (<i>e.g., explosive actuated tools, confined space entry, crane operator, diver, vehicle operator, HAZWOPER training and certification, PPE</i>) and any requirements for periodic retraining / recertification.				
3. Includes procedures for periodic safety and health training for supervisors and employees.				
4. Includes the requirements for emergency response training.				
g. Safety and Health Inspections				
1. Includes specific assignment of responsibilities for a minimum daily jobsite SOH inspection during periods of work activity.				
1a. Includes the name(s) of individual(s) responsible for conducting safety inspections. (<i>e.g., PM, safety professional, QC, supervisors, employees</i>)				
1b. Includes proof of inspector's training / qualifications.				
1c. Indicates when inspections will be conducted.				
1d. Indicates procedures for documentation. (<i>Furnished sample forms upon which inspections will be recorded.</i>)				
1e. Indicates deficiency tracking system and follow-up procedures.				
2. Includes any external inspections / certifications which may be required. (<i>e.g., US Coast Guard</i>)				
h. Mishap Reporting and Investigation				
1. The plan identifies how, when, and who shall complete the Exposure data (man-hours worked).				
2a. The plan identifies how, when, and who shall complete mishap investigations, reports, and logs. (<i>The contractor shall report, thoroughly investigate, and analyze all mishaps occurring incidentally to an operation, project or facility for which this manual is applicable.</i>)				
2b. The plan identifies how, when, and who shall make immediate notification of major mishaps. (<i>Mishaps shall be reported as soon as possible but not more than 24 hours afterwards to the KO/COR.</i>)				
2c. Includes how, when, and who will provide notice to the KO/COR when corrective actions are completed. (<i>Implement corrective actions as soon as reasonably possible.</i>)				

Form A-02 U.S. Army Corps of Engineers Accident Prevention Plan Checklist (cont'd)				Date of Inspection
Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable safety and occupational health risks and associated compliance plans. Using the EM 385-1-1 as a guide, plans, <u>programs</u>, <u>procedures</u> (assessments and evaluations), may include but not be limited to:				
<i>(1) Include a project-specific compliance plan, as applicable to the work being performed, and as identified below. The plans shall incorporate project-wide procedures to control hazards to which the employees of all project employers may be exposed.</i>				
<i>(2) These procedures shall be coordinated with all project employers and shall include project-specific, project-wide emergency response and evacuation procedures, PPE requirements, recordkeeping and reporting requirements, and training requirements.</i>				
<i>(3) The plans shall be prepared prior to the start of any work activities on the job site (as much as the information can be known at that point in time). The plans shall be updated throughout the life of the project to include changes in personnel, equipment, conditions, etc. Additional revisions shall be incorporated as necessary to reflect changing site conditions, construction methods, personnel roles and responsibilities and construction schedules.</i>				
<i>(4) No activity (DFOV) shall be started on site until the APP is revised and submitted to the GDA for acceptance, with the site-specific plans, programs and procedures required to complete the project.</i>				
Item Description	Yes	No	N/A	Remarks (Any NO or N/A item)
i. Plans (Programs, Procedures, Assessments, and Evaluations) required by the Safety Manual				
1. <u>Fatigue Management Plan</u> (01.A.20)				
2. Emergency Plans (01.E):				
(a) Procedures & Test (01.E.01)				
(b) Spill Plans (01.E.01, 06.A.02)				
(c) Fire Fighting Plan (01.E.01; 19.A)				
(d) Posting of Emergency Telephone Numbers (01.E.05)				
(e) Man overboard/abandon ship (19.A.04)				
(f) Plan for prevention of alcohol and drug abuse (01.C.02 & Specs)				
3. <u>Site Sanitation/Housekeeping Plan</u> (02.B)				
4. <u>Medical Support Agreement</u> . Outline on-site medical support and off-site medical arrangements including rescue and medical duties for those employees who are to perform them, and the name(s) of on-site Contractor personnel trained in first aid and CPR. A minimum of two employees shall be certified in CPR and first-aid per shift/site (03.A.01, <u>03.A.03</u>)				
5. <u>Blood-borne Pathogen Program</u> (03.A.05)				
6. <u>Exposure Control Plan</u> (03.A.05)				
7. <u>Automatic External Defibrillator (AED) Program</u> (03.B.04)				
8. <u>Site Layout Plan</u> (04.A)				
9. <u>Access/Haul Road Plan</u> (04.B)				
10. <u>Hearing Conservation Program</u> (05.C)				
11. <u>Respiratory Protection Plan</u> (05.G)				
12. <u>Health Hazard Control Program</u> (06.A)				
13. <u>Hazard Communication Program</u> (06.B.01)				
14. <u>Process Safety Management Plan</u> (06.B.04)				
15. <u>Lead Compliance Plan</u> (06.C.02 & Specifications)				
16. <u>Asbestos Abatement Plan</u> (06.C.03 & Specifications)				

Form A-02 U.S. Army Corps of Engineers Accident Prevention Plan Checklist (cont'd)				Date of Inspection
<i>Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks and compliance plans. Using the EM 385-1-1 as a guide, plans, <u>programs, procedures (assessments and evaluations)</u>, may include but not be limited to:</i>				
Item Description	Yes	No	N/A	Remarks (Any NO or N/A item)
i. Plans (Programs, Procedures) continued.				
17. Radiation Safety Program (06.F)				
18. Abrasive Blasting Plan (06.I)				
19. Heat Stress Monitoring Plan (<u>HSMP</u>) (06.J.02)				
20. Cold Stress Monitoring Plan (<u>CSMP</u>) (06.J.04)				
21. <u>Indoor Air Quality Management Plan</u> (06.L)				
22. <u>Mold Remediation Plan</u> (06.L.04)				
23. <u>Chromium (VI) Exposure Evaluation</u> (06.M)				
24. Crystalline Silica Assessment (06.N.02)				
25. Lighting Plan for Night Operations (07.A.06)				
26. Traffic Control Plan (08.C.05)				
27. Fire Prevention Plan (09.A.01)				
28. Wild Land Fire Management Plan (09.L)				
29. <u>Arc Flash Hazard Analysis</u> (11.B)				
30. <u>Assured Equipment Grounding Control Program (AEGCP)</u> , (11.D.05, <u>Appendix E</u>)				
31. <u>Hazardous Energy Control Program and Procedures</u> (12.A.01)				
32. <u>Standard Pre-Lift Plan – LHE</u> (16.A.03)				
33. <u>Critical Lift Plan – LHE</u> (16.H)				
34. <u>Naval Architectural Analysis – LHE (Floating)</u> (16.L)				
35. <u>Floating Plant Inspection and Certification</u> (19.A.01)				
36. <u>Severe Weather Plan for Marine Activities</u> (19.A.03)				
37. <u>Emergency Plan for Marine Activities</u> (19.A.04)				
38. <u>Man Overboard/Abandon Ship Procedures</u> (19.A.04)				
39. <u>Float Plan for Launches, Motorboats, Skiffs</u> (19.F.04)				
40. <u>Fall Protection and Prevention Plan</u> (21.D)				
41. <u>Demolition/Renovation Plan</u> (to include engineering survey) (23.A)				
42. <u>Rope Access Work Plan</u> (24.H)				
43. <u>Excavation/Trenching Plan</u> (25.A.01)				
44. <u>Fire Prevention and Protection Plan for Underground Construction</u> (26.D.01)				
45. <u>Compressed Air Work Plan for Underground Construction</u> (26.I.01)				
46. <u>Erection and Removal Plan for Formwork and Shoring</u> (27.C)				
47. <u>Precast Concrete Plan</u> (27.D)				

<div>Form A-02</div> <div>U.S. Army Corps of Engineers</div> <div>Accident Prevention Plan Checklist (cont'd)</div>				Date of Inspection	
<p>Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks and compliance plans. Using the EM 385-1-1 as a guide, plans, programs, procedures (assessments and evaluations), may include but not be limited to:</p>					
Item Description	Yes	No	N/A	Remarks (Any NO or N/A item)	
i. Plans (Programs, Procedures) continued.					
48. Lift-slab Plans (27.E)					
49. Masonry Bracing Plan (27.F.01)					
50. Steel Erection Plan (28.B)					
51. Explosives Safety Site Plan (ESSP) (29.A)					
52. Blasting Plan (29.A; 26.J)					
53. Dive Operations Plan (30.A.14, 30.A.16)					
54. Safe Practices Manual for Diving Activities (30.A.15)					
55. Emergency Management Plan for Diving (30.A.18)					
56. Tree Felling/Maintenance Program (31.A.01)					
57. Aircraft/Airfield Construction Safety & Phasing Plan (CSPP) (32.A.02)					
58. Aircraft/Airfield Safety Plan Compliance Document (SPCD) (32.A.02)					
59. Site Safety and Health Plan (HTRW) (33.B)					
60. Confined Space Entry Procedures (34.A.05)					
61. Confined Space Program (34.A.06)					
j. Risk Management Processes (AHAs). Detailed project-specific hazards and controls shall be provided by Activity Hazard Analysis for each activity (DFOW). No work will begin on an activity (DFOW) until the initial AHA has been accepted by the GDA addressing the project-specific hazards. (01.A.14 & 01.A.15) <i>Note: USACE uses the Activity Hazard Analysis (AHA) as part of a total risk management process. Contractors and other individual employer's may use the AHAs or their own version [Job Safety Analyses (JSAs), Job Hazard Analyses (JHAs), or similar Risk Management assessment tools]. These documents are considered equivalent to, and acceptable substitutes for, the USACE's AHA provided the data collected is the same as that required by the AHA.</i>					
Remarks:					

<div><div>Form A-02</div><div>U.S. Army Corps of Engineers</div><div>Accident Prevention Plan Checklist (cont'd)</div></div>	<div>Date of Inspection</div>
<div>Other Remarks:</div>	

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ACTIVITY HAZARDS ANALYSIS

Overall Risk Assessment Code (RAC)
(Use highest code)

Date: _____ Project: _____

Activity: _____

Activity Location: _____

Prepared By: _____

Risk Assessment Code Matrix

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
s e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Add Identified Hazards

	JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	RAC
X				
X				
X				

Add Items

	EQUIPMENT	TRAINING	INSPECTION
X			
X			
X			

Involved Personnel:

Acceptance Authority (digital signature): _____

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SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g., ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
Internet: <https://web.aacei.org/>

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aaashto.org
Internet: <https://www.transportation.org/>

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)
330 N. Wabash Ave., Suite 2000
Chicago, IL 60611
Ph: 202-367-1155
E-mail: info@americanbearings.org
Internet: <https://www.americanbearings.org/>

AMERICAN CONCRETE INSTITUTE (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
Internet: <https://www.concrete.org/>

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
130 East Randolph, Suite 2000
Chicago, IL 60601
Ph: 312-670-5444
Fax: 312-670-5403
Steel Solutions Center: 866-275-2472
E-mail: solutions@aisc.org
Internet: <https://www.aisc.org/>

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1899 L Street, NW, 11th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
E-mail: storemanager@ansi.org
Internet: <https://www.ansi.org/>

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)
P.O. Box 28518
1711 Arlingate Lane
Columbus, OH 43228-0518
Ph: 800-222-2768 or 614-274-6003
Fax: 614-274-6899
E-mail: tjones@asnt.org
Internet: <https://www.asnt.org/>

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston, VA 20191
Ph: 800-548-2723; 703-295-6300
Internet: <https://www.asce.org/>

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Two Park Avenue
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: <https://www.asme.org/>

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)
520 N. Northwest Highway
Park Ridge, IL 60068
Ph: 847-699-2929
E-mail: customerservice@assp.org
Internet: <https://www.assp.org/>

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 W. Quincy Avenue
Denver, CO 80235 USA
Ph: 303-794-7711 or 800-926-7337
Fax: 303-347-0804
Internet: <https://www.awwa.org/>

AMERICAN WELDING SOCIETY (AWS)
8669 NW 36 Street, #130
Miami, FL 33166-6672
Ph: 800-443-9353
Internet: <https://www.aws.org/>

ASSOCIATION OF DIVING CONTRACTORS INTERNATIONAL (ADCI)
5206 Cypress Creek Parkway, Suite 202
Houston, TX 77069
Ph: 281-893-8388
Fax: 281-893-5118
Internet: <https://www.adc-int.org/>

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)
600 North 18th Street
P.O. Box 2641
Birmingham, AL 35291
Ph: 205-257-3839
Fax: 205-257-2540
Internet: <https://aeic.org/>

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: <https://www.astm.org/>

HYDRAULIC INSTITUTE (HI)
6 Campus Drive, First Floor North
Parsippany, NJ 07054-4405
Ph: 973-267-9700
Fax: 973-267-9055
Internet: <http://www.pumps.org>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-981-9667
E-mail: onlinesupport@ieee.org
Internet: <https://www.ieee.org/>

INTERNATIONAL CODE COUNCIL (ICC)
500 New Jersey Avenue, NW
6th Floor, Washington, DC 20001
Ph: 800-786-4452 or 888-422-7233
Fax: 202-783-2348
E-mail: order@iccsafe.org
Internet: <https://www.iccsafe.org/>

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)
3050 Old Centre Ave. Suite 101
Portage, MI 49024
Ph: 269-488-6382
Fax: 269-488-6383
Internet: <https://www.netaworld.org/>

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
3, rue de Varembe, 1st floor
P.O. Box 131
CH-1211 Geneva 20, Switzerland

Ph: 41-22-919-02-11
Fax: 41-22-919-03-00
E-mail: info@iec.ch
Internet: <https://www.iec.ch/>

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
ISO Central Secretariat
BIBC II
Chemin de Blandonnet 8
CP 401 - 1214 Vernier, Geneva
Switzerland
Ph: 41-22-749-01-11
E-mail: central@iso.ch
Internet: <https://www.iso.org>

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS
INDUSTRY (MSS)
127 Park Street, NE
Vienna, VA 22180-4602
Ph: 703-281-6613
E-mail: info@msshq.org
Internet: <http://msshq.org>

MASTER PAINTERS INSTITUTE (MPI)
2800 Ingleton Avenue
Burnaby, BC CANADA V5C 6G7
Ph: 1-888-674-8937
Fax: 1-888-211-8708
E-mail: info@paintinfo.com or techservices@mpi.net
Internet: <http://www.mpi.net/>

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 900
Arlington, VA 22209
Ph: 703-841-3200
Internet: <https://www.nema.org>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 800-344-3555
Fax: 800-593-6372
Internet: <https://www.nfpa.org>

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
100 Bureau Drive
Gaithersburg, MD 20899
Ph: 301-975-2000
Internet: <https://www.nist.gov/>

RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)
E-Mail: boltcouncil@gmail.com
Internet: <http://www.boltcouncil.org>

SOCIETY FOR PROTECTIVE COATINGS (SSPC)
800 Trumbull Drive
Pittsburgh, PA 15205
Ph: 877-281-7772 or 412-281-2331

Fax: 412-444-3591
E-mail: customerservice@sspc.org
Internet: <http://www.sspc.org>

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
1320 North Courthouse Road, Suite 200
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
E-mail: marketing@tiaonline.org
Internet: <https://www.tiaonline.org/>

U.S. ARMY (DA)
Army Publishing Directorate
9301 Chapek Rd., Bldg 1458
Fort Belvoir, VA 22060-5447
Ph: 703-614-3727
E-mail: usarmy.pentagon.hqda-apd.mbx.customer-service@mail.mil
Internet: <https://armypubs.army.mil/>

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
<http://www.wbdg.org/ffc/army-coe/standards>
Order Other Documents from:
Official Publications of the Headquarters, USACE
E-mail: hqpublications@usace.army.mil
Internet: <http://www.publications.usace.army.mil/>
or
<https://www.hnc.usace.army.mil/Missions/Engineering-Directorate/TECHINFO/>

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-571-3343
Fax: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: <https://www.ntis.gov/>
Obtain Military Specifications, Standards and Related Publications
from:
Acquisition Streamlining and Standardization Information System
(ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
Internet: <https://assist.dla.mil/online/start/>; account
registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet:

<https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc>

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

General Services Administration

1800 F Street, NW

Washington, DC 20405

Ph: 1-844-472-4111

Internet: <https://www.gsaelibrary.gsa.gov/ElibMain/home.do>

Obtain documents from:

Acquisition Streamlining and Standardization Information System
(ASSIST)

Internet: <https://assist.dla.mil/online/start/>; account
registration required

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

8601 Adelphi Road

College Park, MD 20740-6001

Ph: 866-272-6272

Internet: <https://www.archives.gov/>

Order documents from:

Superintendent of Documents

U.S. Government Publishing Office (GPO)

732 N. Capitol Street, NW

Washington, DC 20401

Ph: 202-512-1800 or 866-512-1800

Bookstore: 202-512-0132

Internet: <https://www.gpo.gov/>

U.S. NAVAL SEA SYSTEMS COMMAND (NAVSEA)

Commander Naval Sea Systems Command

1333 Isaac Hull Ave., SE

Washington Navy Yard, DC 20376

Ph: 202-781-0000

Internet: <https://www.navsea.navy.mil/>

UNDERWRITERS LABORATORIES (UL)

2600 N.W. Lake Road

Camas, WA 98607-8542

Ph: 877-854-3577 or 360-817-5500

E-mail: CustomerExperienceCenter@ul.com

Internet: <https://www.ul.com/>

UL Directories available through IHS at <https://ihsmarkit.com/>

WASHINGTON STATE ADMINISTRATIVE CODE (WAC)

Legislative Information Center

Cheri Randich, Manager

110 Legislative Building

Olympia, WA 98504-0600

Ph: 360-786-7573

E-mail: support@leg.wa.gov

Internet: <https://app.leg.wa.gov/wac/>

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

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RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)

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 - 1.2.2 Other Factors
- 1.3 RMS SOFTWARE
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RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

Comply with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Closeout
- Import/Export of Data

1.2.1 Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible between the Government and Contractor.

1.2.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", 01 33 00 SUBMITTAL PROCEDURES, and SECTION 01 45 04.00 28 CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through RMS. Also, there is no separate payment for establishing and maintaining the RMS database; costs associated will be included in the contract pricing for the work.

1.3 RMS SOFTWARE

RMS is a Windows-based program that can be run on a Windows-based PC meeting the requirements as specified in Paragraph: SYSTEM REQUIREMENTS. Download, install and be able to utilize the latest version of the RMS software within 7 calendar days of receipt of the Notice to Proceed. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (<http://rmsdocumentation.com>). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

1.4 SYSTEM REQUIREMENTS

The following is the recommended system configuration to run the Contractor Mode RMS for full utilization of all features for all types and sizes of contracts. Smaller, less complicated, projects may not require the configuration levels described below. Required configuration also noted below.

Recommended RMS System Requirements	
Hardware	
Windows-based PC	1.7 GHz i3; AMD A6 3650 GHz or higher processor (REQUIRED)
RAM	8 GB
Hard drive disk	100 GB space for sole use by RMS system
Monitor	Screen resolution 1366 x 768
Mouse or other pointing device	
Windows compatible printer	Laser printer must have 4 MB+ of RAM
Connection to the Internet	minimum 4 Mbs per user
Software	
MS Windows	Windows 7 x 64 bit (RMS requires 64 bit O/S) or newer (REQUIRED)
Word Processing software	Viewer for MS Word 2013, MS Excel 2013 or newer (REQUIRED)
E-mail	MAPI compatible (REQUIRED)

Recommended RMS System Requirements	
Virus protection software	Regularly upgraded with all issued Manufacturer's updates and is able to detect most zero day viruses (REQUIRED)

1.5 RELATED INFORMATION

1.5.1 RMS User Guide

After contract award, download instructions for the installation and use of RMS from the Government RMS Internet Website.

1.6 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance(QA)comments, as well as other miscellaneous administrative information.

1.7 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, RFI's, schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The contractor responsibilities for entries in RMS typically include the following items:

1.7.1 Administration

1.7.1.1 Contractor Information

Contain within the database the Contractor's name, address, telephone numbers, management staff, and other required items. Within 7 calendar days of receipt of RMS software from the Government, deliver Contractor administrative data in electronic format in RMS.

1.7.1.1.1 New Contractors to RMS-CM

Appoint a RMS-CM administrator. This administrator will be given appropriate administrative rights required to enter data by the Government.

1.7.1.2 Subcontractor Information

Contain within the database the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed. Assign each subcontractor/trade a unique Responsibility Code, provided in RMS. Within 7 calendar days of receipt of RMS software from the Government, deliver subcontractor administrative data in electronic format.

1.7.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.7.1.4 Equipment

Contain within the Contractor's RMS database a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.7.1.5 Management Reporting

RMS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of RMS. Among these reports are: Progress Payment Request worksheet, Quality Assurance/Quality Control (QA/QC) comments, Submittal Register Status, Three-Phase Control checklists.

1.7.1.6 Request For Information (RFI)

Exchange all Requests For Information (RFI) using the Built-in RFI generator and tracker in RMS. Email the RFI to the COR and the submittal transmittal mailbox specified in SECTION 01 33 00 SUBMITTAL PROCEDURES paragraph "Electronic Copies" and in the format specified in paragraph Format For Electronic Submittals.

1.7.2 Finances

1.7.2.1 Pay Activity Data

Include within the RMS database a list of pay activities that the Contractor develops in conjunction with the construction schedule. The sum of pay activities equals the total contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities equals the amount of each CLIN. The sum of all CLINs equals the contract amount.

1.7.2.2 Payment Requests

Prepare all progress payment requests using RMS. Complete the payment request worksheet, prompt payment certification, and payment invoice in RMS. Update the work completed under the contract, measured as percent or as specific quantities, at least monthly. After the update, generate a payment request report using RMS. Submit the payment request, prompt payment certification, and payment invoice with supporting data using RMS CM. Include emailing the notification to PayRequest@usace.army.mil of the payment request submitted in RMS.

1.7.3 Quality Control (QC)

RMS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements. Maintain

this data on a daily basis. Entered data will automatically output to the RMS generated daily report. Provide the Government a Contractor Quality Control (CQC) Plan within the time required in SECTION 01 45 04.00 28 CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, submit a RMS update reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.7.3.1 Daily Contractor Quality Control (CQC) Reports.

RMS includes the means to produce the Daily CQC Report. The Contractor can use other formats to record basic Quality Control(QC) data. However, the Daily CQC Report generated by RMS must be the Contractor's official report. Summarize data from any supplemental reports by the Contractor and consolidate onto the RMS-generated Daily CQC Report. Submit daily CQC Reports as required by SECTION 01 45 04.00 28 CONTRACTOR QUALITY CONTROL. Electronically submit reports to the Government within 24 hours after the date covered by the report. Provide the Government a printed signed copy of the QC Daily Report.

1.7.3.2 Deficiency Tracking.

Use RMS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using its Quality Control (QC) punch list items. Maintain a current log of its QC punch list items in the RMS database. The Government will log the deficiencies it has identified using its Quality Assurance (QA) punch list items. The Government's QA punch list items will be included in its export file to the Contractor. Regularly update the correction status of both QC and QA punch list items.

1.7.3.3 QC Requirements

Develop and maintain a complete list of QC testing and required structural and life safety special inspections required by the International Code Council (ICC), transferred and installed property, and user training requirements in RMS. Update data on these QC requirements as work progresses, and promptly provide the information to the Government via RMS.

1.7.3.4 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS.

1.7.3.5 Labor and Equipment Hours

Log labor and equipment exposure hours on a daily basis. The labor and equipment exposure data will be rolled up into a monthly exposure report.

1.7.3.6 Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. Regularly update the correction status of the safety comments. In addition, utilize RMS to advise the Government of any accidents occurring on the jobsite. A brief supplemental entry of an accident is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

1.7.3.7 Features of Work

Include a complete list of the features of work in the RMS database. A feature of work is associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.7.3.8 Hazard Analysis

Use RMS CM to develop a hazard analysis for each feature of work included in the CQC Plan. The Activity Hazard Analysis will include information required by EM 385-1-1, paragraph 01.A.13.

1.7.4 Submittal Management

The Government will provide the initial submittal register in electronic format. Thereafter, maintain a complete list of submittals, including completion of data columns. Dates when submittals are received and returned by the Government will be included. Use RMS CM to track and transmit submittals. ENG Form 4025, submittal transmittal form, and the submittal register update is produced using RMS. RMS will be used to update, store and exchange submittal registers and transmittals. In addition to requirements stated in specification SECTION 01 33 00, actual submittals are to be stored in RMS CM, with hard copies also provided. Exception will be where the Contracting Officer specifies only hard copies required, and where samples, spare parts, color boards, and full size drawings are to be provided.

1.7.5 Schedule

Develop a construction schedule consisting of pay activities, in accordance with SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS paragraph PROJECT SCHEDULE, SECTION 01 32 01.00 28 PROJECT SCHEDULE. Input and maintain in the RMS database the schedule either manually or by using the Standard Data Exchange Format (SDEF). Include with each pay request the updated schedule. Provide electronic copies of transmittals.

1.7.6 Import/Export of Data

RMS includes the ability to import schedule data using SDEF.

1.8 IMPLEMENTATION

Use of RMS CM as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS CM system. RMS CM is an integral part of the Contractor's management of quality control.

1.9 MONTHLY COORDINATION MEETING

Update the RMS CM database each workday. At least monthly, generate and submit a schedule update. At least one week prior to submittal, meet with the Government representative to review the planned progress payment data submission for errors and omissions.

Make required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will not be accepted. The Government will not process progress payments until all required

corrections are processed.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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 - 3.4.4 Additional Requirement
- 3.5 SUBMITTALS
- 3.6 CONTROL
 - 3.6.1 Preparatory Phase
 - 3.6.2 Initial Phase
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ATTACHMENTS:

Sample of Quality Control Report, WWD-QCR

-- End of Section Table of Contents --

SECTION 01 45 04.00 28

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 3740 (2004a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (2007) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable prices contained in The Schedule.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G C

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 GENERAL

Provide quality control and establish and maintain an effective quality control system in compliance with the clause entitled INSPECTION OF CONSTRUCTION of the CONTRACT CLAUSES. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all on-site construction operations and shall be keyed to the proposed construction sequence. Utilize established in-house quality control procedures to assure full compliance with all off-site work. Submit daily reports in compliance with paragraph DOCUMENTATION for all

on-site work and for all off-site work.

3.2 CONTRACTOR QUALITY CONTROL (CQC) PLAN

3.2.1 General

Submit for review by the Government, not later than 15 calendar days after receipt of Notice to Proceed, the Contractor Quality Control Plan proposed to implement the requirements of the clause entitled INSPECTION OF CONSTRUCTION of the CONTRACT CLAUSES. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQC Plan.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The CQC System Manager shall report directly to the owner of the firm or a senior manager not responsible for executing the work. The CQC can not work directly for the Project Manager or manager responsible for the execution of the work.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.

c. A copy of the letter to the CQC System Manager signed by the owner of the firm, or an equivalent individual within the company who is not responsible for managing this project, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work and rework of any nonconformance work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be subject to approval by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from

identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the Coordination Meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC plan, notify the Contracting Officer in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Meeting, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance inspection. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor. Contractor is responsible for preparing the meeting minutes. See Section 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS, paragraph ADDITIONAL MEETINGS.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Site Safety and Health Officer (SSHO) shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC

organization. The CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who is responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, mechanical. These individuals shall be directly employed by the prime Contractor and may not be employed by a supplier or subcontractor on this project; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. A single person may cover more than one area provided that they are qualified to perform QC activities in each designated area, and that workload allows.

3.4.4 Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager and CQC assistant shall have completed the course entitled "Construction Quality Management for Contractors" within the last five (5) years. This course will periodically be offered at various locations throughout the Pacific Northwest. For information concerning this course call your local Associated General Contractors (AGC) Plan Room.

NOTE: For contractor personnel who otherwise fulfill all requirements for designation as a CQC System Manager but have not had the opportunity to obtain a CQM certificate as a result of pandemic restrictions, the Government will tentatively accept proposed personnel until COVID-19 restrictions are lifted. Once the COVID-19 restrictions are lifted and USACE is able to provide face to face CQM training, the proposed personnel have 120 calendar days to obtain the CQM certificate.

3.5 SUBMITTALS

Submittals shall be as specified in SECTION 01 33 00 SUBMITTAL PROCEDURES. The CQC System Manager shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including on-site fabrication, and shall be keyed to the proposed construction sequence. The controls shall include at least three (3) phases of control to be conducted by the CQC System Manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract plans.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. A check to assure that provisions have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawing or submitted data, and are properly stored.
- g. A review of the appropriate Activity Hazard Analysis to assure safety requirements are met.
- h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily QC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

k. The preparatory meeting will include a review of the submittal register to ensure all the required submittals for this portion of the work have been approved and contractor has approved submittals in hand.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verification of full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase shall be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily inspections shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The inspections shall be made a matter of record in the CQC documentation. Final follow-up inspections shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. Do not build upon or conceal non-conforming work. Maintain working "as-built" contract drawings as required in SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work as determined by the Government if the quality of on-going work is unacceptable; or if there are changes in the applicable QC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in [ASTM D 3740](#) and [ASTM E 329](#).

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Contracting

Officer.

3.8 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in clause: COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Contracting Officer. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Contract Clauses Section, "Commencement, Prosecution, and Completion of Work," or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government and provide the list of correct deficiencies to the Government.

3.8.2 Pre-Final Inspection

The Government will perform the Pre-Final Inspection to verify that the contract work is complete and ready to for use. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection can be scheduled. Any items noted on the Pre-Final Inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from the District Office, may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that

all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

Maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form, see attached Sample of Quality Control Report, WWD-QCR, and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- d. Off-site surveillance activities, including actions taken.
- e. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- f. List instructions given/received and conflicts in plans and/or specifications.
- g. Contractor's verification statement.
- h. Work performed today, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- i. Material received with statement as to its acceptability and storage.
- j. Identify submittals reviewed, with contract reference, by whom, and action taken.
- k. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one (1) copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted within 24 hours for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven (7) calendar days of no work and on the last

day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. After receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order suspending or stopping all or part of the work until satisfactory corrective action has been taken.

3.11 PROJECT CLOSE OUT

Within 30 calendar days of construction completion date, the CQC System Manager shall review the Submittal Register and formally notify the Contracting Officer of the schedule in submitting all outstanding submittals. A weekly update shall be provided with an updated schedule until all submittals have been received. Once all the submittals have been approved, the CQC System Manager submits a letter Contracting Officer certifying all submittals have been submitted.

-- End of Section --

CONTRACTOR'S NAME
(Address)

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Contract No.: _____ Date: _____ Report No.: _____

Description and Location of Work: _____

WEATHER: (Clear) (P. Cloudy) (Cloudy) Temperature: _____Min. _____Max.
Rainfall: _____inches

Contractor/Subcontractors and Area of Responsibility with Labor Count for Each:

a. _____

b. _____

c. _____

d. _____

Equipment Data: (Indicate items of construction equipment, other than hand tools, at the jobsite, and whether or not used.)

1. Work Performed Today: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in table above.)*

2. Results of Surveillance: (Include satisfactory work completed, or deficiencies, with action to be taken.)*

a. Preparatory Inspection:

b. Initial Inspection:

c. Follow-up Inspections:

3. Tests Required by Plans and/or Specifications Performed and Results of Tests:

4. Verbal Instructions Received: (List any instructions given by Government personnel on construction deficiencies, retesting required, etc., with action to be taken.)*

5. Remarks: (Cover any conflicts in plans, specifications, or instructions, or any delay to the job attributable to weather conditions. Include environment protection activities, construction deficiencies and corrective action, etc.)*

6. Results of Safety Inspection: (Include safety violations and corrective actions taken.)*

(Contractor's Inspector)

CONTRACTOR'S VERIFICATION: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications except as noted above.*

CQC System Manager

*Attach additional sheet as necessary.

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DIVISION 01 - GENERAL REQUIREMENTS

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TEMPORARY UTILITIES

PART 1 GENERAL

1.1 REFERENCES

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1.2.5 Phone Service

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section Table of Contents --

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SECTION 01 51 00.00 28

TEMPORARY UTILITIES

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

Comply with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 TEMPORARY UTILITIES

1.2.1 Sanitation Facilities

The Government's restrooms on the Project will not be available for use by Contractor personnel. Furnish sanitation facilities in accordance with EM 385-1-1. All facilities shall be located outside the Powerhouse. The location of all facilities will be subject to Contracting Officer approval. Provide wind anchorage to prevent any spillage. In addition, freeze protection shall be provided during the months October through March.

1.2.2 Water

No water is available for Contractor use.

1.2.3 Electricity

Electric power will be made available to the Contractor from the existing electrical systems around the Project and will be supplied without cost to the Contractor. Power is available from existing 120 volt, 1 phase, 15 ampere receptacles, and 480 volt, 3 phase, 30 ampere receptacles. The Government receptacles are located at various sites around the Project. Temporary wiring may be required to facilitate the work. The location of all temporary power lines and connections will be subject to Contracting Officer approval. All temporary circuits, wire, extension cords, and devices shall comply with EM 385-1-1 and shall be furnished, installed, connected, and maintained by the Contractor in a workmanlike manner. All temporary circuits, wire, extension cords, and devices shall be removed by the Contractor, in a workmanlike manner, prior to final acceptance by the Government. All temporary electrical lines and appurtenances shall be furnished and installed at no additional cost to the Government. Only Government Operators can reset existing over-current devices.

1.2.3.1 Temporary Power for Contractor Pumps

See SECTION 02 24 10.02 28 DEWATERING for information related to Temporary

Power used to operate Contractor provided pumps.

1.2.4 Compressed Air

Compressed air at 100 psi up to 20 SCFM will be made available for Contractor use from existing outlets at no cost. Government personnel will also use the compressed air at times for routine and emergency maintenance operations. Government personnel will have priority for use of the compressed air.

1.2.5 Phone Service

No phone service is available for Contractor use through the projects' phone systems. Outside phone lines may be obtained by contacting the telephone companies that service these areas.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used) -- End of Section --

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CONTRACTOR WORK, ACCESS AND STORAGE AREAS

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- 1.4 CONTRACTOR WORK AREA AND ACCESS TO WORK AREA
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- 1.5 GOVERNMENT ROADWAYS AND DECK ACCESS RESTRICTIONS
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- 1.8 BOAT RESTRICTED ZONE POLICY (BRZ)
- 1.9 RADIO AND TELEPHONE COMMUNICATION
- 1.10 PERMITS AND RESPONSIBILITIES
- 1.11 DUST CONTROL PLAN
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 - 1.13.1 Fire Hazards

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

ATTACHMENTS:

Boat Restricted Zone (BRZ) Policy

-- End of Section Table of Contents --

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SECTION 01 55 10.00 28

CONTRACTOR WORK, ACCESS AND STORAGE AREAS

PART 1 GENERAL

The work covered by this section of the specifications consists of work common to more than one section of these TECHNICAL SPECIFICATIONS.

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO LRFD (8th Edition; 2017) Bridge Design
Specifications

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

Responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Transport Loading Diagrams; G ST

Dust Control Plan; I C

1.3 CONTRACTOR'S STORAGE AND STAGING AREA

Storage and staging areas shall be at locations indicated or as otherwise approved by the Contracting Officer. The storage and staging areas may be used for activities such as setup of an office trailer, parking of private vehicles, storage of materials and equipment, and for work activities. Security at the storage and staging site will be the Contractor's responsibility. Install temporary security fencing in a manner approved by the Contracting Officer. Security fencing shall not be installed in a manner that damages existing facilities, such as punching post holes in existing pavement.

1.4 CONTRACTOR WORK AREA AND ACCESS TO WORK AREA

1.4.1 Work and Storage Areas

- a. Limited work, storage, and staging areas will be available within the Powerhouse. Temporary staging prior to lowering items through floor hatches will be available on the Generator floor area El. 287, on a case by case basis. Limited storage area is available on El. 235.5.
- b. See drawings for additional information. Areas are subject to change. Coordinate additional work and storage area requirements with the Contracting Officer (KO). All other stairways, doorways, and floor drainage gutters shall remain open and accessible.
- c. Temporary storage of equipment and materials in the Powerhouse shall be limited to those items required for performance of the work. The Government will not be responsible for providing security for stored equipment, supplies, and materials either inside or outside the powerhouse. Provide all necessary security.

1.4.2 Access to Work Area

- a. Access to work area for personnel will be from the lower parking lot on the Oregon side of the dam, through the personnel door on El. 287 to the Powerhouse interior.
- b. Access for supplies and equipment needing to be moved through the different elevations of the Powerhouse will be through hatches located in floors El. 287.
- c. Contractor may use the Government's powerhouse bridge crane to unload trucks, lower equipment through floor hatches, and to remove and install hatch covers. See SECTION 01 14 00.10 28 PROJECT SITE RESTRICTIONS, paragraph USE OF POWERHOUSE BRIDGE CRANE.
- d. Whenever hatch covers are removed, install temporary guard railing around open hatches. Guard railing shall be in place around open hatches at all times. All guard railing shall conform to EM 385-1-1.
- e. Powerhouse deliveries will be on the South side of the Powerhouse, unless approved otherwise by the Contracting Officer. See Sheet G-103 for route and notes.
- f. See SECTION 01 14 00.10 28 PROJECT SITE RESTRICTIONS for additional access information.

1.4.3 Use or Blockage of Powerhouse Main Door.

Coordinate all use and/or blockage of the Powerhouse Main Door with the KO, a minimum of 7 calendar days prior anticipated use/blockage.

1.5 GOVERNMENT ROADWAYS AND DECK ACCESS RESTRICTIONS

- a. The roadway across McNary dam is not available for use by the public or the Contractor, to include vehicle turnarounds. Access across the Columbia River is over the interstate highway bridge located two miles downstream from the dam. Project access is only available from the Oregon (South) side tailrace deck.

b. Hauling of materials and equipment will be permitted on Project's roadways, bridges and decks. Submit [transport loading diagrams](#) indicating wheel loads and axle configurations for transport vehicles to haul loads exceeding HS-20, in accordance with [AASHTO LRFD Bridge Design Specifications](#). ([AASHTO LRFD Bridge Design Specifications](#) defines HS-20 vehicles as having a gross vehicle weight of 72,000 lbs. and a maximum axle load of 32,000 lbs).

c. Approximate maximum load capacity on roadways on the dam structure is 1.2 times higher than HS-20 load. All transport vehicles exceeding HS-20 loads must have approved transport loading diagrams before accessing roadways over the dam. Protect the various portions of the Project's structures from damage by traffic, prevent material from falling through the deck openings, and also keep the areas in use cleaned up and orderly at all times during use. Vehicle speeds, special precautions, and safety measures shall be as directed by the Contracting Officer.

d. Maintain at least one way traffic at all times on the tailrace deck, except if temporary blockage of the tailrace deck is allowed by the Contracting Officer (KO) for short durations of time in order to load and unload materials and equipment. Coordinate complete blockages with the KO a minimum of 2 Government workdays in advance of anticipated blockage. See [SECTION 01 14 00.10 28 PROJECT SITE RESTRICTIONS](#), paragraph "Government's Work Schedule" for additional information.

1.6 TRAFFIC CONTROL AND PUBLIC ACCESS

Existing public roads and access roads shall be kept open to vehicle traffic at all times. Conduct this work in such a manner as will obstruct and inconvenience traffic as little as possible. When necessary to operate on or cross existing highways or roads, furnish signs, lights, and/or other necessary safeguards to safely control and direct the flow of traffic. Obtain any and all required permits for such operations from the appropriate private or public authority at no additional cost to the Government.

1.6.1 Public Access Barriers

In areas where the public has access to the job site, construct temporary barriers around ongoing work with bright orange plastic fencing. The barrier shall be maintained until completion of the individual piece of work.

1.7 OVERHEAD BIRD EXCLUSION WIRES

a. Bird Exclusion Wires span from the Oregon fish pump entrance and Fish Ladder Entrance to the Navigation Lock, downstream guide wall. Exclusion wires run north-south, and are spaced approximately 25-35 feet apart.

b. Wire elevations vary, but are at approximately EL 287 feet mean sea level (fmsl) at McNary. Wires may need to be removed to allow Contractor access through the BRZ to the work area. Contractor shall remove and dispose of all wires required, in order to perform work on this Contract. Wires shall be replaced by others.

c. Wires are 1x7 stainless steel cable, 3/64" in diameter, with a

breaking strength of 300 lbs.

d. Wires are in tension. Contractor shall take care in removal. Contractor shall be responsible for all safety considerations and any damage caused during removal of Bird Exclusion Wires.

1.8 BOAT RESTRICTED ZONE POLICY (BRZ)

The Boat Restricted Zone (BRZ) Policy is attached at the end of this SECTION. Check with the Contracting Officer for BRZ policy updates prior to the Pre-Construction Meeting.

1.9 RADIO AND TELEPHONE COMMUNICATION

Furnish a radio on all Contractor watercraft, capable of transmitting and receiving on all frequencies, including 156.700 MHz (marine band channel 14 - primary channel) and 156.800 MHz (marine band channel 16 - backup channel). When needed, the McNary Project Powerhouse operator will communicate with the Contractor by radio on the marine band channels mentioned above. Furnish a list of supervisory personnel and their telephone numbers to be notified during non-working hours.

1.10 PERMITS AND RESPONSIBILITIES

Contractor shall be responsible for complying with all Federal, State, and municipal laws, codes, and regulations applicable to work on this contract. This includes obtaining all necessary licenses and permits related to transportation of equipment and/or contract items, and other areas of work on this contract, as applicable. Licenses and permits shall be obtained without additional expense to the Government.

1.11 DUST CONTROL PLAN

Dust control during dust generating activities is the responsibility of the Contractor. Submit a written Dust Control Plan detailing what will be done to prevent dust. Related information is located in the following specs. List may not be inclusive. The Dust Control plan shall reflect all requirements in these specifications:

a. SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS, paragraph AIR PURITY CONTROL IN THE POWERHOUSE.

b. SECTION 03 30 70.00 28 CONCRETE DEMOLITION, REPAIR OF CONCRETE SURFACES, AND EQUIPMENT FOUNDATIONS, paragraph TEMPORARY BARRIER.

c. SECTION 05 05 20.00 28 POST-INSTALLED ANCHORS IN CONCRETE, paragraph DUST CONTROL.

1.12 HAULING MATERIAL

No material shall be allowed to drop off vehicles while in transit. The Contractor shall take all necessary precautions to prevent any material from dropping off the vehicle onto local roads.

1.13 FIRE CONTROL

Each piece of internal combustion engine driven equipment used at the work site shall be equipped with a fire extinguisher in accordance with National Fire Protection Association (NFPA) recommendations as

appropriate. The minimum approved rating of extinguishers shall not be less than 5-B:C.

1.13.1 Fire Hazards

The Contractor shall eliminate all potential fire hazards that may result from their operations. This includes work on or near buildings, grounds, use of equipment, and the storage of supplies, fuels, or cleaning agents. This also includes the removal of any accumulation of burnable or flammable materials or debris around chain-linked fences, signs, and other fixtures on the Project site.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used) -- End of Section --

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Standing Order No. OPN – 74
McNary Project

Boat Restricted Zone (BRZ)
February 28, 2013

1. **Purpose** - The McNary Project establishes this Boat Restricted Zone (BRZ) Policy to ensure that persons whose work requires them to enter the restricted zones are fully apprised of the hazards associated with the structures, current operating conditions, and the required equipment to safely deal with the hazards.
2. **Scope** - The BRZ Policy is applicable to all persons or equipment entering the Boat Restricted Zones at McNary Lock and Dam. The map in Appendix A shows the BRZ's.
3. **General** - The waters immediately around the structures and channels at the project present fixed and dynamic hazards to personnel and equipment performing work in close proximity to these areas.
 - a) Cables and wires may span the channels both upstream and downstream of the powerhouses and spillway structures. Changing pool elevations cause a varying clearance between the water and cables or wires. The cables and wires may be both above and below the water level. The wires and cables are difficult to see in daylight and impossible to see during the hours of darkness.
 - b) The structures have open, unprotected water inlets and outlets that are capable of ingesting, capsizing or swamping smaller vessels. These facilities have both remote and automatic operating capabilities.
 - c) Water velocities at the surface and below are constantly altered due to normal operation of the turbines and spillway gates. (These alterations may occur automatically or remotely.)
 - d) Protective relay actions can cause sudden water elevation variations resulting in a sudden increase or decrease in water velocities. These sudden elevation changes are sufficient in magnitude and duration to capsize a vessel, or pitch them into structures or wires when in close proximity. Personnel on board vessels are at great risk of being cast overboard during sudden elevation changes resulting from load rejection events.
 - e) Surface and submerged debris are an ever-present danger and are capable of fouling or breaking vessel propulsion or steering mechanisms.
 - f) Boat entrance into the forebay BRZ at night will not be allowed without meeting the requirements in this document and equipment being tagged out according to Procedure 385-1-20 (Powerhouse Safety Clearance Procedure).

- (1) Boats may not enter the tailrace BRZ at night.

4. **Requirements** - Personnel and Vessel Safety Equipment.

- a) All BRZ entrances will be at the discretion of the Operator in Charge.
- b) All personnel must wear U.S. Coast Guard (USCG) approved personal flotation devices while in the BRZ.
- c) All vessels entering the BRZ will meet or exceed USCG safety standards for day and night operations. Included are fire extinguishing capabilities, running and anchor lights, and an audible warning device capable of being heard anywhere within the BRZ. Each vessel entering the BRZ will have either a current USCG certification or state inspection sticker on the boat demonstrating the equipment meets current safety standards.
- d) Depending on location, one boat with two motors or two boats (one being used as a rescue boat) will be required.
- e) A marine band radio capable of communication with the project control room on Channel 14 must be available to the boat operator(s). Failure to maintain communication with the control room during the period the boat(s) are operating within the BRZ is cause for removal from the BRZ and denial of future access.
 - (1) A rescue line requirements:
 - (2) Shall be available in a throw bag or other approved device;
 - (3) Shall be of sufficient length (at least 50 feet) to reach personnel that have gone overboard; and shall consist of buoyant material.
- f) A spotlight that can be easily operated by the boat operator must be available.
- g) No vessel may enter the BRZ without proper coordination with the Operating Project Manager or his/her representative:
- h) The applicant must submit a written request for access to the Operations Project Manager two weeks in advance of the anticipated work date(s). The request must include a schedule and written work plan.
- i) The work plan must include a description of the work to be performed, the locations of the work and any known project operating requirements or restrictions necessary.
Requests that require project support must be as far in advance as possible, but a minimum of 30 days prior to the anticipated need.
- j) The applicant must submit a written job and activity hazard analysis with the written request.

k) Immediately prior to entering the BRZ, entrants must contact the control room operator, using marine band radio Channel 14, and request permission to enter the BRZ. The entrants must identify themselves and the BRZ to be entered. This will allow the control room operator time to relay any pertinent real time conditions about the BRZ prior to granting final approval. The BRZ entrants will contact the control room operator at the time they are leaving the BRZ.

l) The project has two distinctive boat restricted zones (forebay and tailrace) that are split up again between the spillway and powerhouse. They all present varying degrees of risk. Consequently, they have varying requirements.

5. **BRZ Forebay Powerhouse** - Operations in the forebay BRZ upstream of the powerhouse have the risk of vessels being pulled into structures, wires and cables. It may be required to clear out the Main Unit Turbine and adjacent Main Unit Turbines during boating activities in the upstream BRZ that require approachment closer than 400 feet to the Dam structure. This will be dependent on several factors (project flows, weather, debris, type of work being performed, etc.)

a) The work vessel second engine shall be of sufficient power that it can propel the boat and anticipated load upstream against current flows.

b) If the nature of the work is outside of 400 feet from the dam, BRZ entrants will have a second boat engine or standby safety boat for their activities while the Units are operating.

c) The work vessel's second engine shall be of sufficient power that it can propel the boat and anticipated load upstream against current flows.

d) While acting as the safety boat, occupants of the boat will have no duties other than observing the primary boat inside the BRZ.

e) The safety boat will meet all the other requirements listed in the "Requirements" section (above).

6. **BRZ Forebay Spillway** - Operations in the forebay BRZ at the spillway have the additional risk of surface spill due to the Top Spill Weir (TSW). No BRZ entrances will be made in front of the spillway until the TSW's spillway gate has been tagged out in accordance with 385-1-20.


a) If the nature of the work is outside of 400 feet to the spillway structure and the TSW is tagged out, BRZ entrants will have a second boat engine or standby safety boat for their activities while spilling. During times of high flows through the spillway, entrance into the spillway BRZ may be prohibited.

b) The work vessel second engine shall be of sufficient power that it can propel the boat and anticipated load upstream against current flows.

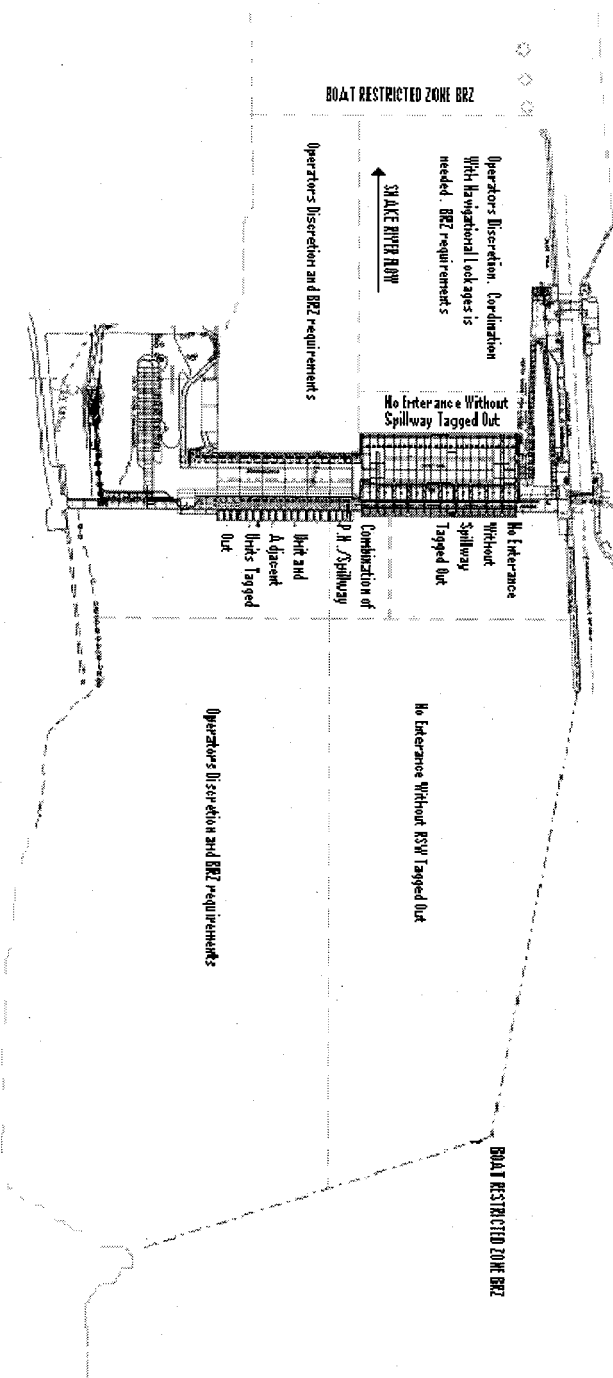
- c) While acting as the safety boat, occupants of the boat will have no other duties other than observing the primary boat inside the BRZ.
 - d) The safety boat will meet all the other requirements listed in the “Requirements” section (above).
7. **BRZ Forebay North of Unit 12 and South of Spillbay 20** - When boat operations in the forebay require work north of Unit 12 and south of Spillway Bay 20, a combination of powerhouse and spillway requirements shall be used.
- a) No entrance into this area will be allowed without the TSW tagged out.
8. **BRZ Tail Race of Powerhouse** - BRZ entrants will have a second boat engine or standby safety boat for their activities.
- a) The work vessel second engine shall be of sufficient power that it can propel the boat and anticipated load against current flows.
 - b) While acting as the safety boat, occupants of the boat will have no other duties other than observing the primary boat inside the BRZ.
 - c) The safety boat will meet all the other requirements listed in the “Requirements” section (above).
9. **BRZ Tail Race of Spillway** - The spillway shall be cleared out during boating activity in the Tailrace BRZ that requires approach within 200 feet to the Spillway structure.
- a) BRZ entrants will have a second boat engine or standby safety boat for their activities.
 - b) The work vessel second engine shall be of sufficient power that it can propel the boat and anticipated load against current flows.
 - c) While acting as the safety boat, occupants of the boat will have no duties except observing the primary boat inside the BRZ.
 - d) The safety boat will meet all the other requirements listed in the “Requirements” section (above).
 - e) If the nature of the work is outside of 200 feet from the spillway structure, BRZ entrants will not be required to clear out the spillway. However, close communication is still necessary. BRZ entrants will have a second boat engine or standby safety boat for their activities.
 - f) The work vessel second engine shall be of sufficient power that it can propel the boat and anticipated load against current flows.

g) While acting as the safety boat, occupants of the boat will have no duties except to observe the primary boat inside the BRZ.

h) The safety boat will meet all the other requirements listed in the "Requirements" section (above).


DAVID R. COLEMAN
Operations Project Manager
McNary Lock and Dam

APPENDIX A



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SECTION 01 57 20.00 28

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 GENERAL INFORMATION

- a. This SECTION covers preventing environmental pollution and minimizing environmental degradation during and as a result of construction operations. Other requirements in the Technical Sections may also contain specific requirements for environmental protection. Those specific requirements are in addition to or modify the requirements in this SECTION. The control of environmental pollution requires consideration of sound levels, air, water, and land resources.
- b. Waste in the Unwatering Sump and Drainage Sump is to be removed and disposed of as part of work on this Project. Assume waste and/or debris in both sumps will test positive for hazardous waste. See paragraph UNWATERING AND DRAINAGE SUMP DEBRIS - TESTING AND DISPOSAL, for additional information.
- c. The following items may contain asbestos as indicated. Contractor shall test for asbestos prior to work on these items:
 1. All Unwatering pumps, and Unwatering pump motor #3 may be original equipment and contain asbestos in gaskets and other interior components.
 2. All original pipe flange fittings may have asbestos gaskets.
- d. Several items are coated with Toxic Metals Based Paint. See SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL for additional information. See paragraph METAL BASED PAINT ABATEMENT in this SECTION for testing, and disposal information.
- e. Contractor shall remove and dispose of the following:
 1. Approximately 30 gallons of used oil from existing equipment.
 2. Approximately 12 gallons of farval grease. Includes farval system, pump, and motor bearings.

1.2 PUBLICATIONS

1.2.1 Applicable Regulations

Prevent, abate, and control all environmental pollution, and minimize environmental degradation by complying with all applicable Federal, State, and local laws and regulations, as well as specific requirements of this Contract. Where conflicting or duplicate regulations apply, the most stringent requirement shall govern. Comply with the most current version of the following list of environmental regulations where applicable. This list is not inclusive of all environmental laws and regulations with which the Contractor shall comply, but represents those that are most likely to apply to work under this Contract.

1.2.2 Referenced Publications and Regulations

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

WETLANDS DELINEATION MANUAL (1987) Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1

ASTM INTERNATIONAL (ASTM)

ASTM D5864 (2011) Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components

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

29 CFR 1910.1001 OSHA General Industry - Asbestos

29 CFR 1910.1200 OSHA General Industry - Hazard Communication

29 CFR 1910.120 OSHA General Industry - Hazardous Waste Operations and Emergency Response (HAZWOPER)

29 CFR 1926.1101 OSHA Construction - Asbestos

29 CFR 1926.65 OSHA Construction - Hazardous Waste Operations and Emergency Response (HAZWOPER)

33 CFR 328 Definition of Waters of the United States

40 CFR 112 Oil Pollution Prevention

40 CFR 122 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

40 CFR 122.26 Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)

40 CFR 763 Toxic Substances Control Act (TSCA) - Asbestos

49 CFR 171 General Information, Regulations, and Definitions

49 CFR 171-178 Transportation of Hazardous Materials

Regulations

40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	RCRA Standards Applicable to Transporters of Hazardous Waste
40 CFR 273	Standards for the Management of Universal Waste - light bulbs, batteries, mercury switches
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Comprehensive Environmental Response Compensation and Liability Act (CERCLA) - Hazardous Substance Spill Reporting Requirements: Asbestos, PCBs, etc.
40 CFR 355	Emergency Planning and Notification
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 82	Protection of Stratospheric Ozone - Refrigerant and SF6 Gas
49 CFR 178	Specifications for Packagings

WASHINGTON STATE ADMINISTRATIVE CODE (WAC)

WAC 173-303	Dangerous Waste Regulation
WAC 173-400	General Standard for Maximum Emissions

OREGON ADMINISTRATIVE RULES (OAR)

OAR 340-093	Solid Waste: General Provisions
OAR 340-101	Identification and Listing of Hazardous Waste
OAR 340-111	Used Oil Management
OAR 340-113	Universal Waste Management

IDAHO ADMINISTRATIVE PROCEDURES ACT (IDAPA)

IDAPA 58.01.05

Rules and Standards for Hazardous Waste

WYOMING STATUTES (W.S.)

W.S. 35-11-101

Hazardous Waste Management: General Provisions

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. The designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G, ECC

SD-06 Test Reports

TCLP Testing; I, ECC

TCLP Testing - Unwatering Sump Debris; I, ECC

TCLP Testing - Drainage Sump Debris; I, ECC

SD-07 Certificates

Notification to The Recycler; I, ECC

Notification To The Disposal Site; I, ECC

Recycling Facility; I, ECC

Disposal Facility; I, ECC

1.4 DEFINITIONS

1.4.1 Discarded Material

The term "discarded material", as used herein, is any material that is abandoned, recycled, or considered "inherently waste-like" as described in 40 CFR 260

1.4.2 Environmental Pollution and Damage

The term "environmental pollution and damage", as used herein, is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally, and/or historically.

1.4.3 Environmental Litigation

The term "environmental litigation", as used herein, means a lawsuit

alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect work has on the environment.

1.4.4 Environmental Protection

The term "environmental protection", as used herein, is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4.5 Solid Waste

The term "solid waste", as used herein, is any discarded material that is not excluded under 40 CFR 261.4(a) or that is not excluded by a variance granted under 260.30 and 260.31 or that is not excluded by a non-waste determination under 260.30 and 260.34.

1.4.6 Hazardous Waste

The term "hazardous waste", as used herein, is a Solid Waste that is not excluded from regulation under 40 CFR 262.11, but is either:

- a. A listed waste under subpart D of 40 CFR 261 or;
- b. A characteristic waste as described in subpart C of 40 CFR 261 or;
- c. Residues which are subject to regulation as hazardous wastes under Oregon Administrative Rules OAR 340-101-0001.

1.4.7 Universal Waste

The term "universal waste", as used herein, is any of the following Hazardous Wastes that are subject to the universal waste requirements of 40 CFR 273, OAR 340-113-0000.

- a. Used batteries that designate as hazardous waste including; lead acid batteries, lithium ion batteries, nickel-cadmium batteries, alkaline batteries, etc.
- b. Used light bulbs that designate as hazardous waste including; florescent bulbs, compact florescent bulbs, sodium vapor lamps, mercury vapor lamps, etc.
- c. Used mercury containing material which is a device or part of a device that contains elemental mercury integral to its function including; thermostats, thermometers, electrical switches, etc.

1.4.8 Other Regulated Waste

The term "other regulated waste", as used herein, is a solid waste that is not a hazardous waste, but is still regulated by federal and state laws for transportation and/or disposal. The types of waste in this category include, but are not limited to: asbestos, PCB contaminated waste, used oil, oily water, anti-freeze, refrigerants and compressed gasses.

1.4.9 Surface Discharge

The term "surface discharge", as used herein, implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge the water from the governing agency under 40 CFR 122.26.

1.4.10 Waters of the United States

The term "waters of the United States (U.S.)", as used herein, include all waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.4.11 Fugitive Dust

The term "fugitive dust", as used herein, is particulate matter that is generated or emitted from open air operations (emissions that do not pass through a stack or vent). Particulate matter consists of solid particles and liquid droplets suspended in the air. These small airborne particles have the potential to adversely affect human health or the environment.

1.5 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this Contract. Comply with all applicable Federal, State, and local environmental laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations is the Contractor's responsibility.

1.6 ENVIRONMENTAL PROTECTION PLAN

a. Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan (EPP) for review and approval by the Contracting Officer. Submit the EPP no later than 90 days prior to the start of on-site work.

b. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which shall be addressed during construction. Define issues of concern within the Environmental Protection Plan as outlined in this SECTION. Address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Identify and discuss topics or issues which are not identified in this SECTION, but which is considered necessary, after those items formally identified in this SECTION. The Environmental Protection Plan shall be current and maintained on site.

1.6.1 Compliance

No requirement in this SECTION shall relieve the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During construction, identify, implement, and submit for approval any additional requirements to be included in the Environmental Protection Plan.

1.6.2 Contents

The Environmental Protection Plan (EPP) shall include, but not be limited to, the following:

- a. Name(s) and phone numbers of individual(s) within the Contractor's organization responsible for ensuring adherence to the Environmental Protection Plan.
- b. Description of the Contractor's environmental protection personnel training program.
- c. Contractor's process for immediately notifying the Contracting Officer (KO), onsite Construction Representative and the Facility's Environmental Compliance Coordinator (ECC) of any spills. The Contractor is responsible for all spill notifications to regulatory agencies (Federal, State, and local). This plan will include the contact information for Federal, State, and local agencies. In the event of a spill, provide a copy of the notification reports to the KO and ECC.
- d. Solid Wastes Management Plan
 1. Solid waste is as defined in 40 CFR 261. The EPP shall describe how solid wastes will be picked up and placed in covered containers which are emptied regularly.
 2. Housekeeping measures to prevent contamination of the site or other areas when handling and disposing of solid waste.
 3. Management of spent hazardous material shall be described in the Hazardous Waste Handling Plan .
- e. Hazardous Waste Handling Plan that complies with all Federal, State, and local laws or regulations that pertain to generation, storage, and transportation of hazardous materials: 40 CFR 260-40 CFR 263, OAR 340-093-005, 49 CFR 171-178, 29 CFR 1910.120/29 CFR 1926.65. This includes the handling of such hazardous materials as hazardous wastes (including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags) if applicable. The Contractor shall prepare and submit a compliance plan detailing how the Contractor handles hazardous materials, petroleum products, and hazardous waste personnel qualifications. The plan shall include all the elements specified in Part 3 EXECUTION as applicable.
- f. Fugitive dust control plan.
- g. Used Oil Management plan for any used oil to be transported off-project in accordance with 40 CFR 279, OAR 340-111-000.
- h. Universal Waste Management and Disposal plan for light bulbs, batteries and mercury ampules in accordance with 40 CFR 273 and OAR 340-113-0002.
- i. Wastewater management plan that identifies the methods and procedures for management and/or discharge of wastewaters which are directly derived from construction activities, such as concrete curing water, clean up water, dewatering of ground water, disinfections water, hydrostatic test water, and water used in flushing of lines.

Waste water will not be disposed of on government property or into waters of the U.S.

j. Asbestos Abatement plan that complies with all Federal and State regulations that pertain to asbestos: 29 CFR 1910.1001, 29 CFR 1926.1101, 40 CFR 763, 40 CFR 61 49 CFR 171-178. This includes but is not limited to notification to the State 10-days prior to abatement, worker training and certifications, air monitoring, sampling, waste shipments, labeling and removal methods.

1.7 ENVIRONMENTAL REVIEW OF CONTRACT VARIATIONS

Any proposed Contractor methods or requested variations from the specifications and drawings that may have an environmental impact will be subject to approval by the KO and may require an extended review, processing, and approval time. The KO reserves the right to disapprove alternate methods OR VARIATIONS, even if they are more cost effective, if the KO determines that the proposed alternate method OR VARIATION will have an unacceptable adverse environmental impact.

1.8 NOTIFICATION

The KO will notify the Contractor in writing of any observed noncompliance with Federal, State, or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection Plan. After receipt of such notice, inform the KO of the proposed corrective action and take such action when approved by the KO. The KO may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the KO may take under the Contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 WASTE HANDLING AND DISPOSAL

Dispose of wastes as directed below, unless otherwise specified and/or shown on the Drawings:

3.1.1 Solid Wastes

Provide waste receptacles. Place solid wastes in Contractor-provided containers which are emptied or removed from the job site on a regular schedule. Conduct handling, storage, and disposal to prevent contamination. Employ segregation measures so that no hazardous waste will become co-mingled with solid waste. Transport solid waste off Government property and dispose of it in compliance with applicable Federal, State, and local requirements for solid waste disposal. A Subtitle D Resource Conservation and Recovery Act (RCRA) permitted landfill shall be the minimum acceptable off-site solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with applicable Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.1.2 Hazardous Waste Handling Plan

The Contractor is required to comply with all Federal, State, and local laws or regulations when handling hazardous materials. This includes the handling of such hazardous materials as hazardous wastes if applicable. The Contractor shall prepare and submit a compliance plan detailing how the Contractor handles hazardous materials, petroleum products, and hazardous waste. The plan shall include, but is not limited to, the following elements as appropriate:

- a. General storage site plan.
- b. An inventory of all hazardous materials brought onto the project site accompanied by their respective Safety Data Sheets (SDS). The Contractor and the Government will jointly maintain the SDSs for all hazardous materials in accordance with 29 CFR 1910.1200.
- c. A list of all anticipated hazardous wastes to be generated.
- d. Waste collection and containment procedures in accordance with applicable Federal, State, and local laws or regulations 40 CFR 262, WAC 173-303-200, and OAR 340-101.
- e. A hazardous material spill and cleanup plan, including tools and readily available materials on hand to facilitate containment and cleanup, 29 CFR 1910.120/29 CFR 1926.65.
- f. Documentation to show that the person handling hazardous waste or sampling hazardous materials is trained and certified to do so.
- g. A waste determination plan that includes a sample analysis plan, or process knowledge, that meets Federal and State requirements for hazardous waste designation 40 CFR 261, WAC 173-303-100.
- h. Provisions to coordinate with Project ECC for profiling and disposal of all Hazardous Waste. The Project ECC must be present to sign the Uniform Hazardous Waste Manifest for all Hazardous Waste shipped off of Corps of Engineers property.
- i. Demobilization plan that describes how the contractor will ensure no expired, used, or unused products are left on site.

3.1.3 Disposal of Hazardous Waste

The Contractor Shall coordinate with the Project ECC for the disposal of all hazardous waste. The following shall apply for all Hazardous Waste:

- a. Hazardous waste generated at the project is required to be applied to the projects generator status. An inventory sheet of all materials being placed in a hazardous waste package shall be maintained. Required information on this inventory sheet is: date placed in package, type of material, quantity, name of person disposing of waste.
- b. Contractor shall coordinate with Project ECC to determine proper container type and marking requirements in accordance with 49 CFR 178 prior to the generation of any hazardous waste. The Project ECC will designate a Satellite Accumulation Area (SAA) for the Contractor to use while generating hazardous waste.

c. When the Contractor is done filling the hazardous waste container or when 55-gallons of waste have been accumulated, the Contractor shall inform the KO, who will notify the project ECC. The project ECC will then arrange for movement of the waste to a designated Government "less than 90-day" hazardous waste storage area (could be "less than 180-day" storage area depending on the generator status at the project, see Project ECC for specific guidance), 40 CFR 262, WAC 173-303-200.

d. Contractor shall coordinate with the Project ECC to expedite off site shipment of hazardous waste. If, for any reason, the hazardous waste cannot be shipped off-site in "less than 90-days" the KO and Project ECC shall be notified immediately. Project ECC will be required to sign all waste shipping records. The cost of disposal is the responsibility of the Contractor.

e. Contractor shall not abandon or otherwise leave any hazardous materials or hazardous waste on government projects.

3.1.4 Universal Waste Disposal

Dispose of all used batteries, light bulbs, and elemental mercury ampules in accordance with Federal and State regulations, 40 CFR 273, WAC 173-303-573, and OAR 340-113.

a. All batteries shall have the terminals taped to secure from arcing prior to being placed in the Used Battery Container. Container shall be labeled with the words "Used Batteries".

b. Used light bulbs that would otherwise be regulated as hazardous waste (i.e. florescent bulbs, mercury or sodium vapor, HID, etc.) shall be stored in a manner that minimizes breakage. Container shall be labeled with the words "Used Bulbs" or "Used Lamps".

c. Mercury switches or other small ampules of elemental mercury shall be stored in a manner which prevents breakage. Container shall be closed and labeled with the words "Used Mercury-Containing Equipment".

3.1.5 Fuel And Lubricants

a. Conduct storage, fueling, and lubrication of equipment and motor vehicles in a manner that affords the maximum protection against spill and evaporation.

b. Manage and store fuel, lubricants, and oil in accordance with all Federal, State, Regional, and local laws and regulations.

c. Store used lubricants and used oil to be discarded in marked, corrosion-resistant containers and recycle or dispose of in accordance with 40 CFR 279, Used Oil regulations.

d. Storage of fuel on the project site is not allowed. Bring fuel to the project site each day that work is performed.

e. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, and waste washings from entering public lands or waters. Provide and utilize the following prevention/cleanup materials during the course of this contract:

1. If the fuel dispensing or storage tanks are not double walled, Contractor shall utilize secondary containment. All secondary containment shall be capable of containing a minimum of 100 percent of the holding tank without release plus free board in compliance with 40 CFR 112.

2. Emergency spill kits shall be immediately available to enable rapid cleanup with sufficient quantities and types of spill control materials to contain any spills that can be anticipated. Contractor shall be responsible for ascertaining the types/quantities of spill equipment required based on types and quantities of chemicals, oils, POLs, they will use and/or what they will be working on.

3. Emergency spill absorbent mats (10-18" x 18" or appropriately sized) shall be carried on board or be in the immediate vicinity of all equipment performing work. Mats shall be of a quilted cotton pillow design, and absorbent (not adsorbent) filled, to encapsulate hydrocarbons (oils, coolants and solvents).

3.1.6 Wastewater

Do not allow wastewater from construction activities (such as on-site material processing, concrete curing, foundation and concrete clean up, water used in concrete trucks, forms, etc.) to enter surface waters or to be discharged to the ground without first applying for and receiving authorization from the EPA (surface waters) or a state authority (ground waters). Wastewater shall be collected and disposed off-Government property in accordance with all Federal, State, and local regulations.

3.2 ASBESTOS ABATEMENT

For the removal of asbestos, demolition, transportation and disposal, follow all County, State and Federal regulations that pertain to asbestos; 29 CFR 1910.1001, 29 CFR 1926.1101, 40 CFR 763, 40 CFR 61 subpart M, 49 CFR 171-178. Coordinate waste shipments, labeling, and packaging with the Project ECC to ensure shipping documents are signed and retained by the Project.

3.3 METAL BASED PAINT ABATEMENT

The following applies to any items identified for removal or disposal that test positive for Resource Conservation and Recovery Act (RCRA) 8 metals and/or Washington State Dangerous Waste metals, if applicable. Additional information is located in SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL.

3.3.1 Metal Based Paint Removal

a. Paint shall be removed prior to any welding or cutting. The paint shall be removed at least four (4) inches away from the point of heat application when welding, grinding, cutting such as torch or air arc, and similar operations. Paint removal system shall be an environmentally safe method for all metals-based paint removal.

b. See SECTION 02 83 33.01 28 TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL, paragraph TOXIC METALS BASED PAINT REMOVAL for additional information.

3.3.2 Metals Testing

a. The Contractor shall perform Toxicity Characteristic Leaching Procedure testing ([TCLP testing](#)) to determine waste characterization for all potential RCRA-8 metal containing material waste generated by work under this contract.

b. If equipment or other items are to be disposed in whole with the metal-based paint remaining, the contractor shall collect a metal sample to determine waste characterization. If any hazardous waste is generated, the contractor shall notify the Contracting Officer and Project ECC(s). The contractor shall be responsible for coordination with the Contracting Officer and the Government Project from which the hazardous waste was generated to develop a disposal procedure. The contractor shall be responsible for characterizing, designating, packaging, labeling, transporting, and disposing of the metal-based waste in compliance with all applicable Federal, state, and local regulations. The contractor is also responsible for coordinating with the Project ECC to provide the project EPA Generator ID number and to get the Project ECC signature on the manifest for transportation and disposal. Prior approval of the manifest will be required by the Project ECC.

c. If any material is to be recycled that contains regulated metals, the Contractor shall provide documentation of proof of [notification to the recycler](#) that the material to be recycled has metals. If there are regulated metals, the Contractor shall also submit written evidence to demonstrate the [recycling facility](#) taking the metal-containing material can handle the material and is approved for regulated metal disposal, treatment, and storage by the EPA, State, and local regulatory agencies.

3.4 UNWATERING AND DRAINAGE SUMP DEBRIS - TESTING AND DISPOSAL

a. The Contractor shall perform [TCLP testing - Unwatering Sump Debris](#) and [TCLP testing - Drainage Sump Debris](#) to determine waste characterization for all Unwatering and Drainage Sump debris, or other potentially hazardous waste, for removal and disposal work under this contract. Assume waste and/or debris in both sumps will test positive for hazardous waste. If any hazardous waste is present, notify the Contracting Officer and Project ECC(s) prior to debris removal. See [SECTION 02 41 00.01 28 DEMOLITION](#), paragraph "Removal of Unwatering and Drainage Sump Debris" for additional information.

b. The contractor shall be responsible for coordination with the Contracting Officer and the Government Project from which the hazardous waste was generated to develop a disposal procedure. The contractor shall be responsible for characterizing, designating, packaging, labeling, transporting, and disposing of any hazardous waste in compliance with all applicable Federal, state, and local regulations. The contractor is also responsible for coordinating with the Project ECC to provide the project EPA Generator ID number and to get the Project ECC signature on the manifest for transportation and disposal. Prior approval of the manifest will be required by the Project ECC.

c. If any material to be disposed of contains regulated metals, the Contractor shall provide documentation of proof of [notification to the disposal site](#) that the material to be disposed of contains hazardous

wastes. If there are regulated wastes, the Contractor shall also submit written evidence to demonstrate the disposal facility taking the hazardous waste containing material can handle the material and is approved for regulated waste disposal, treatment, and storage by the EPA, State, and local regulatory agencies.

3.5 LAND RESOURCES

Confine all activities to areas defined by the Drawings and Specifications. Land resources include trees, shrubs, vines, grasses, topsoil, and landforms. Do not remove, cut, deface, injure, or destroy land resources without approval. Do not fasten or attach ropes, cables, or guys to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times.

3.5.1 Landscape

Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.6 WATER RESOURCES

Monitor all water areas affected by construction activities to prevent pollution of surface and ground water. The Contractor shall be responsible for compliance with applicable Federal and State water quality standards and the conditions of any permits and clearances obtained for the work. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. No water courses shall be polluted by, or have existing pollution contributed to with, any petroleum products, fuels, oils, lubricants, bitumen, sandblast grit, paint chips, calcium chloride, insecticides, herbicides, or other toxic materials harmful to life. Chemical emulsifiers, dispersants, coagulants, or other cleanup compounds shall not be used without prior written approval.

3.6.1 Excess Material Deposits

Do not allow deposit of any materials, effluents, trash, garbage, oil, grease, chemicals, or other contaminants. If any unwanted material is dumped in unauthorized areas, remove the material and restore the area to a condition approximating the adjacent undisturbed area. Excavate, remove, and restore the contaminated ground area as directed.

3.6.2 Care Of Drains

Floor and deck drains, as well as any system that may drain to the river, shall not be used for disposal of any solid, hazardous material or any liquids other than approved clear, clean water. The Contractor shall demonstrate that the pipes and drains are protected from construction waste, and unobstructed when so directed.

3.7 AIR RESOURCES

Equipment operation, activities, or processes performed shall be in accordance with all Federal and State air emission and performance laws and standards.

3.7.1 Fugitive Dust

The owner or operator of a source or activity that generates fugitive dust must take reasonable precautions to prevent dust from becoming airborne and must maintain and operate the source to minimize emissions in accordance with all Federal and State air regulations.

3.7.2 Ozone depleting substances (ODS)

Only EPA certified technicians will be allowed to repair or service ODS equipment. No person maintaining, servicing, repairing or disposing of appliances may knowingly vent or otherwise release into the environment any Class I or Class II substance used as a refrigerant. Section 608 of the Clean Air Act extended the prohibition on venting to substitute refrigerants, including hydrofluorocarbon (HFC) and perfluorinated compounds (PFC) refrigerants. Furthermore, the equipment used to recover refrigerant from appliances must be EPA certified.

3.7.3 Burning

Burning is prohibited on the Government premises.

3.8 POST CONSTRUCTION CLEANUP

Clean up all areas used for construction in accordance with Contract Clause 52.236-12, CLEANING UP.

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CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

ERDC/ITL TR-19-6

(Aug 2019) A/E/C Graphics Standard,
Release 2.1

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Draft O&M Manuals and Parts Catalogs; G C

Final Operation And Maintenance Manuals and Parts Catalogs (HC); G
C

SD-11 Closeout Submittals

Spare Parts; G C

Final Shop Drawings; G C

Working As-Built Drawings; I C

Final As-Built Drawings; G C

Record Drawings; G, GS

Government Issued Items; G C

1.3 DEFINITIONS

1.3.1 Contract Drawings

Contract drawings are the set of Design Drawings furnished by the Government for this contract. Contract Drawings form a part of the legal contract between the Contractor and Government, and do NOT include FIO's or Resource Drawings.

1.3.2 Shop Drawings

a. Shop drawings are a drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator for the following purposes:

1. Manufacturer's or Contractor's drawn version of information shown in the construction documents.
2. Drawn to explain the fabrication and/or installation of the items, in the construction documents, to the Manufacturer's production crew or Contractor's installation crews.

b. See SECTION 01 33 00 SUBMITTAL PROCEDURES, paragraph "Format for SD-02 Shop Drawings", for Shop Drawing requirements.

1.3.3 As-Built Drawings

a. As-Built drawings serve as the basis for the creation of the Record Drawings (see paragraph "Record Drawings"). As-Built drawings are maintained by the Contractor to depict actual conditions throughout construction, including deviations from the Contract Drawings.

b. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to Contractor submitted Requests for Information; direction from the Contracting Officer; designs which are the responsibility of the Contractor, and differing site conditions.

c. Submit As-Built Drawings in pdf or Bentley Navigator.

1.3.4 Record Drawings

The Record drawing set includes all Contract Drawing and accepted final As-Built drawing updates in CAD format. See SECTION 01 33 00 SUBMITTAL PROCEDURES, paragraph "CAD File Requirements".

PART 2 PRODUCTS

2.1 SPARE PARTS

a. Furnish all spare parts identified, identified in the Plans and Specifications to be furnished by the Contractor. See the following Specifications for information on required spare parts:

1. SECTION 22 11 00.01 28 PIPING AND VALVES.
2. SECTION 26 24 19.00 28 MOTOR CONTROL CENTERS.
3. SECTION 26 29 01.00 28 ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE.
4. SECTION 43 21 39.01 28 DRAINAGE AND SUBMERSIBLE PUMPS.
5. SECTION 43 23 31.13 28 POWERHOUSE UNWATERING PUMPS, paragraph SPARE PARTS.

b. Failure of an item to appear in the SECTIONS referenced above, does not relieve the Contractor of responsibility to furnish all spare part(s), identified in the Plans and Specifications to be delivered by the Contractor, at no additional cost to the Government. Notify the Contracting Officer of any discrepancy between the above list and the technical Plans and Specifications, in order to compile a more complete listing.

c. Unless specified otherwise, spare parts packaging requirements shall meet requirements in SECTION 43 23 31.13 28 POWERHOUSE UNWATERING PUMPS, paragraph "Long Term Storage Packaging".

PART 3 EXECUTION

3.1 FINAL SHOP DRAWINGS

a. Upon completion of the work under this contract, submit for review and approval by the Contracting Officer, a copy, in ADOBE .pdf, of the final SHOP DRAWINGS. All drawings submitted to the Contracting Officer shall be in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES, paragraph "Format for SD-02 Shop Drawings". The drawings shall show all changes and revisions, including any field changes, made up to the time that the work is completed and accepted.

b. Submit Final Shop Drawings, meeting requirements of SECTION 01 33 00 SUBMITTAL PROCEDURES, paragraph "CAD File Requirements".

c. The shop drawings are not required to comply with A/E/C CAD and Graphic Standards.

d. Furnish a complete set of Shop Drawings in Bentley DGN format for all Shop drawings produced by the Contractor in performance of this contract. Submittal of concrete placement drawings, concrete reinforcement drawings, and concrete formwork drawings are not required.

e. Furnish an index drawing for all Shop drawing submittal sets. Index shall include the following for each Shop drawing:

1. Sheet Number.
2. File Number.
3. Drawing Title.
4. CAD File Name.

f. Furnish an electronic spread sheet of the index to include all information specified in SECTION 01 33 00 SUBMITTAL PROCEDURES paragraph "Format for SD-02 Shop Drawings". Spread sheet shall be compatible with Microsoft Excel.

3.2 WORKING AS-BUILT DRAWINGS

Maintain a current and accurate record of the work as actually constructed in the form of working as-built drawings.

a. Mark as-built conditions on the contract drawings to show all work performed by the Contractor.

b. As-built drawings shall incorporate all VARIATIONS from the design and modifications to the contract, however minor. Blue color shall be used to mark information added to the drawings and red color shall be used to mark information deleted from the drawings. Green color may be used for notes to designer.

c. Contract drawings shall be maintained on-site during construction. The completeness and accuracy of the marked as-built drawings must be verified by Government Quality Assurance personnel prior to submission of progress payment requests. All variations shall be noted on the updated As-Built drawings.

3.2.1 Submission of Working As-Built Drawings

Prior to demobilizing from the project, the Contractor shall provide one ADOBE .pdf copy of the working as-built drawings to the Contracting Officer showing the color markups.

3.3 FINAL AS-BUILT DRAWINGS

At the completion of the work, submit, in accordance with FAR CLAUSE 52.211-10, a copy of the Final As-Built Drawings, after all As-Built conditions from the working as-built drawings have been incorporated in the CAD drawings. Submit in ADOBE .pdf format.

In preparation for submitting Record Drawings, once the Final As-Built Drawings are approved, populate the CAD File Status Field with "Record Drawing" to comply with the A/E/C Graphic Standards [ERDC/ITL TR-19-6](#), Border Sheet Status Section.

3.4 RECORD DRAWINGS - CAD FILES

a. After approval of the final As-Built Drawings submittal, the Contractor shall create the CAD Record Drawings to update the Contract Drawings with the as-built conditions. The Record Drawing files shall be in the same drawing format as initially provided by the Government. The Government will provide all original CAD files of the contract drawings, in Bentley DGN format.

3.4.1 Drawing Submittal Requirements

Record Drawings submittal shall meet requirements of SECTION [01 33 00](#) SUBMITTAL PROCEDURES, paragraph "CAD File Requirements". Submittal of concrete placement drawings, concrete reinforcement drawings, and concrete formwork drawings are not required.

3.5 SUPERSEDED AND/OR OBSOLETE FIO OR RESOURCE DRAWINGS

Identify FIO or Resource drawings which are superseded and/or obsolete. Mark superseded drawings with a red X across the entire drawing and the word "SUPERSEDED" in red across the title block. Mark obsolete drawings with a red X across the entire drawing and the word "OBSOLETE" in red across the title block. Make an additional note on the superseded drawing giving the file number of the drawing that has replaced the superseded drawing, if applicable. For both superseded and obsolete drawings, draw a red line through the name of the drawing on the contract drawing index sheet.

3.6 SUBMITTAL OF OPERATION AND MAINTENANCE MANUALS AND PARTS CATALOGS

3.6.1 General

Operation and maintenance instructions and parts catalogs which are required for operation, maintenance, dismantling, and/or assembling of equipment furnished by the Contractor, or for identification of parts for procurement of replacements, shall be prepared covering the equipment required to be included in the O&M manuals as required in the technical specifications. Data submitted for the Operation And Maintenance Manuals is in addition to that furnished for the submittal of shop drawings.

O&M Data types are defined as follows:

1. Draft O&M Data - Submit electronic copies of the [Draft O&M Manuals and Parts Catalogs](#), for each type and class of equipment, for approval not later than 30 calendar days prior to the final commissioning of equipment. The Contracting Officer will return electronic draft copies of the data either "APPROVED," or "RETURNED FOR CORRECTION." Resubmit corrected and additional data as directed by the Contracting Officer.

2. Final O&M Data - Within 30 calendar days after final approval of all draft submissions of all O&M data requirements, submit five (5) hard copies of the [Final Operation And Maintenance Manuals and Parts Catalogs \(HC\)](#) copies for approval, for each type and class of equipment. If the final O&M Manuals are "Returned for Correction," four (4) of the five (5) sets of manuals will be returned to the Contractor with all submitted final binders. The final submittal, after corrections, shall consist of five (5) copies of the approved O&M Manuals. If final O&M Manuals are "Approved," the Government will retain all five (5) copies and return a signed ENG Form 4025 to the Contractor.

3.6.2 Form of Submittal

3.6.2.1 Hard Copies

The final O&M submission shall be an assembly of all draft copies and other data required. The submittal shall consist of as many binders as required with a maximum thickness per binder of three (3) inches. The binders shall have a durable leatherette cover and shall be designed for 8-1/2 by 11-inch sheets with binding either of telescoping posts and slide-lock or with fastening using screw posts. Either type of binding provided shall be suitable for ready replacement of sheets. Plastic ring-type loose-leaf binders will not be acceptable. Covers and spines of binders shall bear permanent printed markings listing the following:

- (1) Name of project.
- (2) Contract number.
- (3) Name and address of Contractor.
- (4) Specific item or materials covered by the manual.
- (5) Date of submittal.

Shop drawings, assembly drawings, wiring diagrams and/or schematics

utilizing previously approved shop drawings or specially prepared drawings for these manuals or parts catalogs shall be of a size that requires folding only in left-to-right coordinate as a manual or catalog is opened. Each sheet in the binder shall be numbered and an index provided for ready reference to the data. Each manual shall contain a master table of contents. The master table of contents shall contain all chapters, appendixes, and a master index and shall be included in the front of the first volume if there is more than one volume. Each subsequent volume shall contain an index for the contents within that respective volume. Each volume shall not be broken between chapters, appendixes, and indexes. All chapters, appendixes, and indexes shall be adequately separated and identified by standard line indexes. All standard catalog cuts, manufacturer's printed data or descriptive literature, parts sheets, illustrations, etc., shall either be original manufacturer sheets or reproduced copies equal in clarity and durability to the original copies. At least one (1) copy of such manuals or parts catalogs shall contain all original copies of such data. Thermofax and similar nonpermanent copies are not acceptable.

3.6.2.2 Electronic Copies

Provide electronic copies of the O&M material in the form of a CD-ROM. The CD's shall be submitted with the hard copies of the O&M manuals. The CD-ROM label shall contain the following information:

- (1) Name of project.
- (2) Contract number.
- (3) Name and address of Contractor.
- (4) Specific item or materials covered by the manual.
- (5) Date of submittal.

The documents placed on the CD-ROM shall be in either Adobe PDF or Microsoft Office formats and searchable. Page numbering, indexing and the marking out of irrelevant parts ARE required for the documents placed on the CD-ROM. All documents shall be "Read Only."

3.6.3 Operation Data

Operation data to be furnished shall include (as applicable but not limited to) the following:

- (1) Specific detailed operating instructions.
- (2) Recommended or required operation sequence(s).
- (3) Functional description of operating parts.
- (4) Special precautions or operating procedures.
- (5) Description of system operation in addition to the operating parts.

Provide the necessary coordination of all components between the subcontractors, suppliers, and manufacturers to ensure complete submittals on individual interrelated equipment components. All data shall match the

actual equipment furnished, and standard catalog sheets, cuts, and diagrams will not be acceptable unless all irrelevant parts are marked out and relevant parts are identified by heavy arrows or equal suitable marking at each side of the applicable data. Overall general operating instructions shall be included for all systems.

3.6.4 Maintenance Data

Maintenance data to be furnished shall include (as applicable but not limited to) the following:

(1) Lubrication instructions. Lubrication instructions shall be for the service intended and shall include charts or tables indicating items to be lubricated, recommended frequencies, and grade and type of lubricant to be used in accordance with AGMA, NLGI, SAE, Federal or Military Specifications, as applicable. Where the Contractor or the supplier has installed a lubricant or oil prior to shipment to the project, the "Brand Name" as well as the specification shall be indicated.

(2) Instructions for dismantling, assembly, repair and adjustment. Instructions for dismantling, assembly, repair and adjustment shall include recommended clearances, bolt torques, pressure settings, etc.

(3) Parts lists. Parts lists shall include the full description, nomenclature, part numbers, required number of parts, recommended list of spare parts to be stocked at the Project, and actual spare parts supplied under this contract. All spare parts, both recommended and actual, shall list the following information: the National Stock Number (NSN), part number, model number, serial number, current sources\vendor names for the spares, their respective addresses and telephone numbers, the purchase price, and current replacement costs for each spare part.

(4) Elementary and detailed electrical connection diagrams.

(5) Hydraulic circuit diagrams with recommended or required control and relief valve settings.

(6) Control and interlock system diagrams.

(7) A list of any special tools required for maintenance or repairs.

(8) Name and address of suppliers of parts.

(9) Maintenance tasks and frequencies. Maintenance tasks shall be detailed as step-by-step procedures and shall include troubleshooting techniques.

(10) Maintenance Table: The maintenance table shall include all of the maintenance for the new systems and be broken into the different systems. At a minimum the maintenance table shall outline the tasks to be performed, interval, lubricants and fluids, special tools needed, and a reference to the detailed maintenance instructions in the O&M Manual.

Provide necessary coordination of all components between the subcontractors, suppliers, and manufacturers to ensure complete submittals on individual interrelated equipment components. All data shall match the

actual equipment furnished, and standard catalog sheets, cuts, and diagrams will not be acceptable unless all irrelevant parts are marked out and relevant parts are identified by heavy arrows or equal suitable marking at each side of the applicable data.

3.7 GOVERNMENT ISSUED ITEMS

Return to the Government all items issued to the Contractor from the Government, including but not limited to the following: keys, ID and security badges, radios, pagers, and excess/unused Government Furnished Property/Equipment. Submit documentation signed by the Contractor and Contracting Officer indicating items have been returned or fully accounted for. Format of submittal will be discussed and agreed upon at the Pre-Work Meeting.

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SECTION 01 91 00.00 28

SYSTEMS TESTING AND COMMISSIONING

PART 1 GENERAL

1.1 DESCRIPTION

This SECTION covers the testing and commissioning of mechanical, electrical and control equipment installed under this contract. Commissioning will be a collaborative effort between the Government and the Contractor. Satisfactory completion of all commissioning activities will be a condition for turnover of the equipment from the Contractor to the Government.

The work under this contract alters and interfaces with numerous systems within an operating Power House. Therefore, final acceptance of installed equipment shall consist of: the commissioning of the installed work and the verification of the overall Government system(s).

Furnish labor and material to accomplish and complete the testing and commissioning as specified herein.

1.2 REFERENCED PUBLICATIONS

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.3 ROLES AND RESPONSIBILITIES

During commissioning, the Government and the Contractor will each have roles and responsibilities which will be phase dependent as follows:

1.3.1 Construction Test Phase

During the Construction Test Phase, the Contractor will have the lead role and shall perform all contract required inspections and tests. The Government will perform contract administration and quality assurance for commissioning activities during this phase.

1.3.2 Pre-Operational Test Phase

During the Pre-Operational Test Phase, the Contractor will have the lead role and will be responsible for coordination and performance of commissioning activities. Perform commissioning activities and provide support for the Government verification and learning activities during this phase. The Government will perform contract administration and quality assurance for commissioning activities during this phase.

1.3.3 Operational Test Phase

During the Operational Test Phase, the Government will have the lead role and will be responsible for coordination, performance and oversight of commissioning activities. Perform commissioning activities and provide support for the Government commissioning activities during this phase.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Equipment Commissioning Testing Plan and Schedule; G C

Commissioning Agent's Qualifications; G C

1.5 GENERAL REQUIREMENTS

1.5.1 Equipment Commissioning Testing Plan and Schedule

Submit, at least 60 calendar days prior to the start of on-site work, the proposed step-by-step Equipment Commissioning Testing Plan and Schedule, hereinafter also referred to throughout these specifications as the "Commissioning Plan". This plan and schedule is in addition to the Project Schedule requirements of SECTION 01 32 01.00 28 PROJECT SCHEDULE. The Commissioning Plan shall include those activities and requirements listed in all specification sections in this contract and this SECTION, the items described as Contractor Responsibilities in the "Commissioning List Narrative" attached at the end of this SECTION, as well as those required by equipment manufacturer instructions. The Commissioning Plan shall include a detailed sequential list of activities and duration of each activity. The Commissioning Plan shall be updated and furnished with the monthly project schedule submittals. No on-site work shall commence until the Commissioning Plan has been "Approved" or "Approved Except as Noted".

1.5.2 Government Commissioning and Testing Plan

The Government will provide its step-by-step Commissioning and Testing Plan at least 10 calendar days prior to the start of Government commissioning activities. The plan will include a detailed sequential list of activities and duration of each activity. An overview of the Government Commissioning Plan is contained in the "Commissioning List Narrative" attached at the end of this SECTION.

1.5.3 Equipment Commissioning Testing Report

Submit, upon completion of the testing of any equipment, a report as specified in the technical specification that includes the completed Equipment Commissioning Testing Plan and Schedule and all tests performed during commissioning. The report shall include a copy of all original forms used during commissioning.

1.6 QUALIFICATIONS

1.6.1 Contractor's Commissioning Agent

Furnish a Commissioning Agent with a minimum of five (5) years experience in preparing commissioning plans and performing commissioning and testing of electrical, mechanical and control equipment of comparable physical size and complexity in an industrial facility. The Commissioning Agent may be a subcontractor. The Commissioning Agent shall coordinate directly with the Prime Contractor's on-site management to ensure overall compliance with the contract and the approved Commissioning Plan. The [Commissioning Agent's qualifications](#) shall be submitted in résumé format for approval 90 calendar days prior to commencement of on-site construction.

1.6.2 Equipment Manufacturer's Commissioning Services

Furnish manufacturer certified personnel to perform start-up, testing, and commissioning for all new equipment and systems.

1.7 GENERAL RESPONSIBILITIES OF CONTRACTOR'S COMMISSIONING AGENT

The responsibilities of the Contractor's Commissioning Agent shall include, but not be limited to:

- a. Coordinate with subcontractors to provide the Equipment Removal, Installation, and Testing Plan and Schedule, and provide scheduled progress updates.
- b. Attend scheduled commissioning coordination meetings including the Red Zone meeting (as defined in SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS), to discuss, coordinate and schedule commissioning activities.
- c. Prepare and submit detailed inspection and test plans required by the contract technical specifications and oversight of the Contractor's commissioning activities, including subcontractor activities for all commissioning phases.
- d. Provide on-site oversight of commissioning tests and inspections for installed or modified equipment during the Test Phases.
- e. Provide technical commissioning support for Government-led commissioning activities during the Operational Test Phase.
- f. Coordinate the availability of required craftworkers during Pre-Operational and Operational Test Phases.

1.8 RESPONSIBILITIES OF CONTRACTOR'S COMMISSIONING AGENT DURING CONTRACTOR'S COMMISSIONING

The responsibilities of the Contractor's Commissioning Agent during the Contractor's Commissioning shall include, but not be limited to:

- a. Coordinate with subcontractors equipment manufacturers, provide Equipment Removal, Installation, and Testing Plans and Schedules, and provide scheduled progress updates.
- b. Represent the Contractor by attending commissioning coordination

meetings.

c. Certify and submit results of all required Quality Control Reports.

1.9 RESPONSIBILITIES OF CONTRACTOR'S COMMISSIONING AGENT DURING GOVERNMENT'S COMMISSIONING

The responsibilities of the Contractor's Commissioning Agent during the Government's Commissioning shall include, but not be limited to:

a. Represent the Contractor by attending commissioning coordination meetings.

b. Coordinate the availability of fully qualified craftsmen for commissioning support to assist during system commissioning for both the Contractor's commissioning and testing requirements, as well as all of the Government's commissioning and testing requirements.

1.10 COMMISSIONING SUPPORT

Provide commissioning support during all test phases. Commissioning support shall be as follows:

a. Commissioning Agent: During the Pre-Operational Test Phase and the Operational Test Phase, the Contractor's Commissioning Agent shall be present to witness the Government's commissioning activities and to participate in troubleshooting and issue resolution as it relates to the equipment being commissioned. The Commissioning Agent shall coordinate directly with the Prime Contractor to adjust and/or make changes to equipment installed or modified by the Contractor during the installation.

b. Craftworkers: During the Pre-Operational Test Phase and Operational Test Phase, the Contractor shall provide skilled craftworkers to support the Government's commissioning activities. Craftworkers shall be appropriate trades and skill level required for the particular commissioning tests to be performed and will be under the supervision of the Commissioning Agent. Craftworkers will only be required to make adjustments or changes to Contractor-installed equipment when a need is identified during performance of the Government's commissioning activities.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 FIELD TESTING

a. During the construction and installation of all equipment specified under this contract, perform the necessary inspections to ensure that the installations are in accordance with manufacturer's instructions and the contract documents.

b. Detailed testing shall be performed on all installed equipment as specified in the technical specification sections of this contract to ensure that operation and performance conform to contract documents. All tests will be witnessed by the Contracting Officer. Notify the Government not less than 30 calendar days prior to starting any test. All Field Test Reports shall be submitted prior to the commissioning

tests.

3.2 COMMISSIONING AND TESTING TABLE

The following table is an estimate of commissioning and testing activities that shall be performed on all equipment installed under this contract. The list contains, but is not limited to the following:

COMMISSIONING AND TESTING TABLE

EQUIPMENT/ SECTION	GOVERNMENT WITNESS FACTORY TESTING
Drainage Pump	YES
Unwatering Pumps	YES

This Testing and Commissioning table is not intended to be all inclusive, but is intended to be used as a guide by the Contractor in developing Testing and Commissioning Plans to be submitted as per this contract. Responsible for including Testing and Commissioning Plans for all equipment installed under this contract and to include other plans as prescribed by equipment manufacturers or by the Government.

3.3 FINAL GOVERNMENT COMMISSIONING AND TESTING

After the Contractor has completed all testing and commissioning required under these specifications, the Government will conduct an overall verification of the completed system's installation. Participate in these activities by reviewing and becoming familiar with the Government final commissioning plan, and by participating in the final commissioning process. The Government Final Commissioning activities are estimated to be performed over a five (5) consecutive, calendar days (12 hours per day) for a total of 60 hours.

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DEWATERING

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PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

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DEWATERING

PART 1 GENERAL

1.1 SCOPE

These requirements are in addition to those contained in other sections or indicated on the Contract drawings. The Contractor shall furnish all necessary labor and materials for dewatering the work areas as indicated. Major items of work involving dewatering activities include:

- a. Installation of drainage pump seismic bracing.
- b. Concrete removal in unwatering sump.
- c. Installation of the unwatering pump intake piping and suction bell.
- d. Installation of drainage sump baffle box.
- e. Removal and inspection of drainage header check valve.

1.2 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

Comply with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Dewatering Plan; G ME

1.4 DEWATERING OF WORK AREAS

Dewater the drainage and unwatering sumps as required to allow for completion of the work. Perform dewatering in accordance with the following:

- a. Perform dewatering in accordance with the applicable requirements in EM 385-1-1 and Section 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS. All dewatering operations are considered incidental to the work. No separate payment for dewatering will be made.

b. The new drainage pump must be in operation prior to installing temporary pumps in the unwatering sump. All temporary pumps placed in the drainage sump shall discharge into the unwatering sump.

c. Temporary pumps for the drainage and unwatering sumps shall be discharged into the fishway drain flushing pipe shown on drawings. Pumps must be sized for tailrace pressure typically at elevation 265. If needed, temporary unwatering pumps may also be discharge into the drainage sump provided additional flow will not overwhelm the drainage pump.

d. The Contractor's dewatering pumps and temporary unwatering pump power may be connected to Bus 1 and Bus 2 on the SQO switchgear which has 480 volts, 3 phase, 60 Hz power. Bus 1 has one 600 ampere breaker with a frame rating of 800 amperes available for temporarily powering one of the unwatering pumps. Bus 2 has two 400 ampere breakers with frame ratings of 800 amperes available for submersible pumps. Contractor to provide necessary breakers if provided breakers do not meet temporary power requirements. The total load of the submersible pumps shall not exceed 800 amperes. Temporary cable shall run from the SQO switchgear to the access hatch in the floor via the existing cable tray. The overall length of cable required for temporary power is approximately 150 feet. Contractor to verify length and routing of the temporary power run. The temporary power cables and protective devices shall be sized and set in accordance to NFPA 70E.

e. When all work requiring temporary dewatering is complete, remove all temporary dewatering facilities and return the permanent electrical equipment back to original condition.

1.4.1 Unwatering Discharge 18 Inch Isolation Valve

The Contractor is responsible for installing the unwatering discharge pipe plug in order to remove and install the 18 inch isolation gate valve. Installation of the pipe plug cannot begin unless unwatering pump 2 or 3 is operational having been configured to discharge out the fishway drain flushing line and the new submersible pump for sump at EL 176 has been installed. Unwatering pump 2 or 3 can be considered operational using temporary power should the primary MCC be offline.

1.4.1.1 Coordination

Coordinate with the project prior to taking the unwatering system off line a minimum of 60 calendar days prior to start of work. All requested outages must be coordinated with the Contracting Officer's Representative.

1.4.2 Sump Conditions and Expected Flow Rates

The following are the sump expected flow rates:

Drainage Sump: A maximum of 1,000 gpm is expected to flow into the drainage sump at any given time, through multiple drains.

Unwatering Sump: Flows into the unwatering sump will vary depending on number of Units that are out for service. No more than 3 Units will be unwatered during the unwatering system outage. Flows are not expected to exceed 1,500 gpm per unwatered Unit.

Draft Tube Valve Pits: When a draft tube drain valve is removed, the

valve pit will fill with leakage from the Unit. It is anticipated that the pit will fill with approximately 30 inches of water, with up to 1,500 gpm entering the pit from the Unit, and then exiting through the 18 inch Tee at the bottom of the pit. Unwatering sump level must be kept below elevation 177 during draft tube valve replacement.

1.5 DEWATERING PLAN

Submit a Dewatering Plan prior to commencement of on-site work. The plan shall provide a detailed description of each step required to perform the work, the order the work is to be performed, and information on the equipment to be used to perform the work. Include the proposed methods for keeping sump areas dry including the installation of temporary dams and/or water diversion structures. Also include the proposed method for removing the temporary dams and/or diversion structures from the site. Include procedures for the installation of all temporary pumps with their controls, as well as how the drainage unwatering pumps will be incorporated during the sump outages.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

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SECTION 02 41 00.00 28

DEMOLITION

PART 1 GENERAL

Existing items to be removed contain lead based paint and asbestos. Additional Environment Protection requirements are included in Section 01 57 20.00 28 ENVIRONMENTAL PROTECTION

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6 (2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

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

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Demolition Plan; G, C

Notification; G, C

1.3 QUALITY ASSURANCE

Submit timely notification of demolition in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the

Environmental Protection Agency requirements specified.

1.4 PROJECT DESCRIPTION

1.4.1 Demolition Plan

Prepare a [Demolition Plan](#) and submit proposed demolition and removal procedures for approval before work is started. Include in the plan procedures for removal and disposition of materials, coordination with other work in progress, a detailed description of methods and equipment to be used for each operation, and of the sequence of operations. Coordinate with Waste Management Plan. For additional information on concrete removal, see Section [03 30 70.00 28 CONCRETE](#), paragraph REMOVAL METHOD, subparagraph "General". Provide procedures for safe conduct of the work in accordance with [EM 385-1-1](#). Plan shall be approved by the Contracting Officer prior to work beginning.

1.4.2 General Requirements

Do not begin demolition until authorization is received from the Contracting Officer. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the powerhouse. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with [EM 385-1-1](#), Section 23, Demolition, and other applicable Sections.

1.5 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Provide new supports and reinforcement for existing construction weakened by demolition, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.5.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction or equipment. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas.

1.5.2 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.5.3 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary

services or connections for electrical and mechanical utilities. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.4 Embedded Piping

All existing embedded piping is to remain in place. Flange connections to embedded piping are expected to be suitable for reuse. If corrosion or other damage is detected notify the Contracting Officer.

1.6 PROTECTION OF PERSONNEL

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site.

1.7 EXISTING CONDITIONS

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Digital photographs will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. For additional information see Section 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS paragraph PRE-WORK AND POST WORK SURVEYS.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include the following:

- a. Concrete and Masonry: Completely fill holes and depressions, left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.
- b. Where existing equipment has been removed leaving damaged or missing

resilient tile flooring, patch to match the existing floor tile.

3.1.2 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings.

3.1.2.1 Piping

Disconnect piping at unions, flanges and valves, and fittings as required. If the piping that remains can become pressurized due to upstream valve failure, end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve shall be attached to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property.

3.1.3 Electrical Equipment and Fixtures

Remove existing electrical equipment as specified on demolition drawing sheets. This also includes associated breakers, control transformers, wiring, hour meters and unwatering pump and drainage pump motor cabling.

3.2 DISPOSITION OF MATERIAL

3.2.1 Title to Materials

Except for materials or equipment scheduled for salvage to remain Property of the Government, all materials and equipment removed shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.2.2 Salvaged Equipment to Remain Property of Government

Remove salvaged items to remain the property of the Government in a manner to prevent damage, and pack or crate into wooden crates to protect items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers and date of storage. Clearly mark containers on the top and side as directed by the COR. Deliver salvaged items to the area(s) on the project site designated by the COR. The following items are to remain property of the Government:

a. Electrical

1. One (1) Ultrasonic water level sensor from the unwatering sump.
2. One (1) Drainage and unwatering PLC with enclosure.

b. Mechanical

1. One (1) Unwatering pump line shaft

3.2.3 Removal of Unwatering and Drainage Sump Debris

Clean out waste and/or debris from Unwatering Sump chamber where pump intakes are located. Any debris in the sump that could become entrapped in pump intakes shall also be removed. Clean out all waste and/or debris in the drainage sump prior to installation of the drainage pump seismic bracing. See SECTION 01 22 00.00 28 MEASUREMENT AND PAYMENT, paragraph CLIN 0002 UNWATERING PUMP AND DRAINAGE PUMP SYSTEM REHABILITATION, for estimated quantities. Debris is expected to be silty dirt, small 3 inch minus rock, small woody debris and shells. Test debris for hazardous waste as specified in SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION, paragraph UNWATERING AND DRAINAGE SUMP DEBRIS - TESTING AND DISPOSAL.

3.3 CLEANUP

Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.4 DISPOSAL OF REMOVED MATERIALS

3.4.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations. Dispose in accordance with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan.

3.4.2 Removal from Government Property

Transport waste materials removed from Government property for legal disposal.

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TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL

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TOXIC METALS BASED PAINT REMOVAL AND DISPOSAL

PART 1 GENERAL

a. Toxic Metals based paint exists on several components. TOXIC METALS BASED PAINT is defined as paint containing Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, Copper, Nickel, and Zinc. Actual levels of toxic metals may vary. The Contractor is responsible for verifying actual Total Metals in all paint removed from the work site.

The following items have toxic metals based paint:

- a. Draft Tube Drain Valve Pit Access Ladders (Main Turbine Units, and Station Service Units).
- b. Existing Valves and valve stems.
- c. Existing piping coated with paint.
- d. Toxic Metals Based Paint is anticipated to be present on all Unwatering Pumps, and Unwatering Pump motor #3. Test these items for Toxic Metals Based Paint prior to removal.

1.1 DESCRIPTION OF WORK

To the maximum extent possible no cutting, grinding, sanding, heat application, or any other operation that would create a hazardous waste shall be performed on any surfaces coated with Toxic Metals based paint.

- a. To the maximum extent possible parts shall be mechanically disassembled by unbolting, unscrewing, uncoupling connections, etc. in a manner to prevent creation of a hazardous waste.
- b. If any Toxic Metals based paint is removed at the project site in a manner that creates a hazardous waste, then all operations for removal, handling, and storage of Toxic Metals based paint shall be in compliance with Federal, state, and local laws, as outlined below, and in accordance with SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION. If there is any conflict between law and the outlined procedure, the law shall govern.
- c. Paint shall be removed prior to any welding or cutting. The paint shall be removed at least four (4) inches away from the point of heat application when welding, grinding, cutting such as torch or air arc, and similar operations.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualified Personnel; G SO

SD-03 Product Data

Metal Binding Product; G, ECC

Manufacturer's Product Data Sheet; G, ECC

SD-06 Test Reports

Test Results; G SO

SD-07 Certificates

Testing Laboratory; G SO

Salvaged Material Containing Contaminated Waste; I ECC

Copies of Notifications; I ECC

1.3 WORKER SAFETY PROTECTION

1.3.1 Clothing

Workers shall use appropriate protective clothing including non absorbent gloves, fog-proof goggles, full-body coveralls with head covers, and half-mask air purifying respirators equipped with HEPA filters. Coverall sleeves shall be secured at the wrist and pant legs at the ankle with tape.

1.3.2 Blood Metals Testing

All workers involved with Toxic Metals based paint removal operations shall have blood toxic metals testing performed prior to commencement of work and after completion of all work. The blood level [testing laboratory](#) shall be state certified for performing such work. Submit proof of certification to the Contracting Officer. Blood toxic metals testing shall be performed within two (2) days before start of Toxic Metals based paint or dust removal and within two (2) days after completion of Toxic Metals based paint or dust removal. A copy of all [test results](#) shall be submitted.

1.4 EQUIPMENT

1.4.1 Containers

Contractor furnished containers conforming to the requirements of SECTION [01 57 20.00 28](#), ENVIRONMENTAL PROTECTION shall be used to receive and retain Toxic Metals contaminated material until disposal.

1.4.2 Vacuum Systems

HEPA filtered vacuum systems shall be used during abatement operations which generate dust. The systems shall be suitably sized for the project, and filters shall be capable of removing particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent.

1.5 WORKER QUALIFICATIONS

Work shall be performed by personnel qualified to perform Toxic Metals based paint and abatement work. Names and qualifications (experience and training) of [qualified personnel](#) who will be working onsite with hazardous waste shall be submitted.

a. A State licensed Journeyman Electrician shall oversee and be in the abatement area while abatement work is performed to ensure the safety of abatement workers and to prevent damage to existing electrical equipment and systems.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 TOXIC METALS BASED PAINT REMOVAL

a. Toxic Metals based paint shall be removed by a wet method such as solvents or chemical paint removers and clean rags. If a dry removal method is used the system shall be connected to a vacuum system as described in paragraph "Vacuum Systems". Paint removal system shall be an environmentally safe method for all metals-based paint removal.

b. For all Metal Based Paint removal involving blasting, use a blasting media specifically developed for use to remove, bind, and stabilize Metals-based paint. Submit [Manufacturer's Product Data Sheet](#), for blasting media to be used, prior to purchase of blasting media.

3.1.1 Wet Paint Removal Product

For areas where paint removal is required, provide and use a paint removal product, that utilizes a wet system which is capable of keeping the metals in a wet state and binding it into the paint remover. No airborne toxic metals dust shall be generated during the paint removal process. The wet system shall contain lime for metal stabilization. No flammable solvents or fumes. The system shall be an environmentally safe method for Toxic Metals based paint removal. Submit [metal binding product](#) literature for approval.

3.2 STORAGE AND DISPOSAL

3.2.1 TCLP Testing

The Contractor shall perform a composite sample for Toxicity Characteristic Leaching Procedure (TCLP) and test for Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, Copper, Nickel, and Zinc to determine waste characterization. See SECTION [01 57 20.00 28](#) ENVIRONMENTAL PROTECTION, paragraph "Metals Testing" for additional information.

3.2.2 Contaminated Waste

Toxic Metals-contaminated waste, scrap, debris, bags, containers, equipment, and Toxic Metals-contaminated clothing, which may produce airborne concentrations of Toxic Metals particles shall be stored in Contractor furnished containers. Each container shall meet the requirements stated in SECTION [01 57 20.00 28](#), ENVIRONMENTAL PROTECTION. These containers shall also be properly labeled to identify the type of

waste as required in SECTION 01 57 20.00 28, ENVIRONMENTAL PROTECTION and the date Toxic Metals-contaminated wastes were first put into the container. Toxic Metals-contaminated waste shall be handled, stored, and tested in accordance with Federal and State laws and regulations. The Contractor shall store the containers at an on-site interim storage area assigned by the Contracting Officer. The contractor shall be responsible for the disposal of the containers.

3.2.2.1 Salvaged Material Containing Contaminated Waste

Any salvaged material containing contaminated waste shall require notification to the Contracting Officer. Provide documentation to the Contracting Officer showing that the subcontractors and disposal/salvage/recycling contractors can receive Toxic Metals painted materials and are certified and authorized by all applicable regulations to dispose/recycle or salvage materials contaminated with toxic metals. All subcontractors and disposal/salvage/recycling contractors and/or subcontractors shall be notified that Toxic Metals-based paint is present on materials from this project. All notifications shall be documented and be in compliance with Federal and State Regulations. Copies of notifications sent to subcontractors shall be provided to the Contracting Officer.

3.2.3 Non-Contaminated Waste

Non-contaminated waste, scrap, and debris shall be disposed of by the Contractor off the project site at a permitted solid waste disposal facility or at a facility for inert and uncontaminated on-site work debris.

3.3 REMOVAL OF COMPONENTS NOT REQUIRING ON-SITE ABATEMENT

There are numerous components identified in the specifications containing Toxic Metals based paint that will be removed as complete components that do not require on-site abatement. For those items, the Contractor shall deliver those components to a qualified facility that can receive/handle Toxic Metals based paint items. The Contractor shall provide documentation to the Government of proper disposal.

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SECTION 03 30 70.00 28

CONCRETE DEMOLITION, REPAIR OF CONCRETE SURFACES, AND EQUIPMENT FOUNDATIONS

PART 1 GENERAL

1.1 GENERAL INFORMATION

The work covered by this section consists of furnishing all material, labor, and equipment, and performing all work required for the removal of concrete, core drilling, the restoration of the concrete surfaces to the required lines and grades, and placement of equipment foundations in required locations. The Contractor shall provide protection from concrete dust and water damage to existing and new equipment. The Contractor shall take effective measures to control gas, vapor, fumes, dust, slurry and mist during concrete removal operations.

1.2 REFERENCES

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

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318 (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)

ASTM INTERNATIONAL (ASTM)

ASTM A185/A185M (2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM C387/C387M (2017) Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar

ASTM C881/C881M (2015) Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

ASTM C1107/C1107M (2017) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

ASTM C309 (2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C928/C928M (2013) Packaged, Dry, Rapid-Hardening

Cementitious Materials for Concrete Repairs

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

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

29 CFR 1910

Occupational Safety and Health Standards

29 CFR 1910.1000

Air Contaminants

29 CFR 1910.94

Ventilation

29 CFR 1926

Safety and Health Regulations for Construction

29 CFR 1926.55

Gases, Vapors, Fumes, Dusts, and Mists

29 CFR 1926.57

Ventilation

29 CFR 1926.58

Safety and Health Regulations for Construction

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Concrete Removal and Disposal Plan; I, ST

Core Drilling Procedure; I, ST

Concrete Imaging Report; I, ST

Grout Pads; I, ST

SD-03 Product Data

Non-shrink grout; I, ST

Epoxy Adhesive Grout; I, ST

Dry Packaged Concrete; I, ST

Mortar; G, ST

Reinforcing Steel Bar; I, ST

Skim Coat; G, ST

SD-06 Test Reports

Sump Investigation; I, ST

1.4 CONCRETE REMOVAL LOCATIONS

Remove concrete as required in the contract. .

PART 2 PRODUCTS

2.1 NON-SHRINK GROUT

Non-shrink grout shall be inorganic, non-metallic, non-gas-liberating cement-based grout meeting all requirements of ASTM C1107/C1107M; shall have a minimum 28-day compressive strength of 5000 psi; and shall have no shrinkage (0.0 percent) and a maximum 2.0 percent expansion in the hardened state. Manufacturer's data shall be submitted for review 30 days before anticipated use. When submitting the product data, indicate what application it will be used for and anticipated thickness.

2.2 EPOXY ADHESIVE GROUT

Epoxy Adhesive Grout shall be two part epoxy adhesive meeting all requirements of ASTM C881/C881M. Manufacturer's data shall be submitted for review 30 days before anticipated use. When submitting the product data, indicate what application it will be used for and anticipated thickness.

2.3 DRY PACKAGED CONCRETE

Dry Packaged Concrete shall conform to ASTM C387/C387M, normal weight, normal strength. Minimum compressive strength f'c shall be 3000 psi at 28 days. Each bag of concrete shall have factory printing indicating the ASTM designation, weight, and strength. Bags shall be stored off the ground and covered to protect from getting wet. Concrete shall be mixed with electric motor operated portable mixer. Potable water shall be used for mixing the concrete. When submitting the product data, indicate what application it will be used for and anticipated thickness.

2.4 REINFORCING STEEL BAR

Reinforcing Steel Bar shall conform to the requirements of ASTM A615/A615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A185/A185M. Details of reinforcement not shown shall be in accordance with ACI 318, Chapters 7 and 12.

2.5 MORTAR FOR UNCONFINED CONCRETE REPAIR

Mortar shall be a commercially available prepackaged material consisting of a formulation suitable for the application proposed and meeting the requirements for ASTM C928/C928M. The use of metallic iron in the mortar will not be acceptable. Mortar shall have a minimum 7-day compressive strength of 5000 psi. When submitting the product data, indicate what application it will be used for and anticipated thickness.

PART 3 EXECUTION

3.1 GENERAL SAFETY

3.1.1 General

All site work shall be accomplished in compliance with EM 385-1-1, 29 CFR 1910 and 29 CFR 1926 as applicable.

3.1.2 Electrical Hazards

The work areas may be in proximity of energized electrical equipment. Contractor is required to formally train and document safety training for all workers required to work in this area. Spray over onto live equipment is hazardous to workers and equipment and shall not be permitted. Signed safety training sheets will be required to be turned into Contracting Officer to document worker safety training.

3.2 GAS, VAPOR, FUME, DUST, SLURRY AND MIST CONTROL

All necessary measures shall be taken to effect maximum control of all gases, vapors, fumes, dust, slurry and mists created by Contractor operations under this contract. To the maximum extent possible, all dust and dirt shall be removed by vacuum cleaning and mopping, unless otherwise directed by the Contracting Officer. The required concrete removal and disposal plan shall include the following:

- a. Provision of exhaust ducts which shall discharge outside the structure where mechanical ventilation is used. Ventilation systems shall comply with requirements of 29 CFR 1910.94 and 29 CFR 1926.57.
- b. Controlled operation of power-driven tools.
- c. Furnishing and removing of approved dust preventatives in areas which cannot be properly rendered free from excessive dusting by vacuum cleaning and mopping or other methods.
- d. Vacuum cleaning and mopping (or other acceptable method) of spaces inside the structure where dust accumulates.
- e. Only air, electrical, propane, or battery-driven equipment may be used inside the structure.
- f. The powerhouse is pressurized to prevent dust infiltration from the outside. All doors shall be kept closed when not being used.
- g. Blocking doors for extended periods shall not be permitted unless agreed upon in writing by the Contracting Officer (C.O.).
- h. Methods to prevent exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at concentrations above those specified in 29 CFR 1910.1000, 29 CFR 1926.55 and 29 CFR 1926.58.

3.3 TEMPORARY BARRIER

Temporary barriers for the control of dust and debris shall be constructed as required to control dust and debris and meeting criteria outlined in EM 385-1-1. The design of the barriers shall be submitted for approval,

as part of the Concrete Removal and Disposal Plan.

3.4 REMOVAL METHOD

3.4.1 General

Concrete shall be removed in a manner that will not fracture the surrounding concrete. Maintain a safety ground from the ground system to the frame of the concrete cutting tool during cutting operations to avoid electrical shock hazards. Reinforced concrete removal shall result in flush, level smooth surface at the lines shown on the drawings. Care shall be taken not to damage existing reinforcing bar. Explosive or chemical demolition will not be allowed. Adequate equipment shall be provided to remove the pieces of concrete safely and without damage to the surrounding structure. Slurry or tailings generated from sawing or drilling operations shall be confined to the immediate area, and disposed of by vacuuming and mopping. If during any cutting or core drilling activity copper tailings are produced, the Contractor shall report such findings in writing to the C.O. Additional dust control measures shall be implemented per paragraph "GAS, VAPOR, FUME, DUST, SLURRY AND MIST CONTROL". A written [concrete removal and disposal plan](#) shall be submitted 60 days prior to commencement of concrete work, showing equipment to be used, include a waste water collection plan as specified in [01 57 20.00 28 ENVIRONMENTAL PROTECTION](#), expected noise levels and duration. All concrete removed shall become the property of the Contractor and shall be disposed of in accordance with applicable regulations.

3.4.2 Recommended Procedure

Saw cutting, core-drilling, wire cutting or any combination thereof is the recommended method for the concrete removal to be done as part of this contract. In addition to cutting, chipping or grinding may be used to bring the concrete profile to the final finished grade. When the portion of concrete to be removed is of such a magnitude that it cannot be extracted in a single piece, additional cutting shall be performed to allow the concrete to be removed in several convenient sized sections.

3.4.3 Saw Cutting

Saw cutting shall be performed at the locations shown on the contract drawings. The saw cuts shall be done using a diamond-bladed saw. Saw cuts shall be straight and uniform. Scan concrete for embedded items before cutting. If electrical items are found contact the KO.

3.4.4 Core Drilling

Prior to core drilling the Contractor shall research the area to avoid and identify existing embedded ground wires, conduit, piping and raceways. Contractor shall refer to reference drawings to assure drill patterns are likely to miss existing reinforcing, ground wires and conduit. Research of the area shall include concrete imaging techniques such as radiographic imaging, ground penetrating radar, or electromagnetic field detection. Contractor shall submit a [Concrete Imaging Report](#) describing the findings and locating the embedded items on a concrete outline drawing of the area. Drill pattern shall be adjusted to miss embedded obstructions. All core drilling equipment shall be securely grounded during cutting operations to avoid electrical shock hazards. For core holes, if possible shift core holes to avoid rebar or cut as little rebar as possible. Submit photo of the rebar layout and draw a circle of the area that will be drilled over

the rebar.

Submit [Core drilling procedure](#) for approval 60 days prior to commencement of core drilling work, no core drilling shall commence without Contracting Officer approval; submit together with Concrete Imaging Report.

3.4.5 Chipping

When required, concrete removed by saw cutting, core drilling, or stitch drilling shall be brought to the final required lines and grades by using lightweight chipping hammers, bush hammers grinding or other approved means. Chipping operations shall be such that the over breakage does not exceed 2 inches or extend below the existing grade.

3.4.6 Exposed Reinforcement

In all areas where concrete removal will leave exposed reinforcing bars except for the interiors of cored penetrations, the local area around the bar or conduit shall be chipped back to a depth necessary to allow the bar to be burned off 1 1/2 inches back from the final finished concrete surface shown on the drawings, the conduit or bar shall be burned off 1 1/2 inches from the final finished concrete surface shown on the drawings, and the area shall be patched with an approved non-shrink grout bringing it to required final lines and grades as shown on the drawings.

3.4.7 Existing Concrete Strength

The existing concrete to be removed may be expected to range in strength from about 3000 to over 6000 psi. The nominal aggregate size of the concrete is unknown. Zones of honeycomb concrete may also be encountered during the drilling process.

3.4.8 Existing Embedded Items

Embedded items in the path of the concrete cutting or drilling operations include, but are not limited to:

- a. Reinforcing steel as well as minor embedded steel at various distances from the concrete faces.
- b. Steel anchors and form tie backs used in placement of the existing concrete. The number and kind are unknown.
- c. Electrical Conduit.

3.4.9 Concrete Cutting Tolerances

- a. The concrete cut through the existing concrete shall be accurately located. Wire or saw cuts shall be within 1/8 inch of plan dimensions.
- b. The core drill holes through existing concrete shall be accurately located and drilled. During the drilling operation, the drill wobble should be minimized to assure a true and straight hole to meet the specified tolerances.

3.4.10 Finished Surface Tolerance

Finish Smoothness of exposed concrete for the sump pump access as shown on drawing S-101. It can be achieved by one of two means. By cutting and

sanding the concrete surface smooth. The cut surface shall be equivalent to broom finish smoothness or smoother or apply a skim coat. The skim coat product shall meet the criteria as specified for tolerances and smoothness. Submit for approval the **skim coat** product that will work for this application.

3.4.11 Quality Control

A quality control system for the concrete cutting operation shall be established and maintained. The system shall be sufficient to maintain tolerances such that the final concrete cutting conforms to the tolerances outlined in this section of the specifications. The Government reserves the right to inspect this control system to determine if the tolerances are being adhered to, and direct the Contractor to correct and repair any deviations from these tolerances.

3.4.12 Disposal Of Waste Water And Concrete Debris

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that it does not stain, discolor, or affect exposed surfaces of the structure and is not allowed to enter the river or reservoir. As some Project drains lead to the river, waste water shall not be disposed of in Government drains. The method for disposing of wastewater shall be as per the written concrete removal plan and as per requirements of SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION. The method for disposing of concrete debris shall be in accordance with state's disposal requirements and such that it is not allowed to enter the river or reservoir and shall be included in the written concrete removal plan.

3.4.13 Repair Of Concrete Surfaces

Contractor shall restore all concrete surfaces where equipment is removed and the location is not to be reused for equipment placement. Restoration of the concrete surfaces shall be to the required lines and grades shown using a government approved method. The completed surface shall be level, smooth, and even with the adjacent concrete. Deformations in the surface and protrusions of aggregate will not be acceptable. Grinding will be permitted to achieve an acceptable finish surface. Repair Procedure of Concrete Surfaces shall be submitted for approval 30 calendar days prior to performing repair. Repair work shall not proceed without an approved procedure. The repair procedure shall include detailed information on all materials and methods used. If piping, conduit or ground wires are damaged during core drilling or concrete excavation, a sufficient area of the concrete to allow the ground wire, conduit, or piping to be repaired shall be excavated by saw cutting the perimeter of the area to a depth of 1 1/2 to 2 inches and then completing the remaining excavation needed using a bush hammer taking care to preserve embedded reinforcing steel intact.

3.5 EQUIPMENT FOUNDATIONS

Equipment foundations complying with this specification shall be provided for new equipment where shown on the drawings.

3.5.1 Housekeeping Pad for Equipment Foundation

Equipment foundations shall consist of a new 4-inch thick concrete housekeeping pad reinforced with a 6 by 6 -W2.9 wire mesh, placed uniformly 3 inches from the top of the slab. Edges above existing slab

elevation shall have 1/2-inch chamfer. Slab shall be of adequate size to project at least 1 inch beyond the equipment or to match similar dimensions for nearby existing equipment installations. Concrete shall be consolidated by a combination of rodding, spading, and internal vibrating.

Existing concrete surface shall be free of all dust, dirt, oil, and laitance and be saturated to SSD prior to concrete placement. One of the following methods shall be performed prior to placing the concrete pad:

1. Roughened existing concrete surface to 1/4-inch amplitude prior to concrete placement.
2. Install four 1/2 inch DIA epoxy anchor with a minimum of 4" of embedment into the existing concrete. The anchors shall be located 6 to 8 inches from each corner of the concrete pad. The anchors shall be cast with a minimum of 3 inches of embedment in the new concrete pad. The anchors shall be a minimum of 36 ksi yield strength. The anchor may be an all thread rod or a number 4 bar.

3.5.2 Concrete Placement

Concrete shall be placed within 1-1/2 hours after mixing. Surfaces against which concrete is to be placed shall be clean and damp. Immediately after placing, concrete shall be consolidated by a combination of rodding, spading, and internal vibrating.

3.5.3 Concrete Slabs

Surfaces shall be screeded and darried or bull-floated to bring the surface to the required finish level with no coarse aggregate visible. Tolerance for a floated finish shall be true plane within 0.25 inches in 10 feet. For permanently exposed edges where the concrete is bounded by the forms, the Contractor shall chamfer the edge of the concrete to match with the existing slab's edge.

3.5.4 Concrete Curing

All concrete shall be moist or membrane cured for a minimum of 7 days. Membrane curing compound shall conform to [ASTM C309](#) and shall be applied in accordance with the manufacturer's recommendations. All concrete shall be adequately protected from damage. The air and forms in contact with concrete shall be maintained at a temperature above 40 degrees F. for a minimum of 72 hours after placement and at a temperature above 32 degrees F. for the remainder of the specified curing period.

3.5.5 Grout Pads

Grout shall be packed or poured to develop full contact under the base/sole plate or equipment base. The grout pad shall be sloped at a 45deg angle from the base of the base plate or equipment base to the concrete. It is not acceptable to have a horizontal ledger made of grout penetrating beyond the base plate or equipment base. Grout under baseplate shall be uniformly placed in contact with all surfaces. Any base plate with a grout pad larger than 18 shall have a submittal documenting the method at which the grout shall be placed. Bleed holes, method of installation, and material product data shall be included in the submittals. For pumps all leveling screws to be backed off after grouting such that they will not support any of the load.

3.6 SUMP INVESTIGATION

Reference Drawings SD101. Prior to removing the concrete around the sump, Perform a GPR scan that can read up to 7 feet deep. The intent of the scan is to validate the as-built condition of the drawings and to validate the concrete depth prior to concrete removal. Scan a minimum of 2 feet beyond the area of the concrete removal. If the GPR is unable to read the depth of the concrete, core drill a 1" DIA hole that is 7 feet deep. If rock or water is hit notify the KO. The core hole shall be located at the south west corner of the concrete excavation (furthest from the existing sump, towards the center of the room within the concrete removal area). Grout in the bottom of the core hole after the concrete is removed. Submit the finding of the GPR results and if coring is done, submit the finding of the coring.

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 - 3.3.4 Inspections Report

3.4 DUST CONTROL

-- End of Section Table of Contents --

SECTION 05 05 20.00 28

POST-INSTALLED ANCHORS IN CONCRETE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318 (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)

ACI 355.2 (2007) Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary

ACI 355.4 (2011) Qualification of Post-Installed Adhesive Anchors in Concrete (ACI 355.4) and Commentary

ASTM INTERNATIONAL (ASTM)

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM E488/E488M (2015) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

ASTM F1554 (2017; E 2018) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

1.2 APPLICABILITY

This guide specification covers the requirements for all steel elements, with diameters of 3/8 inches to 1 1/4 inches, that are post-installed into hardened concrete.

1.3 DEFINITIONS

1.3.1 Anchor

"Anchor" as used herein includes all types of mechanical and adhesive anchors, hybrid anchors (combination of mechanical and adhesive anchor), undercut anchors, expansion anchors, threaded rods, reinforcing bars and dowels and any other steel connecting element that references this specification section in the project drawings or other specification sections.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Installer Qualifications; G ST

Anchor Installation Submittal; G ST

Anchor Design Submittal; G ST

SD-03 Product Data

Non-Shrink, Non-Metallic Grout; G ST

SD-06 Test Reports

Inspections Report; G ST

SD-08 Manufacturer's Instructions

Non-Shrink, Non-Metallic Grout; G ST

1.5 DESIGN OF ANCHORS

Anchors shall be designed by a professional engineer for all bracing and anchoring to support all equipment and system unless otherwise noted on the drawings. Anchors shall meet criteria outlined in this specification section.

1.5.1 Anchor Design Submittal

For anchors that are designed by the engineer submit the following:

1. Anchor Location
2. Anchor Type
3. Required Load (or manufactures recommended anchors)
4. ICC ES Evaluation Services Reports (ESR), and anchor test data in accordance with applicable ESR
5. Anchor Capacity
6. Any anchor limitations such as temperature range or torque limits

7. Reference Drawings
8. PE Stamp

Submittal shall be labeled with an index with the information listed above.

1.5.2 Anchor Installation Submittal

For all post installed anchors submit the following:

1. Anchor Location and intent usage
2. Anchor Type
3. Anchor Brand
4. Engineer Design Information (Anchor Design Submittal Number) or drawing reference location for non-designed anchors
5. Installation Limitations such as Temperature and Torque limits
6. Installer
7. Rebar detection methods
8. Hole drilling and cleaning methods
9. Manufactures installation methods
10. Contractor installation procedure
11. Manufacturer's Material Safety Data Sheets (MSDS)
12. Isolation kit needed.

1.5.3 Isolation Kits

Contractor shall use isolation kits for areas where dissimilar metals can not be avoided or specified on the job. Isolation kits shall include the isolation between the shaft of the anchor and the anchor bolt head/washer. Isolation kits are required in areas of dissimilar metal that is submerged or may be submerged.

1.6 QUALITY ASSURANCE

Perform all work in accordance with EM 385-1-1. To protect personnel from overexposure to toxic materials, conform to the applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation. Submit the MSDS for epoxies and other potentially hazardous materials in Anchor Installation Submittal.

1.6.1 Qualifications

The submittals must identify individuals who will be working on this contract and their relevant experience and training. Do not make changes in approved personnel without prior approval of the Contracting Officer.

1.6.1.1 Installer Qualifications

Adhesive anchors installer qualifications shall include written and performance tests in accordance with the ACI/CRSI Adhesive Anchor Installer Certification program as prescribed in ACI 318, within 12 months prior to performing work on this contract. The anchor installers shall be required to repeat the certification program when, in the opinion of the Contracting Officer, their work indicates a reasonable doubt as to their proficiency. Certification shall be submitted for those passing the test and upon approval, they shall be considered qualified. Those not passing shall be disqualified until passing. All expenses in connection with qualification or requalification shall be borne by the Contractor. Alternately, the Contractor can arrange for the anchor manufacturer's representative to provide onsite installation training for all of their

anchoring products specified.

For all post installed adhesive anchors items that will be evaluated in the testing and demonstrating of the installation will be but not limited to:

- (1) Hole drilling procedure
- (2) Hole preparation & cleaning technique
- (3) Adhesive injection technique & dispenser training / maintenance
- (4) Anchor/threaded rod preparation and installation
- (5) Rebar dowel preparation and installation
- (6) Proof loading/torque values
- (7) Installation in horizontal and upward orientations

Submit certification for each worker showing that they have completed the above training within 1 years prior to onsite work. Certification must include organization or manufacturer's name, instructor's name and qualifications, trainee's name, list of instruction received, date of instruction, and confirmation of successful performance tests.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Packing, Shipping, Handling, and Unloading

Deliver products to job site in manufacturer's or distributor's original packaging undamaged, complete with installation instructions. Inspect materials delivered to site for damage. Unload and store with minimal handling.

1.7.2 Storage

Protect, store, and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration. Do not allow chemical materials to freeze. Remove materials that have not be stored in accordance with the manufacturer's recommendations, including expired materials, from the job site.

1.8 ANCHOR CRITERIA

The following are anchor criteria when designing and selecting anchors.

1.8.1 Limitations on Allowable Fasteners to Concrete

Do not utilize powder actuated fasteners, screw or coil type anchors to secure equipment. Do not use expansive drop-in threaded insert type anchors to suspend equipment. Do not use expansion anchors to resist vibratory loads due to rotating machinery. Do not use chemically bonded adhesive anchors to resist pull-out in overhead and wall installations. For chemically bonded adhesive anchors for use in low temperature or under-water applications, provide product data indicating suitability for use and pass on-site installation test(s) under anticipated environmental conditions.

1.8.2 General Requirements for Fasteners to Concrete

Provide anchors at least 1/2 inch in diameter unless otherwise indicated in the plans or this specification section. Provide chemically bonded adhesive anchors with an embedded depth equal to at least 12 times nominal diameter of the bolt/rod. Provide expansive or undercut anchors with a

minimum embedded depth of at least 4 inches. Compute anchor capacity as per Chapter 17 of **ACI 318** and reduce the anchor capacity to account for the effect of spacing between anchor bolts and the distance between anchor bolt and the nearest concrete edge. Provide anchor test data in accordance with ICC ES Evaluation Services Reports (ESR) for each type and class of concrete anchor verifying the suitability of an anchor for the intended application.

All anchors shall be intended for checked concrete and suitable for seismic applications.

1.8.3 Floor Mounted Equipment

Anchor floor mounted equipment to concrete that is reinforced and integrally connected to the reinforced concrete structure. Intermittent tension developed due to laterally applied seismic force of 1000 pounds (lbs) or less may be resisted with expansive concrete anchors capable of resisting dynamic loading in cracked and un-cracked concrete unless otherwise indicated on the drawings. Resist intermittent tension developed due to laterally applied seismic force greater than 1000 lbs with undercut concrete anchors. Epoxy anchors are permitted in applications where concrete foundation pads are not integrally connected to the reinforced concrete structure. Embedment is only considered to occur in structural concrete. Embedment solely in architectural floating slabs and house-keeping foundation pads not integrally connected to the reinforced concrete structure will not be accepted. For anchorage of channel foundations or for housekeeping pads not integrally connected to structural slab, full anchor embedment is required to be in the structural slab beneath the equipment foundation. For anchors installed in an environment subject to water intrusion and freeze thaw cycles, provide epoxy adhesive anchors or alternately use undercut anchors and seal with a flexible sealant recommended by the anchor manufacturer and as indicated on the drawings and approved by the KO.

1.8.4 Wall Mounted and Suspended Equipment

Secure wall mounted and suspended equipment with undercut anchors if the equipment weighs 50 lbs and above.

1.8.5 Wall Mounted Systems

Secure Wall mounted systems with undercut anchor(s) at least once every 40 feet and when direct tension above 500 lbs develops due to gravity loads or laterally applied seismic force. Wall mounted systems may be secured with expansive anchors capable of resisting dynamic loading in cracked and un-cracked concrete at other locations.

1.8.6 Suspended Systems

Secure all sway brace assemblies including the vertical support component(s) to the concrete with undercut anchors. Expansive concrete anchors capable of resisting dynamic loading in cracked and un-cracked concrete may only be used to secure hangers at locations without sway bracing. Suspended piping or conduit may be secured with 3/8 inch minimum diameter anchors for pipe and conduit nominal diameters of 3/8 inch through 2 inch to allow compatibility with piping requirements for threaded rod used as hangers. For systems not required to have sway bracing, secure the system a minimum of every 40 feet with undercut anchors.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Post-Installed Anchors

Provide anchors of the type, embedment, and diameter indicated on contract drawings. Minimum concrete spacing and edge distances must be as shown on contract drawings or design calculations. Design values listed must be as tested according to [ASTM E488/E488M](#). Minimum allowable tension and shear values must be as indicated on contract drawings. If more than one type of anchor is to be used on a project, clearly indicate on the submittal where each type of anchor will be used. Submit data in the Anchor Installation Submittal.

2.1.1.1 Certification

Submit product information in the Anchor Design Submittal with recommended design values and physical characteristics for each type anchor.

Provide certified test reports showing compliance with specified performance characteristics and physical properties. Anchors must have one of the following certifications:

- (1) ICC-ES Evaluation Report indicating conformance with current applicable ICC ES Acceptance Criteria.
- (2) Third party Evaluation Report indicating conformance with ACI 355.2 or 355.4, as applicable.

2.1.1.2 Mechanical Anchors in Concrete

Anchors must have been tested and qualified for performance in cracked and uncracked concrete in accordance with [ACI 355.2](#).

Anchors must be galvanized (Hot-Dip Galvanized or Sherardized) in accordance with [ASTM A153/A153M](#) or stainless steel.

2.1.1.3 Adhesive Anchors in Concrete

Use a two-component epoxy-based or hybrid adhesive to bond steel anchors to concrete. The adhesive must be moisture insensitive, low creep, structural adhesive. Anchors must have been tested and qualified for performance in cracked and uncracked concrete, horizontal and overhead applications, and long term creep in accordance with [ACI 355.4](#).

Threaded rods must meet the requirements of [ASTM F1554](#) Grade 36. Threaded rods must be galvanized in accordance with [ASTM A153/A153M](#) or stainless steel.

2.2 EQUIPMENT

Assemble at the site of the work, sufficient equipment that is dependable, appropriate and adequate to accomplish the work specified. Maintain the equipment in good working condition.

PART 3 EXECUTION

3.1 ANCHORING AND REINFORCING

Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edges of concrete. Anchor capacity is also highly dependent on proper installation. Follow all manufacturer and Evaluation Report recommended installation instructions.

3.1.1 Drilling and Installing Mechanical Anchors

Drill holes for anchors using drilling equipment and bits suitable for the intended purpose, in accordance with Manufacturer's published installation instructions. Diameter of holes must be as recommended by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes must be drilled perpendicular to the concrete surface. Unless otherwise specified, do not drill holes in concrete till it has achieved full design strength.

Clean holes, install anchors and set anchors in place in accordance with the manufacturer's recommendations. Protect threads and anchor from damage during anchor installation. Ensure proper embedment and placement in accordance with contract documents and all other work.

3.1.2 Drilling and Installing Adhesive Anchors

Drill holes for anchors using drilling equipment and bits suitable for the intended purpose, in accordance with Manufacturer's published installation instructions. Diameter of holes must be as recommended by the anchor manufacturer. Unless otherwise shown on the drawings, all holes must be drilled perpendicular to the concrete surface. Unless otherwise specified, do not drill holes in concrete till it has achieved full design strength.

Clean holes, place grout (Adhesive), and install anchors in accordance with anchor manufacturer's recommendations. Remove excess grout (Adhesive) after the anchor has been set in place. Remove spills on adjacent surfaces. Protect threads and anchor from damage during anchor installation. Ensure proper embedment and placement in accordance with contract documents and all other work. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

Use piston plugs for horizontal and vertical installation.

Adhesives must be stored at temperatures prescribed by the manufacturer and must not be used beyond the expiration date.

3.1.3 Unused or Repairs to Drilled Holes

Any holes made for anchors that are not used must be filled with [non-shrink, non metallic grout](#) suitable for the orientation and size of hole and have a minimum compressive strength of 4000 psi. Repair must completely fill hole and be flush with existing concrete. Place in accordance with manufacturer's recommended instructions. Final anchor positions must not be within [1 inch](#) of repair patches.

3.2 EMBEDDED ITEMS

Existing reinforcing bars or other embedded items in the structure may

conflict with specified anchor locations. Existing reinforcing and embedded items must not be damaged during installation of post installed anchors.

The contractor must review the existing drawings and must use Radar detection systems , X-Ray, GPR, or other appropriate means to accurately locate the position of existing reinforcing bars and embedded items at the locations of the anchors in the field. Scanning method must provide enough accuracy and precision to locate the space between rebar. Structural integrity of existing concrete must not be impaired by investigating method.

Do not drill through existing rebar.

3.3 TESTS AND INSPECTIONS

3.3.1 Mechanical Anchors

For mechanical anchors whose strength is dependent on a minimum installation torque, torque test the anchors with a calibrated torque wrench. Perform torque testing on the first three anchors of each type and size, for each installer, and a minimum of 10 percent of randomly selected anchors. Anchor selection will be determined by the Contracting Officer. Calibrate torque wrenches at the beginning the job. Maintain the applied torque between 20 and 80 percent of wrench capacity.

For mechanical anchors whose strength is not dependent on a minimum installation torque, the special inspector must perform proof loading on the first three anchors of each type and size, for each installer and a minimum of 10 percent of randomly selected anchors. Anchor selection will be determined by the Contracting Officer. Perform confined tension proof load testing in accordance with [ASTM E488/E488M](#). Use incremental loading for tensile test. Maintain proof load for a minimum of 10 seconds. Consider anchors to have failed if displacement exceeds $D/10$, where D is the nominal anchor diameter, or if any of the failure modes listed in [ASTM E488/E488M](#) occur.

Proof loads must be the design capacity or 50% of the tension capacity of the anchor, whichever is greater.

3.3.2 Adhesive Anchors

Perform proof loading on the first three anchors of each type and size, for each installer, and a minimum of 10 percent of randomly selected anchors. Anchor selection will be determined by the Contracting Officer. Perform confined tension proof load testing in accordance with [ASTM E488/E488M](#). Use incremental loading for tensile test. Maintain proof load for a minimum of 10 seconds. Consider anchors to have failed if displacement exceeds $D/10$, where D is the nominal anchor diameter, or if any of the failure modes listed in [ASTM E488/E488M](#) occur.

Adhesive anchors and capsule anchors must not be torque tested.

Proof loads must be to the design capacity or 50% of the tension capacity of the anchor.

3.3.3 Action Required from Failed Tests/Inspections

Immediately report failed anchor locations and test results to the

Contracting Officer. Anchors that fail to meet proof/torque load or installation requirements must be regarded as malfunctioning. Do not re-use holes unless specifically allowed by manufacturer's published instructions and approved by the Post Installed Anchor Special Inspector.

If any of the tested anchors fail to achieve the specified torque or proof load within the limits of the contract documents, test a minimum of two adjacent anchors for each anchor that fails.

Continuously special inspect and proof load/torque test any replacement anchors.

Fill unused anchor holes and patch failed anchor locations in accordance with this specification. Prior to performing the repair, the Contractor must submit to the Contracting Officer for approval, the proposed fill and patch materials.

Additional tests, repairs, delays, or modification of work to accommodate failed tests will be at no cost to the Government.

3.3.4 Inspections Report

Report the results of all inspections. Submit report as an electronic PDF file to the Contracting Officer for review. The KO shall be witness the testing. The report must include the following:

- (1) Exact locations of the inspected and tested work
- (2) Inspector's name
- (3) Date of inspection
- (4) Summary of work completed during the inspection period
- (5) Test results
- (6) Statement by the inspector that clearly identifies the tested anchors as being acceptable or rejected.

3.4 DUST CONTROL

Control dust resulting from demolition to prevent the spread of dust and avoid creation of a nuisance in the surrounding area. Do not use water when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, or pollution.

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STRUCTURAL METAL FABRICATIONS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 360 (2016) Specification for Structural Steel Buildings

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI-ASC A14.3-2018 (2018) American National Standards for Ladders

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-189 (2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B4.1 (1967; R 1994; R 2004; R 2009; R 2020) Preferred Limits and Fits for Cylindrical Parts

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020; Errata 1 2021) Structural Welding Code - Steel

AWS D1.6/D1.6M (2017) Structural Welding Code - Stainless Steel

AWS QC1 (2016) Specification for AWS Certification of Welding Inspectors

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc

Coating (Hot-Dip) on Iron and Steel
Hardware

ASTM A240/A240M	(2020a) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A276/A276M	(2017) Standard Specification for Stainless Steel Bars and Shapes
ASTM A653/A653M	(2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A924/A924M	(2020) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM D256	(2010; R 2018) Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D1187/D1187M	(1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
ASTM D2240	(2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness
ASTM E165/E165M	(2018) Standard Practice for Liquid Penetrant Examination for General Industry
ASTM E709	(2015) Standard Guide for Magnetic Particle Examination
ASTM F3125/F3125M	(2019) Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

MASTER PAINTERS INSTITUTE (MPI)

MPI 79	(2012) Primer, Alkyd, Anti-Corrosive for Metal
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RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)

RCSC A348	(2020) RCSC Specification for Structural
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Joints Using High-strength Bolts

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G, ST

Welding Procedures; G, ST

Welding Repair Plan; I, ST

SD-03 Product Data

Filler Metal; I, ST

SD-06 Test Reports

Tests, Inspections, and Verifications; I, ST

Welding Procedures Qualified; G, ST

SD-07 Certificates

Welding Qualifications; I, ST

Application Qualification for Steel Studs; I, ST

Weld Inspection Log; I, ST

Certified Welding Inspector; I, ST

Nondestructive Testing Personnel; I, ST

1.3 QUALITY ASSURANCE

1.3.1 Detail Drawings

Submit detail drawings for metalwork and machine work, prior to fabrication, include within the detail drawings catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Indicate methods of protecting the work during shipping, storage, field assembly, and installation.

1.3.2 Welding Qualifications

Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welder or welding operator is more than 6 months old, accompany the welding operator's qualification certificate with a current certificate by the welder attesting to the fact that he has been engaged in welding since the date

of certification, with no break in welding service greater than 6 months.

Conform to all requirements specified in [AWS D1.1/D1.1M](#) or [AWS D1.6/D1.6M](#) as applicable to the welding material.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Stainless Steel

Stainless steel plates: [ASTM A240/A240M](#) AISI Type 304 or 304L or 316 or 316L.

Stainless steel bars and shapes: [ASTM A276/A276M](#) AISI Type 304 or 304L or 316 or 316L.

All stainless steel plates, bars and shapes to have a minimum yield strength equal to 25ksi and minimum ultimate strength equal to 70ksi.

2.1.2 Carbon steel

[ASTM A36/A36M](#)

2.1.3 UHMW

100 percent virgin cross-linked UHMW with 2.5 percent carbon black added for UV stabilization. Blocks and bars shall be fabricated from UV-stabilized, cross-linked ultra high molecular weight polyethylene (UHMWPE) conforming to the following requirements:

PHYSICAL TEST	TEST VALUE	SPECIFICATION
Tensile Strength	Yield: 3,000 psi (min.) Ultimate: 5,000 psi (min.)	ASTM D638
Izod Impact at 23 deg	22.5 ft-lbs/in (min.)	ASTM D256
Durometer Hardness	65 (min.)	ASTM D2240
Water Absorption	NONE	ASTM D570

2.1.4 Locking agent

Install a locking agent on the screws holding the UHMW to the seismic pump brace. Locking agent shall be suitable for underwater use after installed and appropriate drying time. The locking agent is to be the type that is disassembled with heat and be good for a temperature range from -32deg to 200deg F.

2.2 FABRICATION FINISHES

2.2.1 Galvanize

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Provide galvanizing in accordance with [ASTM A123/A123M](#), [ASTM A153/A153M](#), [ASTM A653/A653M](#) or [ASTM A924/A924M](#), Z275 G90.

2.3 LADDER

Contractor shall provide galvanized fixed ladders as shown on drawings M-402, M-403 and M-501. Ladder shall be compliant with the requirements of [ANSI-ASC A14.3-2018](#), American Standard for Ladders - Fixed - Safety Requirements.

Contractor shall provide one stainless steel ladder as shown on drawing S-101. Ladder shall be compliant with the requirements of OSHA CFR 1910.23 and contain guard post and comply with [ANSI-ASC A14.3-2018](#), American Standard for Ladders - Fixed - Safety Requirements.

2.3.1 Ladders and Platforms

Steel ladders and platforms shall be designed and fabricated in accordance with the applicable requirements in [AISC 360](#).

2.3.2 Materials.

For carbon steel ladders material to conform to [ASTM A36/A36M](#) or higher strength steel.

For stainless steel ladders material see section 2.1.1.

2.3.3 Welding

Welding for steel ladders shall conform to all applicable requirements of [AISC 360](#) or [AWS D1.1/D1.1M](#) or [AWS D1.6/D1.6M](#).

2.3.4 Ladder Steps and Rungs

Carbon Steel Ladders. The minimum sizes (cross sections) of steps and rungs fabricated of steel conforming to [ASTM A36/A36M](#)-2005 shall be as follows:

Because ladders will be subjected to corrosive and wet conditions, 1-inch-diameter solid bar, or the equivalent in strength for square, rectangular, or other solid shapes, is required.

Stainless steel ladder shall meet criteria as previously specified.

2.3.5 Ladder Side Rails

Carbon Steel Ladders. The recommended minimum sizes (cross section) of side rails fabricated of steel conforming to [ASTM A36/A36M](#)-2005 are as follows:

Because ladders will be subjected to corrosive and wet conditions, flat solid bar stock, 2-1/2 inches wide by 1/2-inch thick, or the equivalent in strength in solid shapes, is required.

2.3.6 Rung Ends

Ladders of steel shall have each rung end securely fastened to the side rails so as to fully develop the strength of the step or rung, and so as to securely lock each step or rung to the side rails. The connection of the rungs to the side rails shall be designed to develop the full strength of both the rung and the side rails.

For carbon steel the connection shall be at minimum 1/4" fillet weld, welded

all around the rungs and shall not allow water to penetrate behind the welds.

2.3.7 Maximum Spacing of Supports

The spacing of supports for fastening the side rails to the structure shall be 10 feet 0 inches maximum, and for the clear width of steps or rungs.

2.3.8 Protective Finishes

Carbon-steel ladders shall be hot-dip galvanized.

2.3.9 Anchor

For carbon steel ladder the anchor shall be galvanized epoxy anchors.

For Stainless steel ladder the anchor shall be stainless steel epoxy anchors.

2.4 FABRICATION

2.4.1 Structural Fabrication

Material must be straight before being laid off or worked. Perform straightening, if necessary, by methods that will not impair the metal. Sharp kinks or bends are cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Make bends using approved dies, press brakes or bending rolls. Where heating is required, take precautions to avoid overheating the metal and allow it to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material, other than structural steel, is subject to approval and must be indicated on detail drawings. Shearing must be accurate and all portions of the work neatly finished. Make corners square and true unless otherwise shown. Fillet re-entrant cuts to a minimum radius of $\frac{3}{4}$ inch unless otherwise approved. Provide finished members free of twists, bends and open joints. Tighten bolts, nuts and screws.

2.4.1.1 Dimensional Tolerances for Structural Work

Measure dimensions using an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit must be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of $\frac{1}{32}$ inch is permissible in the overall length of component members with both ends milled; component members without milled ends must not deviate from the dimensions shown by more than $\frac{1}{16}$ inch for members 30 feet or less in length, and by more than $\frac{1}{8}$ inch for members over 30 feet in length.

2.4.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Prepare surfaces and edges in accordance with AWS D1.1/D1.1M or AWS D1.6/D1.6M, Prequalification of WPSs Clause.

Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Chip, grind or machine to sound metal hand-guided cuts which are to be exposed or visible.

2.4.2 Welding

2.4.2.1 Welding of Structural Steel

2.4.2.1.1 Welding Procedures for Structural Steel

Use prequalified welding procedures for structural steel as described in AWS D1.1/D1.1M or AWS D1.6/D1.6M, Prequalification of WPSs Clause or qualify by tests as prescribed in AWS D1.1/D1.1M or AWS D1.6/D1.6M, Qualification Clause. For welding procedures qualified by tests, the coupon welding and specimen testing will be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure does not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contracting Officer.

- a. Submit a complete schedule of welding procedures for each steel structure to be welded prior to commencing fabrication. Provide the schedule in conformance with the requirements specified in the provisions of AWS D1.1/D1.1M or AWS D1.6/D1.6M
- b. Provide within the schedule detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Include in the welding procedures filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Clearly identify each welding procedure as being prequalified or required to be qualified by tests.
- c. Show types and locations of welds designated or in the specifications to receive nondestructive testing in the welding procedures.

2.4.2.1.2 Welding Process

Perform welding of structural steel by an electric arc welding process using a method which excludes the atmosphere from the molten metal and conforms to the applicable provisions of AWS D1.1/D1.1M or AWS D1.6/D1.6M. Minimize residual stresses, distortion and shrinkage from welding.

2.4.2.1.3 Welding Technique

2.4.2.1.3.1 Filler Metal

Provide the electrode, electrode-flux combination and grade of filler metal conforming to the appropriate AWS specification for the base metal and welding process being used or be as shown where a specific choice of AWS specification allowable is required. Submit filler metal product data. Include the AWS designation of the electrodes to be used in the schedule of welding procedures. Use only low hydrogen electrodes for manual shielded metal-arc welding regardless of the thickness of the steel. Use a controlled temperature storage oven at the job site as prescribed by AWS D1.1/D1.1M, Fabrication Clause to maintain low moisture

of low hydrogen electrodes. For stainless steel use electrodes as appropriate for the stainless steel as outlined in AWS D1.6/D1.6M

2.4.2.1.3.2 Preheat and Interpass Temperature

Perform preheating as required by AWS D1.1/D1.1M or AWS D1.6/D1.6M, Fabrication Clause or as otherwise specified except that the temperature of the base metal must be at least 70 degrees F. Slowly and uniformly preheat the joint area by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

2.4.2.1.3.3 Stress-Relief Heat Treatment

Where stress relief heat treatment is specified or shown, perform in accordance with the requirements of AWS D1.1/D1.1M or AWS D1.6/D1.6M, Fabrication Clause unless otherwise authorized or directed.

2.4.2.1.4 Workmanship

Perform welding workmanship in accordance with AWS D1.1/D1.1M or AWS D1.6/D1.6M, Fabrication Clause and other applicable requirements of these specifications.

2.4.2.1.4.1 Preparation of Base Metal

Prior to welding inspect surfaces to be welded to ensure compliance with AWS D1.1/D1.1M or AWS D1.6/D1.6M, Fabrication Clause.

2.4.2.1.4.2 Temporary Welds

Make temporary welds, required for fabrication and erection, under the controlled conditions prescribed for permanent work. Make temporary welds using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Conduct preheating for temporary welds as required by AWS D1.1/D1.1M for permanent welds except that the minimum temperature must be 120 degrees F in any case. In making temporary welds, do not strike arcs in other than weld locations. Remove each temporary weld and grind flush with adjacent surfaces after serving its purpose. Weld temperature for stainless steel shall be kept within criteria of AWS D1.6/D1.6M.

2.4.2.1.4.3 Tack Welds

Tack welds that are to be incorporated into the permanent work are to exhibit the same quality requirements as the permanent welds; clean and thoroughly fuse them with permanent welds. Perform preheating as specified above for temporary welds. Provide cascaded ends on multiple-pass tack welds. Remove defective tack welds before permanent welding.

2.4.2.2 Welding of Steel Studs

Welding of steel studs must conform to the requirements of AWS D1.1/D1.1M or AWS D1.6/D1.6M, Stud Welding Clause, except as otherwise specified for the procedures for welding steel studs to structural steel, including mechanical, workmanship, technique, stud application qualification, production quality control and fabrication and verification inspection procedures.

2.4.2.2.1 Application Qualification for Steel Studs

As a condition of approval of the stud application process, submit certified test reports and certification that the studs conform to the requirements of AWS D1.1/D1.1M or AWS D1.6/D1.6M, Stud Welding Clause, certified results of the stud manufacturer's stud base qualification test, and certified results of the stud application qualification test as required by AWS D1.1/D1.1M or AWS D1.6/D1.6M, Stud Welding Clause, prior to commencing fabrication, except as otherwise specified.

2.4.2.2.2 Production Control

Production control of stud welding must conform to the requirements of AWS D1.1/D1.1M or AWS D1.6/D1.6M, Stud Welding Clause, except as otherwise specified for quality control for production welding of studs. Weld studs on which pre-production testing is to be performed must be in the same general position as required on production studs (flat, vertical, overhead or sloping). If the reduction of the length of studs becomes less than normal as they are welded, stop welding immediately and do not resume until the cause has been corrected.

2.4.3 Bolted Connections

2.4.3.1 Bolted Structural Steel Connections

Provide bolts, nuts and washers of the type specified or indicated. Equip all nuts with washers except for high strength bolts. Use beveled washers where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated, conform the materials, workmanship and installation to the applicable provisions of ASTM F3125/F3125M. Install High Strength Bolts ASTM F3125/F3125M Grade A325 or Grade A490 in accordance with the requirements of RCSC A348. All High Strength Bolted Connections are fully pretensioned to the minimum pretension as specified in RCSC A348. Follow the pre-installation verification procedures outlined in RCSC A348. All other bolted connections are snug tight in accordance with RCSC A348.

- a. Accurately locate bolt holes, smooth, perpendicular to the member and cylindrical.
- b. Drill or subdrill holes for regular bolts and ream in the shop and not more than 1/16 inch larger than the diameter of the bolt.
- c. Match-ream or drill holes for fitted bolts in the shop. Remove burrs resulting from reaming. Keep bolt threads entirely outside of the holes. The body diameter of bolts must have tolerances as recommended by ASME B4.1 for the class of fit specified. Place fitted bolts in reamed holes by selective assembly to provide an LN-2 fit.
- d. Holes for high strength bolts must not have diameters more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts, the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly cannot distort the

metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

2.5 TESTS, INSPECTIONS, AND VERIFICATIONS

Perform material tests and analyses certified by an approved laboratory to demonstrate that materials are in conformity with the specifications. These tests and analyses must be performed and certified at the Contractor's expense. Perform tests, inspections, and verifications conforming to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Conduct tests in the presence of the Contracting Officer if so required. Furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Properly label specimens and samples and prepare for shipment. Submit certified test reports for materials with all materials delivered to the site.

2.5.1 Nondestructive Testing

When doubt exists as to the soundness of any material part, such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government if the part is found to be sound and by the Contractor if the part is found to be defective. Any defects will be cause for rejection; replace and retest rejected parts at the Contractor's expense.

2.5.2 Tests of Machinery and Structural Units

The details for tests of machinery and structural units must conform to the requirements of the particular sections of these specifications covering these items. Assemble each complete machinery and structural unit and test them in the shop, in the presence of the Contracting Officer, unless otherwise directed. Waiving of tests does not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site, operate each complete machinery or structural unit through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects.

2.5.3 Inspection of Structural Steel Welding

Nondestructive testing of designated welds will be required. Supplemental examination of any joint or coupon cut from any location in any joint may also be required.

2.5.3.1 Visual Examination

All visual inspection will be conducted in accordance with AWS D1.1/D1.1M, or AWS D1.6/D1.6M by a Certified Welding Inspector. Document this inspection in the Visual Weld Inspection Log. Submit certificates indicating that certified welding inspectors meet the requirements of AWS QC1.

2.5.3.2 Nondestructive Testing

Perform as designated or described in the sections of these specifications, the nondestructive testing of shop and field welds covering the particular items of work. Record final nondestructive testing results in the Weld Inspection Log which identifies final NDT inspection of all welds requiring inspection and submit the log.

2.5.3.2.1 Testing Agency

The nondestructive testing of welds and the evaluation of tests as to the acceptability of the welds must be performed by a testing agency adequately equipped and competent to perform such services or by the Contractor using suitable equipment and qualified personnel. All personnel performing nondestructive testing shall be certified Level I or II in the method of NDT being utilized in accordance with [ANSI/ASNT CP-189](#). Level I inspectors must have direct supervision of a Level II inspector. Submit certification for [nondestructive testing personnel](#) prior to all testing. In either case, written approval of the examination procedures is required and performance of the examination tests must be done in the presence of the Contracting Officer. The evaluation of tests are subject to the approval and all records become the property of the Government.

2.5.3.2.2 Examination Procedures

Conform to the following requirements.

2.5.3.2.2.1 Ultrasonic Testing

Examine, evaluate and report ultrasonic testing of welds in conformance to the requirements of [AWS D1.1/D1.1M](#), Inspection Clause, for statically loaded connections. Provide ultrasonic equipment capable of making a permanent record of the test indications. Make a record of each weld tested.

2.5.3.2.2.2 Magnetic Particle Inspection

Conform magnetic particle inspection of welds to the applicable provisions of [ASTM E709](#).

2.5.3.2.2.3 Dye Penetrant Inspection

Perform dye penetrant inspection of welds conforming to the applicable provisions of [ASTM E165/E165M](#).

2.5.3.2.3 Welds to be Subject to Nondestructive Testing

Test 100% of CJP and PJP welds using ultrasonic testing per Table 6.2 of [AWS D1.1/D1.1M](#).

Test 100% of all fillet welds with dye penetrant testing.

Visual inspect 100% of all welds.

2.5.3.3 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive testing. When coupons are removed from any part of a

structure, repair the members cut in a neat manner with joints of the proper type to develop the full strength of the members. Peen repaired joints as approved or directed to relieve residual stress. The expense for removing and testing coupons, repairing cut members and the nondestructive testing of repairs is borne by the Government or the Contractor in accordance with the Contract Clauses INSPECTION AND ACCEPTANCE.

2.5.3.4 Supplemental Examination

When the soundness of any weld is suspected of being deficient due to faulty welding or stresses that might occur during shipment or erection, the Government reserves the right to perform nondestructive supplemental examinations before final acceptance. The cost of such inspection will be borne by the Government.

2.5.4 Welding Repair Plan

Repair defective welds in accordance with AWS D1.1/D1.1M or AWS D1.6/D1.6M, Fabrication Clause. Remove defective weld metal to sound metal by use of air carbon-arc or oxygen gouging. Thoroughly clean surfaces before welding. Retest welds that have been repaired by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting will be borne by the Contractor. Submit welding repair plans for steel, prior to making repairs.

2.5.5 Inspection and Testing of Steel Stud Welding

Perform fabrication and verification inspection and testing of steel stud welding conforming to the requirements of AWS D1.1/D1.1M, Welding Clause except as otherwise specified. The Contracting Officer will serve as the verification inspector. Bend or torque test one stud in every 100, including studs that do not show a full 360 degree weld flash, have been repaired by welding or whose reduction in length due to welding is less than normal as required by AWS D1.1/D1.1M, Stud Welding Clause. If any of these studs fail, bend or torque test two additional studs. If either of the two additional studs fails, all of the studs represented by the tests will be rejected. Studs that crack under testing in the weld, base metal or shank will be rejected and replaced by the Contractor at no additional cost.

PART 3 EXECUTION

3.1 DISSIMILAR METALS

Where dissimilar metals are in contact, protect surfaces with a coating in accordance with MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect in accordance with ASTM D1187/D1187M, asphalt-base emulsion. Clean surfaces with metal shavings from installation at the end of each work day.

3.2 PREPARATION

3.2.1 Material Coatings and Surfaces

Remove rust preventive coating just prior to field erection, using a remover approved by the metal manufacturer. Surfaces, when assembled,

must be free of rust, grease, dirt and other foreign matter.

3.2.2 Environmental Conditions

Do not clean or paint surfaces when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than minus 5 degrees F above the dew point of the surrounding air, or when surface temperature is below 45 degrees F or over 95 degrees F, unless approved by the Contracting Officer. Metal surfaces to be painted must be dry for a minimum of 48 hours prior to the application of primer or paint.

3.3 INSTALLATION

Thoroughly clean all parts to be installed. Remove packing compounds, rust, dirt, grit and other foreign matter. Clean holes and grooves for lubrication. Examine enclosed chambers or passages to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Do not use pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts used for assembling and tightening parts. Tighten bolts and screws firmly and uniformly but take care not to overstress the threads. When a half nut is used for locking a full nut place the half nut first followed by the full nut. Lubricate threads of all bolts except high strength bolts, nuts and screws with an appropriate lubricant before assembly. Coat threads of corrosion-resisting steel bolts and nuts with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted.

3.3.1 Alignment and Setting

Accurately align each machinery or structural unit by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other must be true within the respective tolerances required. Set true machines to the elevations shown.

3.4 TESTS

3.4.1 Workmanship

Workmanship must be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

3.4.2 Production Welding

Perform production welding conforming to the requirements of AWS D1.1/D1.1M or AWS D1.6/D1.6M, as applicable. Studs, on which pre-production testing is to be performed, must be welded in the same general position as required on production items (flat, vertical, overhead or sloping). Test and production stud welding will be subjected to visual examination or inspection. If the reduction of the length of studs becomes less than normal as they are welded, stop welding immediately and do not resume until the cause has been corrected.

3.5 PUMP SEISMIC BRACE

When fabricating the Pump seismic brace, all stainless steel screws shall be countersunk with a locking agent installed. The top surface shall not have any bumps from fabrication that could catch on the pump screen during installation from above. The front UHMW tapers shall have no item that can catch on the pump screen when being installed. If the screws do not sit flush with the UHMW, than increase the counter bore slightly. The screw are to sit flush or slightly inset.

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SECTION 06 82 14.00 28

FIBERGLASS REINFORCED PLASTIC (FRP) PIPE AND TUBE RAILINGS

PART 1 GENERAL

This Section includes new fiberglass reinforced plastic (FRP) pipe and tube railing/guards, mounting systems and accessories.

1.1 REFERENCES

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

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)

ASME B18.2.2 (2015) Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

ASME B18.6.2 (2020) Square Head Set Screws and Slotted Headless Set Screws (Inch Series)

ASME B18.6.3 (2013; R 2017) Machine Screws, Tapping Screws, and Machine Drive Screws (Inch Series)

ASME B18.21.1 (2009; R 2016) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series)

ASME B18.21.2M (1999; R 2014) Lock Washers (Metric Series)

ASTM INTERNATIONAL (ASTM)

ASTM D430 (2006; R 2012) Standard Test Methods for Rubber Deterioration - Dynamic Fatigue

ASTM D638 (2014) Standard Test Method for Tensile Properties of Plastics

ASTM D696 (2016) Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer

ASTM D790	(2017) Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D1148	(2013; R 2018) Standard Test Method for Rubber Deterioration–Discoloration from Ultraviolet (UV) or UV/Visible Radiation and Heat Exposure of Light-Colored Surfaces
ASTM D2344/D2344M	(2016) Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2021) Life Safety Code
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U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	Safety and Health Requirements Manual
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The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

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

29 CFR 1910.23	(Nov 2016) Ladders
29 CFR 1926	Safety and Health Regulations for Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation Drawings; G, ST

SD-03 Product Data

FRP Pipe and Tube; I, ST

Railings/Guards; G, ST

Anchorage Materials; G, ST

Adhesives; I ST

Resins; I ST

Hardeners; I ST

SD-05 Design Data

Structural Performance Of Guardrails; I, ST

SD-06 Test Reports

Ultraviolet Test Reports; I, ST

Thermal Expansion Test Reports; I, ST

Flame Spread Test Reports; I, ST

1.3 QUALITY CONTROL

Submit the contractor [Installation Drawings](#). The drawings shall show how and where the guardrail shall be installed.

1.4 DELIVERY, HANDLING, AND STORAGE

Deliver all manufactured materials in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturers, clearly marked and identified relative to the complete system. Provide all adhesives, resins and their catalysts and hardeners in clearly marked or noted crates or boxes. Store all manufactured materials in dry indoor facilities with a constant temperature range between [70 and 85 degrees F](#) until they are required.

Handle all materials to prevent abrasion, cracking, chipping, twisting, or other deformations, and other types of damage.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

2.1.1 [Installation Drawings](#)

Submit templates and erection and installation drawings indicating thickness, type, and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the building construction.

Include plans, elevations, sections, details, and attachments to other work. Indicate for installed products to comply with design loads. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2.1.2 Product Data

Submit the manufacturer's catalog data manufacturer's specifications, load tables, dimension diagrams, and anchor details for the following items:

- a. [FRP Pipe and Tube](#)

- b. Railings/Guards
- c. Anchorage Materials
- d. Adhesives
- e. Resins
- f. Hardeners

2.1.3 Design Requirements

Ensure that all posts and rails are FRP structural shapes manufactured by the pultrusion process. Compose structural shapes of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements, and dimensions as necessary to meet the design requirements in accordance with [ASCE 7-16](#), [29 CFR 1910.23](#), [NFPA 101](#), [EM 385-1-1](#) and dimensions specified.

Ensure that fiberglass reinforcements are a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application required, the physical properties required, or both.

Provide resins, with appropriate hardeners, of isophthalic polyester, with the chemical formulation necessary for corrosion resistance, strength, and other physical properties.

Ensure that all finished surfaces of FRP items, including FRP pipe and tube, railings/guards, anchorage materials, and fabrications, are smooth, resin-rich, and free of voids, dry spots, cracks, and unreinforced areas. Provide complete coverage of all glass fibers with resin to protect against their exposure to wear or weathering.

Protect all pultruded structural shapes from ultraviolet (UV) attack with:

- a. Integral UV inhibitors within the resin
- b. Synthetic surfacing veil to help produce a resin-rich surface
- c. UV-resistant coating for outdoor exposures

Provide FRP products that have a flame spread rating of 25 or less as specified in [ASTM E84](#), Tunnel Test. Submit [Flame Spread Test Reports](#) to the Contracting Officer.

Ensure that rails, posts, and kick plates are integrally pigmented yellow. Submit [Ultraviolet Test Reports](#) for FRP material, similar to the requirements of [ASTM D1148](#) for rubber deterioration, and [ASTM D430](#), to the Contracting Officer. Submit testing data relating to [Thermal Expansion Test Reports](#).

Provide structural shapes in the guardrail system to meet minimum longitudinal mechanical properties as follows:

Tensile Strength	ASTM D638	30,000 psi
Tensile Modulus	ASTM D638	2,500,000 psi
Flexural Strength	ASTM D790	30,000 psi
Flexural Modulus	ASTM D790	1,800,000 psi
Flexural Modulus-Full Section		2,800,000 psi
Short Beam Shear	ASTM D2344/D2344M	4,500 psi
Shear Modulus-Transverse		450,000 psi
Coefficient of Thermal Expansion	ASTM D696	.000008 in/in/F
Flame Spread	ASTM E84	25 or less

2.1.4 Structural Performance of Guardrails

Provide a guardrail system capable of withstanding the effects of loads in accordance with ASCE 7-16 and EM 385-1-1, with the following minimum loads and stresses within limits and under the conditions indicated:

a. Handrails:

- (1) Uniform load of 50 lbf/foot applied in any direction.
- (2) Concentrated load of 200 lbf applied in any direction.
- (3) Uniform and concentrated loads need not be assumed to act concurrently.

b. Top Rails of Guards:

- (1) Uniform load of 50 lbf/foot applied in any direction.
- (2) Concentrated load of 200 lbf applied in any direction.
- (3) Uniform and concentrated loads need not be assumed to act concurrently.

The guardrails shall meet the overall geometry (rail spacing) as specified in accordance to EM 385-1-1. Guardrails shall be designed to be submerged at times. All steel fasteners and post base shall be stainless steel. Any member of the guardrail shall not be able to hold water. Items like square tubes shall be completely sealed or drain holes at the base/low end shall be added. Submit calculations or manufacture data that documents the loading criteria is achieved.

2.2 FABRICATION

Perform fabrication of the guardrail post/rail connection such that the rails are unbroken and continuous between the post or through the post without the use of packs or splices. Ensure that no sharp, protruding

edges remain after assembly of the handrail. Space the posts no more than 72 inches apart. Coat all field-fabricated and shop-fabricated cuts with a vinyl ester resin to provide maximum corrosion resistance and water intrusion.

2.3 MATERIALS

2.3.1 Fasteners

Provide stainless-steel fasteners.

2.3.2 Anchors

Anchors shall be installed in accordance to subsection 05 05 20.00 28 POST-INSTALLED ANCHORS IN CONCRETE.

2.3.3 Component Connections

2.3.3.1 Bolts, Nuts, Studs, and Rivets

Provide bolts, nuts, studs, and rivets conforming to ASME B18.2.2 and to be stainless steel.

2.3.3.2 Screws

Provide stainless steel screws conforming to ASME B18.2.1, ASME B18.6.2, and ASME B18.6.3.

2.3.3.3 Washers

Provide stainless steel lock washers conforming to ASME B18.21.2M and ASME B18.21.1.

PART 3 EXECUTION

3.1 INSTALLATION

Install items in accordance with 29 CFR 1910.23 and 29 CFR 1926 at locations indicated, according to the manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Include all materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation.

- a. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
- b. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

3.1.1 Workmanship

Ensure that FRP work is well formed to shape and size, with sharp lines and angles and true curves. Ensure that drilling and punching produces clean true lines and surfaces. Ensure that exposed surfaces of work-in-place to have smooth finishes. Mill joints where tight fits are required. Ensure that corner joints are coped or mitered, well formed, and in true alignment. Accurately set work to established lines and

elevations and securely fasten in place. Ensure that the installation is in accordance with the manufacturer's installation instructions and the approved drawings, cuts, and details.

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SECTION 13 48 00.01 28

SEISMIC RESTRAINT FOR MECHANICAL AND ELECTRICAL EQUIPMENT

PART 1 GENERAL

1.1 SCOPE OF WORK

The work covered in this section consists of furnishing all labor, equipment and materials to select, design, and provide seismic restraints for new systems and equipment provided as part of work performed.

1.2 REFERENCES

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

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-10 (2010; Change 2010; Change 2011) Minimum Design Loads for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B31.1 (2020) Power Piping

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel

ASTM A47/A47M (1999; R 2018; E 2018) Standard Specification for Ferritic Malleable Iron Castings

ASTM A167 (2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

ASTM A576 (2017) Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality

ASTM E84 (2020) Standard Test Method for Surface Burning Characteristics of Building Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 693 (2005) Recommended Practice for Seismic Design of Substations

IEEE Std 628 (2001; R2006) IEEE Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations

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

MSS SP-58 (2018) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation

MSS SP-69 (2003; Notice 2012) Pipe Hangers and Supports - Selection and Application (ANSI Approved American National Standard)

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4 (2007; E 2004) Brush-Off Blast Cleaning

SSPC Paint 20 (2019) Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)

SSPC SP 2 (2018) Hand Tool Cleaning

SSPC SP 3 (1982; E 2004) Power Tool Cleaning

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-2962 (Rev A; Notice 2) Enamel, Alkyd, Gloss, Low VOC Content

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Grout Foundation; G, ST

SD-02 Shop Drawings

Submit within 90 calendar days of Contract Award, detail drawings along with catalog cuts, templates, anchorage system including mechanical specifications of anchor bolts, erection and installation details for the items listed. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, anchorage, and installation. The submittals shall also show the ½" gap required between the Drainage and Unwatering pumps seismic brace and the suction bell. All drawings shall be stamped by the Professional Engineer (PE) who performs and stamps the calculations required above.

Equipment Detail Drawings; G, ST

Systems Detail Drawings; G, ST

SD-05 Design Data

Submit within 90 calendar days of Contract Award, structural design calculations performed by qualified civil or structural engineers who are presently registered professional engineers (PE). The calculations shall verify the capability of the seismic restraints and of structural members to which seismic restraint are attached for carrying the design load. The design shall include seismic anchorage design and details. All calculations shall be stamped and signed by a PE.

Structural Design Calculations for Seismic Restraints of Equipment;
G, ST

Structural Design Calculations for Seismic Restraints of Systems;
G, ST

Pipe Support Materials; G, ME

Piping Supports; G, SE

1.4 DESIGN STANDARDS

1.4.1 General Requirements

The requirements for seismic protection measures described in this section shall be applied to the equipment and systems below. Resistance to lateral forces induced by earthquakes shall be accomplished without consideration of friction resulting from gravity loads. Existing concrete strength shall be taken as $f'_c = 3,000$ psi.

1.4.2 Code Requirements for Equipment Restraint

Seismic design for equipment restraint shall be in accordance with Chapter 13, "Seismic Design Requirements for Nonstructural Components," of [ASCE 7-10](#) with the seismic design force computed as per Section 13.3 "Seismic Demands on Nonstructural Components". Electrical equipment restraint shall be designed in accordance with the provisions in [IEEE 693](#) Annex D, or Section 1621 of [ASCE 7-10](#) whichever produces the more adverse seismic effects. For [ASCE 7-10](#), use Seismic Risk Category III, spectral acceleration $S_{DS} = 0.266$, $I_p = 1.25$, and $z=h=1$. For [IEEE 693](#), the seismic qualification level shall be high.

1.4.3 Code Requirements for Systems Restraint

Seismic design for systems restraint shall be in accordance with Chapter 13, "Seismic Design Requirements for Nonstructural Components," of [ASCE 7-10](#) with the seismic design force computed as per Section 13.3 "Seismic Demands on Nonstructural Components". For [ASCE 7-10](#), use Seismic Risk Category III, spectral acceleration $S_{DS} = 0.266$, $I_p = 1.25$, and $z=h=1$. Restraint of electrical systems shall conform to the requirements of [IEEE Std 628](#).

1.5 EQUIPMENT

Submit structural design calculations for seismic restraints, [grout foundation](#) and detail drawings for the following equipment provided under this contract. The calculations and detail drawings shall be developed by the Contractor in accordance with the requirements of this specification and submitted under the titles listed below:

(a) One pump motor for drainage pump and three pump motors for unwatering pump.

(b) One Motor Control Cabinet for 480V

[Structural Design Calculations for Seismic Restraints of Equipment](#)
[Equipment Detail Drawings.](#)

1.6 SYSTEMS

Submit [Structural Design Calculations for Seismic Restraints of Systems](#) and [Systems Detail Drawings](#) for the following new systems provided under this contract. The calculations and detail drawings shall be developed by the Contractor in accordance with the requirements of this specification:

- (a) Piping
- (b) Conduit
- (c) Cable Trays

1.7 DEFINITIONS

Sway Brace. An assembly intended to be attached to piping, conduit, bus, or raceways to resist horizontal earthquake loads.

Four-Way Brace. A sway brace intended to resist differential movement in all horizontal directions.

Lateral Brace. A sway brace intended to resist differential movement perpendicular to the axis of piping, conduit, bus, or raceways.

Longitudinal Brace. A sway brace intended to resist differential movement parallel to the axis of piping, conduit, bus, or raceways.

Undercut anchor. Undercut concrete anchors are bearing-type anchors designed to be installed in cured concrete in a hole with a conical undercut near its blind end.

Expansive anchor. Expansive concrete anchors are designed to be installed in cured concrete in a straight hole. Anchorage relies on an torque-controlled expansion wedge and the friction developed between the drilled hole and the expanded wedge.

Adhesive anchor. Adhesive concrete anchors are designed to be installed in cured concrete in a straight hole drilled with a roto-impact drill. Anchorage relies on a chemical adhesive bond to the threaded rod and to the concrete.

Monolith Expansion Joint. Expansion /contraction joint separating two adjacent, structurally independent monoliths.

PART 2 PRODUCTS

2.1 PIPE SUPPORT MATERIALS

Pipe support material shall conform the following:

2.1.1 Auxiliary Steel

Auxiliary steel shall be light gauge and structural steel shapes meeting the requirements of [ASTM A36/A36M](#). After fabrication and cutting, steel surfaces shall be cleaned mechanically with hand tools according to [SSPC SP 2](#), power tools according to [SSPC SP 3](#) or by sandblasting according to [SSPC 7/NACE No.4](#) and primed and painted. Two coatings of [SSPC Paint 20](#) primer and one coat of [CID A-A-2962](#) paint shall be shop applied to structural steel associated with pipe supports. The Contractor shall have the option to use electrogalvanized steel products. Where auxiliary steel is stainless steel, the Contractor shall provide Type 304 or Type 316 stainless steel conforming to [ASTM A167](#) with No. 1 Finish.

2.1.2 Standardized Pipe Supports

Pipe supports shall conform to the requirements of [MSS SP-58](#). The specific support types shall be selected based on [MSS SP-69](#).

2.1.3 Piping Supports

Piping Supports shall be fabricated of [ASTM A36/A36M](#) carbon steel or made of [ASTM A47/A47M](#) malleable iron and be galvanized using Hot-Dip Galvanizing or Electro-Plated Zinc galvanizing. All hangers and supports shall be of a uniform type and material for a given pipe run and application. The Contractor shall submit catalog cuts or detail drawings with enough information to verify that the piping supports meet the requirements for Standardized Pipe Support, as described in this section.

2.1.4 Hanger Rods

Hanger rods shall be zinc coated carbon steel conforming to [ASTM A576](#) or [ASTM A307](#). The diameter of the rods for piping system support shall be as recommended by the manufacturer of the hanger or support, but shall not be smaller than required by [ASME B31.1](#).

2.1.5 Dielectric Barriers

Where the pipeline and pipe support are made of different materials polytetrafluoroethylene (PTFE), Neoprene, Nylon, or other electrically insulating material shall be used to insulate between the pipeline and the support. The barrier material shall be thick enough to provide enough insulation to withstand a 600-volt breakdown test. The [ASTM E84](#) flame spread rating of the insulation shall not be greater than 25. The [ASTM E84](#) smoke-developed rating shall not be greater than 50.

2.2 CONCRETE ANCHORS

For concrete anchors see specification section [05 05 20.00 28](#), POST-INSTALLED ANCHORS IN CONCRETE. Indicated in the submittal in the anchor specification if the anchor is intended for a seismic bracing or seismic loading, and indicate the load.

PART 3 EXECUTION

3.1 SEISMIC SWAY BRACING

3.1.1 Sway Bracing Design Requirements

Sway bracing conforming with the requirements of these specifications shall be designed and provided for both mechanical and electrical systems. Seismic forces shall be applied both in lateral and vertical directions. Design of sway braces shall be based on the water filled weight of pipe combined with the seismic forces. Design of sway braces for electrical conduit or raceways shall be based on the design weight of the completely filled conduit or raceway.

3.1.2 Sway Bracing Required for Systems

Sway bracing shall be provided for all suspended systems with the following exceptions. Sway bracing shall be provided for all piping greater than 2 1/2 inch diameter, or for piping larger than 1 inch diameter in boiler rooms or for gas piping, or for all pipe diameters if the piping is used as part of a fire protection system. Sway bracing shall be provided for all conduit larger than 2 1/2 inches in diameter. Sway bracing shall be provided at junctions, and at horizontal or vertical transitions for electrical service raceways and bus ducts. Sway bracing is not required for piping suspended by individual hangers 12 inches or less in length from the top of the pipe to the bottom of the structure the piping is attached to.

3.1.3 Sway Bracing Layout

3.1.3.1 General

Sway bracing shall consist of transverse, longitudinal, and 4-way braces. Piping shall be designed such that sway bracing attachment and configuration does not interfere with thermal expansion of the piping.

3.1.3.2 Transverse Braces

Transverse sway braces for piping and conduit shall be provided at every fourth hanger for diameter sizes 1/4 through 2 1/2 inches and at every third hanger for pipe diameter sizes 3 inch through 8 inch. Transverse sway braces shall be provided for bus ducts and electrical raceways at vertical or horizontal transitions. Vertical systems shall be braced at not more than 20 foot intervals and the bracing shall be located above the center of gravity of the item being braced.

3.1.3.3 Longitudinal or Four-Way Braces

Longitudinal braces or four-way braces shall be provided at least once per monolith. Longitudinal or four-way braces shall be provided at least once per straight length of piping or conduit that is greater than 10 feet in length. Four-way sway braces shall be provided for bus ducts and electrical raceways at junctions.

3.1.4 Seismic Isolation for Piping Systems

Spreaders or rack type hangers shall be provided between adjacent piping runs to prevent contact during seismic activity whenever pipe surfaces are less than 4 inches apart and shall be provided at the same interval as

sway bracing at an equal distance between sway braces.

3.2 MONOLITH EXPANSION JOINTS

Equipment shall not be rigidly attached on each side of a monolith expansion joint. For systems which are rigidly attached on each side of a monolith expansion joint, flexible connections or system configurations that are capable of accommodating displacements equal to twice the full width of the joint in both orthogonal directions or a minimum of 2 inches in both orthogonal directions shall be provided. A individual seismic sway brace shall not be attached to the structure on each side of a monolith joint.

3.3 SPREADERS

Spreaders shall be provided between adjacent piping runs to prevent contact during seismic activity whenever pipe or insulated pipe surfaces are less than 4 inches apart. Spreaders shall be applied at same interval as sway braces at an equal distance between the sway braces. If rack type hangers are used where the pipes are restrained from contact by mounting to the rack, spreaders are not required for pipes mounted in the rack.

3.4 QUALITY CONTROL

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McNary Piping Color Marker Identification and Label Scheme

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SECTION 22 11 00.01 28

PIPING AND VALVES

PART 1 GENERAL

1.1 SCOPE

This section specifies the materials and workmanship standards applicable to the fabrication, assembly, installation, and testing of the various items of piping work. These requirements are in addition to those contained in other sections or indicated on the drawings.

1.2 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020; Errata 1 2021) Structural Welding Code - Steel

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.20.1 (2013; R 2018) Pipe Threads, General Purpose (Inch)

ASME B16.3 (2016) Malleable Iron Threaded Fittings, Classes 150 and 300

ASME B16.42 (2016) Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300

ASME B16.5 (2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard

ASME B16.21 (2016) Nonmetallic Flat Gaskets for Pipe Flanges

ASME B16.34 (2017) Valves - Flanged, Threaded and Welding End

ASME B31.3 (2016) Process Piping

ASME B31.9 (2017) Building Services Piping

ASME B40.100 (2013) Pressure Gauges and Gauge Attachments

ASTM INTERNATIONAL (ASTM)

ASTM A 53 (1997) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

ASTM A 105/A 105M	(2005) Carbon Steel Forgings for Piping Applications
ASTM A 516/A 516M	(2004) Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM A536	(1984; R 2014) Standard Specification for Ductile Iron Castings
ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A320/A320M	(2015) Standard Specification for Alloy/Steel and Stainless Steel Bolting Materials for Low-Temperature Service

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A13.1	(2020) Scheme for the Identification of Piping Systems
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AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C110/A21.10	(2012) Ductile-Iron and Gray-Iron Fittings for Water
AWWA C116/A21.16	(2015) Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray Iron Fittings
AWWA C515	(2009) Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service
AWWA C606	(2015) Grooved and Shouldered Joints

ASTM INTERNATIONAL (ASTM)

ASTM A312/A312M	(2019) Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
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INTERNATIONAL CODE COUNCIL (ICC)

ICC Plumbing Code	(2012) International Plumbing Code
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MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-25	(1998) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-110	(2010) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Identification Tags; G, C

Valve Operator Color Schedule; G, ME

SD-02 Shop Drawings

Piping Drawings; G, ME

SD-03 Product Data

Resilient Seat Wedge Gate Isolation Valves; G, ME

Silent Check Valves; G, ME

Double Wafer Check Valve; G, ME

Unwatering Discharge Plug; G, ME

Ball Valves; I, ME

Equalizer Valve Packing; I, ME

Spare Equalizer Valves; I, ME

Miscellaneous Piping Materials; I, ME

SD-06 Test Reports

Water Piping Test Plan; G, ME

Discharge Piping Weld Test; I, ME

1.4 QUALITY ASSURANCE

Plumbing systems including fixtures, equipment, materials, installation, and workmanship shall be in accordance with the ICC Plumbing Code (referred to herein as Plumbing Code) except as modified herein. In the Plumbing Code the advisory provisions shall be considered to be mandatory, as though the word "shall" had been substituted for the word "should" wherever it appears; reference to the "authority having jurisdiction," the Administrative Authority, the Plumbing Official, and the Design Engineer shall be interpreted to mean the Contracting Officer.

1.5 PIPING DRAWINGS

The Contractor shall submit Piping Drawings for the pump discharge and inlet pipes, pump columns as well as all replaced drainage piping. Drawings shall consist of plans drawn to scale, with elevations, sections and details to show clearly the location (by dimension to pertinent

building features) of all piping. This includes but is not limited to, details of connections and size and type of piping and valves, all support types and locations, pipe thrust restraints, sway braces, and appurtenances.

PART 2 PRODUCTS

2.1 WATER PIPING

2.1.1 Galvanized Steel Piping

Steel pipe for the pump shaft columns and pump discharge pipes shall be galvanized steel pipe conforming to [ASTM A 53](#), Type S, Grade B, seamless pipe. For all nominal pipe sizes flanged connection and fittings shall be used according to [ASME B16.5](#) and [ASME B16.42](#) class 150 as applicable, unless noted otherwise. For nominal pipe sizes less than 4 inches in diameter that cannot be flanged due to existing conditions threaded connections and fittings shall be used according to [ASME B16.3](#) class 150, unless noted otherwise. Fabricated piping shall be "hot-dip" galvanized in accordance with [ASTM A123/A123M](#) after all welding is complete. All welding and repairs to galvanizing shall be done according to [05 50 14.00 28](#) METALWORK AND METAL FABRICATION.

2.1.2 Stainless Steel Piping

Stainless steel pipe shall meet the requirements of [ASTM A312/A312M](#), seamless, Grade TP304, TP304L, TP316, or TP316L, Schedule 10S with dimensions conforming to [ASME B31.9](#).

2.2 VALVES

Generally, valves shall conform to [ASME B16.34](#) as applicable or unless specified otherwise. Valves of nominal sizes equal to or greater than 4 inches in diameter shall have flanged end connections conforming to [ASME B16.42](#) class 150. Valves of nominal sizes less than 4 inches in diameter shall have threaded end connections according to [ASME B16.3](#) class 150 with a union on all but one side of the valve, or solder end connections for connections between bronze valves and copper tubing. All new valves shall be provided with means to lock them in both the open and closed positions. Contractor shall verify the existing dimension of all valves over 6 inches in diameter to confirm new replacement valves will fit within the existing space per [SECTION 01 11 01.00 28](#) SUPPLEMENTARY REQUIREMENTS, paragraph FIELD VERIFICATION OF SITE CONDITIONS.

2.2.1 Resilient Seat Wedge Gate Isolation Valves

Resilient Seat Wedge Gate valves shall conform to [AWWA C515](#). Valves shall have a ductile iron body, stainless steel stem, bronze mounted trim, bolted bonnet and EPDM rubber encapsulated ductile iron wedge. Each valve shall be provided with a non-rising stem and a geared handwheel operator with chain for valves located more than 6 feet above the floor. For valves located at EL 176 and 207 provide the necessary shaft extensions and operator base as shown on plans. Shaft segments, couplings, bushings and operator base shall be provided per manufactures recommendation. Shaft supports for draft tube valves shall be supplied per valve manufacturer's specifications to maintain shaft alignment and be anchored to wall per [SECTION 05 05 20.00 28](#) POST-INSTALLED ANCHORS IN CONCRETE. Valves shall open when turned counter-clockwise. Valves operators shall be color code as follows, normally open green, normally closed red and anything else

yellow. The Contractor shall submit the following product data:

[Resilient Seat Wedge Gate Isolation Valves](#)

[Valve Operator Color Schedule](#)

2.2.2 Equalizer Valves

Supply two spare equalizer valves for direct replacement of existing 24 inch 100s Stockholm 150 OWG valves. Spare valves must be resilient seat wedge gate valves. Spare equalizer valves shall be on-site prior to start of construction work.

[Spare Equalizer Valves](#)

2.2.2.1 Equalizer Valve Packing

Supply and install new stem packing for all existing equalizer valves. Equalizer valves are vintage 1952, 24 inch 100s Stockholm 150 OWG. Submit product data from packing manufacturer showing the design of the new custom packing will work with existing valves.

[Equalizer Valve Packing](#)

2.2.3 Silent Check Valves

The check valve shall be a silent type check valve and begin to close as forward flow diminishes and be fully closed at zero flow velocity preventing flow reversal and resultant water hammer or shock. The valve body shall be constructed of ductile iron meeting [ASTM A536](#) class 150. The valve shall be provided with flanges according to [ASME B16.42](#) class 150. The Contractor shall submit the following product data:

[Silent Check Valves](#)

2.2.4 Double Wafer Check Valve

Double wafer check valve will consist of a double flap springs assisted design, Buna-N O-ring seal, and cracking pressure of not more than 0.3 psi. The valve body shall be constructed to meet ASME Class 150. The valve shall be of lug body design or be provided with flanges according to [ASME B16.42](#) class 150. All internal working components such as pins, hinge and wafer shall be stainless steel. The Contractor shall submit the following product data:

[Double Wafer Check Valve](#)

2.2.5 Unwatering Discharge Plug

a. The Unwatering Discharge Plug shall be installed into the unwatering 18 inch discharge pipe located in the tailrace at elevation 260. Contractor must first remove the broken 18 inch flapper valve. Plug shall be blind flange with 3 inch air snorkel. The snorkel shall reach a minimum elevation of 275 when installed and terminate in a goose neck configuration. Air snorkel shall be made out of schedule 40 steel pipe. Supply 18 inch gasket to ensure a good seal between blind flange and pipe. Contractor shall verify the condition of the embedded flange prior to plug fabrication during the fish ladder outage of

2023. The contractor shall submit the following shop drawing:

Unwatering Discharge Plug

b. After removal from the Unwatering Discharge pipe, the Unwatering Discharge Plug will become property of the Government. Turn the plug over to the Contracting Officer after removal.

2.2.6 Ball Valves

Ball valves for pipe sizes less than 2.5 inches shall conform to the requirements of MSS SP-110 full port design, copper alloy. Valves shall have two-position lever handles.

2.3 MISCELLANEOUS PIPING MATERIALS

Supply all needed pipe fitting materials to include, but not limited to: bolts, nuts, gaskets, etc. Re-use of such materials is prohibited. Submit product data for all miscellaneous piping materials.

2.3.1 Flanges and Gaskets

Flanged fittings, including flanges, bolts, nuts, bolt patterns, etc., shall be in accordance with ASME B16.5 Class 150 and shall have the manufacturer's trademark affixed in accordance with MSS SP-25. Flange material shall conform to ASTM A 105/A 105M. Blind flange material shall conform to ASTM A 516/A 516M. Bolts shall conform to ASTM A320/A320M. Flange gaskets shall be full face flat type gaskets conforming to the requirements of ASME B16.21. Flange gaskets for the collection piping in the drainage sump shall be Nitrile rubber suited for non-potable water service and resistant to a wide range of oils, greases and other lubricants. Flange gaskets for the pump discharge piping shall be suited to non-potable water service with galvanized piping.

2.3.2 Mechanical Couplings

Mechanical couplings for use with grooved ends are acceptable for piping 8 inch diameter and less. Provide pipe ends grooved by roll grooving or with welded-on adapters and cut grooves in accordance with AWWA C606. Provide grooves as recommended by the coupling manufacturer.

2.3.3 Threaded Fittings

Threaded fittings shall be made of galvanized malleable iron and conform to the requirements of ASME B16.3 class 150. Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1.

2.3.4 Expansion Joints

Expansion joints shall be made of EPDM with galvanized carbon retension rings sized to match piping. Joints shall have a minimum working pressure of 115 psi. Contractor shall verify size of each joint needed.

2.3.5 Flanged Coupling Adapter

Adapter body shall be per ASTM A536 Grade 65-45-12. Flange shall meet AWWA C207 Class D and per ANSI B16.1 Class 125 with O-ring material being NBR (Buna-N). Coupling gasket to meet ASTM D2000.

2.3.6 Welded Outlets

Where indicated branches in pipe spools shall be made using welded branch outlets. Outlets shall be designed for their intended purpose and made of a material compatible with the pipe spool. Outlets shall be formed to allow a full penetration weld between the pipe spool and outlet. Outlets shall be sized to match the branch pipe size.

2.3.7 Pressure Gauges

Pressure gauges shall be installed as indicated. Gauges shall be of the pressure indicating dial type, glycerin filled with an elastic element. Gauges shall conform to the minimum requirements of [ASME B40.100](#). Gauges shall have a minimum 6 inch diameter face and be equipped with an isolation valve.

2.3.8 Offset Pipe Clamps

Offset pipe clamps in the drainage sump shall be stainless steel to match the material of the pipe which they support and be of the size required to fit the pipe supported. Material shall be minimum 1/4" by 1-1/2" for 4" pipe and minimum 1/4" by 2" for 6" pipe.

2.3.9 Draft Tube Drain Tee

Draft tube drain tee's shall be class 150 conforming to [AWWA C110/A21.10](#) and coated per [AWWA C116/A21.16](#).

2.3.10 Custom Suction Bell

The suction bells shall be fabricated according to the plans, meeting [ASTM A 53](#) and be hot dip galvanize in accordance with [ASTM A123/A123M](#). Flange connection shall be per [ASME B16.5](#). Suction bell shall be fabricated and inspected per SECTION 05 50 14.00.

PART 3 EXECUTION

3.1 INSTALLATION

Installation of plumbing systems including piping, equipment, materials, and workmanship shall be in accordance with the [ICC Plumbing Code](#), except as modified herein. Plastic piping shall not be permitted.

3.1.1 Pipe Plug Installation

The unwatering pipe plug shall be installed prior to removal and replacement of the 18 inch unwatering pump isolation gate valve. Plug to be removed immediately after installation of the isolation valve.

3.1.2 Piping Joints

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

3.1.2.1 Threaded

Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene (PTFE) tape applied.

3.1.2.2 Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes less than 4 inches; flanges shall be used on pipe sizes 4 inches and larger.

3.2 FIELD QUALITY CONTROL

3.2.1 Inspections

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

3.2.2 Field Testing

Each system shall be tested as in service in order to demonstrate compliance with the contract requirements before final acceptance of the work. Perform the following tests in addition to the tests specified in the Plumbing Code, except as modified herein. The results of each test shall be submitted in report form. Defects in the work shall be corrected by the Contractor, and tests repeated until work is in compliance with contract requirements. All corrections and subsequent testing shall be done at no additional cost to the Government. The Contractor shall furnish water, electricity, instruments, connecting devices, and personnel for performing tests.

3.2.2.1 Water Piping Test Plan

Hydrostatically test piping systems in accordance with ASME B31.3. Vent or flush air from the piping system. Pressurize system for 10 minutes with water at one and one-half times design working pressure of the pump, then reduce to design working pressure and check for leaks and weeps. Contractor shall submit a test plan for approval. No rupture, cracking or permanent distortion of any part of the pump shall be observed in a test when hydrostatically tested at the required pressure. The Contractor shall submit the following:

Water Piping Test Plan

3.3 WELD TESTING

Test unwatering and drainage pump discharge piping welds in accordance with the AWS D1.1/D1.1M ultrasonic test (UT) method.

Discharge Piping Weld Test

3.4 IDENTIFICATION SYSTEMS

3.4.1 Identification Tags

Identification tags made of engraved laminated plastic or engraved anodized aluminum shall be installed on all valves. Tags shall be 4-1/2 inch wide by 3-1/2 inch tall, and marking shall be stamped or engraved. If

the tag is indoors and protected from UV light it can be a plastic tag, if the tag is in an exterior or exposed to UV light then the tag shall be engraved anodized aluminum. Indentations for tags should be green on white with white lettering. Information on the tag shall include the valve ID #, description, location, elevation. Tags shall be attached to valves with two corrosion resistant cables or clamp on fasteners. Submit identification tag template and valve list prior to tag fabrication.





















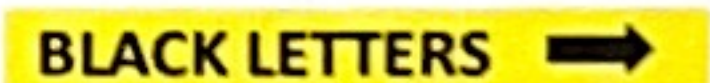








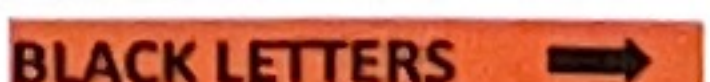

3.4.2 Pipe Labels

All piping shall have labels in accordance with ASME A13.1. Drainage and Unwatering Sump discharges are considered drains. See attached McNary Piping Color Marker Identification and Label Scheme.

-- End of Section --

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McNary Piping Color Marker Identification and Label Scheme

<u>Color:</u>	<u>Marking:</u>	<u>Description:</u>	<u>Label Background, Text, & Arrows:</u>
ALUMINUM		DOMESTIC WATER SUPPLY	
		HOT WATER	
GREEN		COOLING WATER SUPPLY	
		COOLING WATER RETURN	
		HVAC	
RED		50 PSIG FIRE	
		100 PSIG FIRE	
BLUE		100 PSIG AIR	
		200-300 PSIG AIR	
BLACK		CO2 INITIAL	
		CO2 DELAY	
BROWN		LUBE OIL SUPPLY	
		LUBE OIL RETURN	
Yellow		TRANSFORMER OIL SUPPLY	
		TRANSFORMER OIL RETURN	
Purple		HYDRAULIC OIL SUPPLY	
		HYDRAULIC OIL RETURN	
Gold		HIGH PRESSURE OIL	
		LOW PRESSURE OIL	
Orange		DRAINS	
		SEWER	

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CYBERSECURITY

PART 1 GENERAL

1.1 GENERAL INFORMATION

a. This Section covers the cybersecurity requirements for industrial control systems in order to verify and deliver components to the Project in an Interim Secure State (ISS).

b. ISS is achieved when the cybersecurity risk for the control system is known and the system has been verified to be technically and physically secure to an acceptable risk tolerance during the installation phase.

c. The requirements of this SECTION apply to the following Specifications SECTIONS:

1. Section 26 24 19.00 28, MOTOR CONTROL CENTERS.

2. Section 40 94 43.00 28, PROCESS CONTROLLERS - PROGRAMMABLE LOGIC CONTROLLERS (PLC).

1.2 REFERENCES

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

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD Directive 8140.01 (2016) Cyberspace Workforce Management

DOD 8500.01 (2014) Cybersecurity

DOD 8510.01 (2020; Change 1-2020) Risk Management Framework (RMF) for DoD Information Technology (IT)

DOD 8570.01-M (2005; Change 4, 2015) Information Assurance Workforce Improvement Program

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST FIPS 140-2 (2001) Security Requirements for Cryptographic Modules

NIST SP 800-37 (2010; Revision 1) Guide for Applying the Risk Management Framework to Federal Information Systems

U.S. ARMY (DA)

DA AR 25-2 (2007; RAR 2009) Information Assurance

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Account Level Permissions Listing (Encrypted); G, CS
Sensitive Data Protection Plan (Encrypted); G, CS

SD-02 Shop Drawings

Network Diagram (Encrypted); G, CS
System Data Flow Diagram (Encrypted); G, CS

SD-03 Product Data

Pre-Design Software Listing (Encrypted); G, CS
Pre-Design Hardware Listing (Encrypted); G, CS
Complete Software Listing (Encrypted); G, CS
Complete Hardware Listing (Encrypted); G, CS
Ports, Protocols, and Services List (Encrypted); G, CS
Certificate Protection Status (Encrypted); G, CS
Backup Software (Encrypted); I, CS

SD-05 Design Data

Network Configuration Files (Encrypted); G, CS
Deviations from the STIGs (Encrypted); G, CS

SD-06 Test Reports

SCAP Tool Scan (Encrypted); G, CS
Antivirus/Antimalware Scan (Encrypted); G, CS

SD-07 Certificates

Contractor Personnel Qualifications; G, CS

SD-11 Closeout Submittals

Vulnerability Resolution Report (Encrypted); G, CS
Comprehensive Password List (Encrypted); G, CS
Comprehensive Passphrase List (Encrypted); G, CS
Comprehensive Account List (Encrypted); G, CS
Initial Backups (Encrypted); G, CS
BIOS Protection Passwords (Encrypted); G, CS
BIOS Protection Passphrases (Encrypted); G, CS

1.3.1 Encrypted Submittal Requirements

a. Submittals specified as "Encrypted" shall be submitted on DoD Safe Access File Exchange (SAFE) website as specified SECTION 01 33 00 SUBMITTAL PROCEDURES, paragraph "Electronic Copies". Enable "Encrypt email message when possible" and "Require CAC for Pick-up..." for all

Encrypted submittals.

b. The Government will identify authorized DoD SAFE recipients at the Pre-Work meeting.

c. Submit a 4025, only, into RMS when an encrypted submittal is sent by DoD SAFE.

d. **Data for encrypted submittals is sensitive and shall be protected by the Contractor.** Contractor shall only disclose sensitive information to those who need to know. Sensitive information shall not be stored on shared storage systems. Spreadsheets shall be password protected. Submit a list of individuals authorized to access the sensitive information and a [Sensitive Data Protection Plan \(encrypted\)](#).

1.3.2 Submittals of Lists

Contractor shall submit the following using a Government-provided Excel spreadsheet. Spreadsheet will be provided upon request after Notice to Proceed.

- a. Pre-Design Software Listing.
- a. Complete Software Listing.
- b. Complete Hardware Listing.
- c. Ports, Protocols, and Services List.
- d. Comprehensive Password List.
- e. Comprehensive Passphrase List.
- f. Comprehensive Account List.
- g. BIOS Protection Password List.
- h. BIOS Protection Passphrase List.
- i. Certificate Protection Status List.

1.4 DEFINITIONS

- a. BIOS: Basic Input/Output System.
- b. CCI: Control Correlation Identifier. See <https://iase.disa.mil/Pages/index.aspx> for information.
- c. DISA: Defense Information Security Agency.
- d. IAVAs: Information Assurance Vulnerability Alerts. See <http://iase.disa.mil/Pages/index.aspx> for additional information.
- e. ICS-CERT: Industrial Control Systems Cyber Emergency Response Team. See <https://ics-cert.us-cert.gov/> for additional information.
- f. ISO: Information System Owner.
- g. ISO-DR: Information System Owner's Delegated Representative.

Government Representative.

h. ISS: Interim Secure State.

i. IT: Information Technology.

j. RMF: Risk Management Framework. See [DOD 8510.01](#), and [NIST SP 800-37](#) for information and requirements.

k. SCADA: Supervisory Control and Data Acquisition.

l. SCAP: Security Configuration Automation Protocol. See <https://iase.disa.mil/stigs/scap/Pages/index.aspx> for information.

m. SHB: Secure Host Baseline, or Army Gold Master. An image for certain Windows-based operating systems is available from the Government, upon request.

n. STIGs: Security Technical Implementation Guides, as released by the Defense Information Security Agency (DISA). See <http://iase.disa.mil/stigs/Pages/index.aspx> for information.

o. USACE: United States Army Corps of Engineers.

p. VLAN: Virtual LAN (Local Area Network).

1.5 CONTRACTOR PERSONNEL

a. Contractor personnel assigned to Cybersecurity functions under this contract shall possess the following certifications:

1. [DOD Directive 8140.01](#), Information Assurance Training, Certification, and Workforce Management.

2. [DOD 8570.01-M](#), Information Assurance Workforce Improvement Program, Information Assurance Improvement (IAT) Level II.

b. Background investigations are required at the personnel security standard of IAT II level, in accordance with [DA AR 25-2](#). Submit [Contractor personnel qualifications](#) for acceptance, a minimum of 60 days prior to purchase of any equipment provided under this contract.

1.6 CONTRACTOR PORTABLE ELECTRONIC DEVICES (PED)

a. All Contractor personnel and equipment that will connect USACE-owned systems are subject to the requirements of this SECTION. This includes all Contractor equipment, including laptops and other portable devices, that will not be delivered the USACE as part of this contract.

b. All Contractor PEDs shall be approved by the Contracting Officer for connection to USACE-owned systems prior to connection.

c. For compliance, security, and network maintenance purposes, authorized individuals within USACE may monitor equipment, systems, and network traffic at any time, per the existing acceptable use and audit policies. USACE reserves the right to audit networks and systems on a periodic basis to ensure compliance with Army policy. Users connecting to USACE-owned equipment with approved PEDs consent

to monitoring and inspection of their equipment.

c. PEDs approved for connection to USACE-owned systems equipment shall meet the following requirements:

1. Be subject to scanning or checking by designated USACE site personnel before being connected to any USACE-owned equipment. This process will be repeated before connection each time the PED goes off-site (crosses the facility boundary).
2. Undergo regular maintenance ensuring the PED is patched and up to date and a current full antivirus scan has been completed within the previous 10 days.
3. Ensure the PED firewall is enabled and set to "Public".
4. Demonstrate that all required patching and software/firmware updates are applied, and compliance with any applicable STIG version and release is achieved.
5. Employ data-at-rest encryption to protect information stored on the device. The types of information that must be protected include the following:
 - i. Site specific drawings.
 - ii. Configuration files.
 - iii. Project files.
 - iv. Vulnerability data.
 - v. Any specific information that could potentially lead to a compromise.

d. If limited connectivity to the Internet is required to update software patches and retrieve updated virus definitions, the following requirements shall be met:

1. The host based firewall on the computer shall be enabled and the network identifier for the Internet connection must be set to "Public".
2. After the software patches are applied and the virus definitions updated, the computer shall be isolated from the Internet connection, and a full scan with the Antivirus Software completed, resulting with no detections, prior to connection to the USACE-owned equipment.
3. Prior to connecting to the equipment, network, or system, antivirus definition files shall be verified to be less than seven days old and a full scan has been completed.

e. In the event that an authorized or approved non-USACE-owned PED is lost or stolen, user shall immediately notify the Contracting Officer.

1.6.1 Prohibited Activities

a. Under no circumstances are users authorized to engage in any

activity that is illegal under local, state, federal or international law while utilizing authorized or approved USACE-owned or non-USACE-owned resources related to work on this contract. The following activities are strictly prohibited with regards to connecting authorized or approved USACE-owned or non-USACE-owned PED, with no exceptions:

1. Using SCADA or other related monitoring and/or control systems for any personal use.
 2. Connecting unauthorized or unapproved non-USACE PEDs to USACE equipment, systems, or networks.
 3. Intentional introduction of malicious programs into the network or server (e.g., viruses, worms, Trojan horses, e-mail bombs, etc.).
 4. Port scanning or security scanning without prior notification to the KO, in coordination with designated site IT personnel.
 5. Executing any form of network monitoring which will intercept data not intended for the user's host, unless this activity is a part of the user's normal job/duty.
 6. Hotspot-capable PEDs are not permitted to broadcast Wi-Fi signals as an access point (i.e. function as a router for a wireless network) within and/or around certain areas of the USACE facility premises (e.g., control room and computer server room, unit control equipment enclosures such as RTU cabinets, digital governor or exciter cabinets, etc.) and shall not be connected to USACE equipment, systems, or networks.
 7. PEDs shall not be loaned or otherwise given to any person other than whom the device is assigned to.
 8. Exporting software, technical information, encryption software or technology, which is in violation of international or regional export control laws. Notify the KO of any material that is in question. Material in question shall only be exported with KO approval.
- b. Any use of email on SCADA and any related monitoring/control of USACE systems or networks is prohibited.
- c. Any user found to have violated this policy may be subject to disciplinary action.

1.7 CYBERSECURITY REQUIREMENTS

- a. All items and components provided by the Contactor shall meet all Cybersecurity Requirements of this Specification, as well as **DOD 8500.01** and **DOD 8510.01**. Include all applicable current Cybersecurity Regulations, policies, and processes from these documents.
- b. Prior to Government acceptance of the system, the Contractor shall adhere to all vendor-specific, ICS-CERT, and IAVA alert requirements for reporting, patching, and/or mitigating. Address all vulnerabilities for Contractor provided hardware and software within

30 days of the alert.

c. Notify the Contracting Officer within 48 hours of receipt of an alert and within 48 hours of resolution. After Government acceptance, submit a [Vulnerability Resolution Report \(encrypted\)](#). The report shall identify the vulnerability alert ID and the date of resolution for each component.

1.8 SECURE CONFIGURATIONS OF COMPUTER OPERATING SYSTEMS

a. Configure the Operating System and all Network accessible Devices following the Principle Of Least Privilege, and Application Separation as described below.

b. Configure the following per the latest STIGs (STIGs in place at the time of Government acceptance). Assume STIGs requirements will be similar to those in place at time of contract Award.

1. All Operating Systems.

2. All Network accessible Devices.

c. Install the most current versions of the following, unless otherwise specified or approved. Assume similar costs and lead time, for acquisition, as the latest marketed versions at time of contract Award.

1. Security-relevant Software updates.

2. Security-relevant Firmware updates.

1.8.1 Principle of Least Privilege

a. All Operating Systems and Network accessible Devices shall be configured using the Principle of Least Privilege. Principle of Least Privilege shall be used for all of the following:

1. Operating System permissions.

2. File access.

3. User accounts.

4. Application-to-application communications.

b. Configure all control systems using a role-based access control scheme so that normal operations occur using an Operator level account, with minimum privileges required to operate the system. See paragraph "Operator Level Accounts", below, for additional information and requirements.

c. Unnecessary/unused accounts shall be removed from the control system. Any "guest-level" accounts that are created on the System by default shall be disabled.

d. Submit [Account Level Permissions Listing \(Encrypted\)](#) and allowable operations for the following account levels a minimum of 60 calendar days prior to anticipated beginning of account configurations:

1. Service Level Accounts.
2. Operator Level Accounts.
3. Administration Level Accounts.

1.8.1.1 Service Level Accounts

All required Service Level Accounts shall be created as normal users with no administrative permissions. Removable media devices and USB ports (with the exception of keyboard and mouse) shall be disabled.

1.8.1.2 Operator Level Accounts

Operator Level Accounts allow normal operation of the system, but do not allow for any configuration changes. Removable media devices and USB ports (with the exception of keyboard and mouse) shall be disabled. The Contractor shall document the minimum privileges required for the Operator level account in the Account Level Permissions submittal.

1.8.1.3 Administration Level Accounts

a. Administration-level (privileged access) accounts shall be required to perform any configuration changes on the system. Separate administration-level accounts shall be provided for each administrator on the system.

b. Removable media devices and USB ports shall be available for Administration Level Accounts, only. The availability of the USB ports and removable media devices shall be configurable using the accounts on the system.

1.8.2 Application Separation

a. Application Separation utilizes the operating system on the primary partition of the hard drive. The following shall be installed on different partitions:

1. Application Databases. No two data bases shall be installed in the same partition.
2. Web servers. No two web servers shall be installed in the same partition.

b. For Virtual Machines, web servers and database servers shall not be hosted on the same Virtual Machine.

1.9 CONTRACTOR GENERATED PASSWORDS

All Contractor generated passwords shall meet requirements of DA AR 25-2. See Information Assurance Best Practices (IA BBP) Section 4-IA-O-0001.

1.10 CONTRACTOR GENERATED PASSPHRASES

All passphrases utilized for encryption shall meet DOD 8500.01 minimum standards.

1.11 BASIC INPUT/OUTPUT SYSTEM (BIOS) PROTECTION

- a. Provide a protection mechanism to prevent unwanted changes to the system BIOS for all devices on the system, where feasible.
- b. All BIOS Protection Mechanisms shall utilize passwords, and passphrases, that conform to DoD STIG requirements. BIOS Protection passwords shall be used to allow access by system engineering and administrative personnel after initial commissioning of the system.
- c. Submit all BIOS Protection passwords (Encrypted) to the KO. Submit BIOS Protection Passphrases (Encrypted) (information required to decrypt the data), to the KO in a separate communication.

1.12 LOGGING AND AUDITING

- a. Design the control system to log critical events, control system alarms, and operator actions related to the operation of the control system. These critical events will be defined by the Government at the Pre-Work meeting.
- b. The Log of operator actions shall only be accessible via any Administration Level accounts on the system. The operations log shall include the following:
 1. A time stamp.
 2. The control action taken.
 3. The account through which the action was initiated.
- c. Configure Operating System logging per the STIG requirements without exception, including the specified minimum log sizes defined in the STIGs.

1.13 COMMUNICATIONS

- a. Protect the following communications using NIST FIPS 140-2 compliant encryption methods (see <https://csrc.nist.gov/Projects/Cryptographic-Module-Validation-Program/Standards> for additional information):
 1. Public switched telephone network.
 2. Leased lines.
 3. Any wireless communication.
- b. Establish Virtual Private Network IPSec tunnels between the different facilities, including all wireless devices, using approved network devices. See <https://aplits.disa.mil/processAPList.action> for additional information.
- c. Protected communications shall use Digital Certificates, where possible. Self-signed certificates are acceptable. Document communications devices that cannot be Certificate protected. Submit Certificate Protection Status (Encrypted) for all communication devices prior to any Contractor equipment requiring certificates arriving at the Project site.

d. All passphrases and/or pre-shared keys utilized for encryption shall meet **DOD 8500.01** minimum standards. Include all passphrases and pre-shared keys in Certificate Protection Status submittal.

e. Firewalls shall be provided to control communications between tunnels. Firewalls shall meet STIG requirements.

f. The proposed network and wireless devices shall be selected from the DISA approved product list (APL). See <https://aplits.disa.mil/processAPList>.

1.14 CONTROL DEVICE CODE PROTECTION

a. The Contractor shall configure and utilize the existing cyber security features, available on the devices that are to be added to the control network.

b. For example, password protection of logical programming in PLCs, Relays, and other automation equipment shall be used to provide a layer of protection for these devices, if it were accessed by unauthorized persons.

c. Any passwords set to protect code or configuration setting shall be provided to the Government as defined in the ACCOUNT MANAGEMENT paragraph. All programming/code developed under this contract shall be accessible and changeable by the Government upon completion of work under this contract.

d. The Contractor shall provide all **Network Configuration Files (Encrypted)** developed for the control system. Include any codes, hardware or software keys, license numbers, etc., required to enable the Government to access or change the programming on all devices supplied under this contract. These shall be provided to the Government at no additional cost.

PART 2 PRODUCTS

2.1 COMPLETE SOFTWARE LISTING

a. Provide comprehensive software listings for each computer on the control system. Include, at a minimum, the following:

1. Software Name.
2. Software Vendor.
3. Software Version Number (major version number only, for Pre-Design Software Listing).
4. Software Selection Purpose/Justification.
5. License Status and number identifier.

b. Submit a **Pre-Design Software Listing (Encrypted)** a minimum of 30 calendar days prior to beginning of system design. Submit a **Complete Software Listing (Encrypted)** a minimum of 60 calendar days prior to installed operation of the software.

c. Software with a currently supported STIG meets Government cybersecurity requirements. Software without a currently supported STIG is subject to Government review and approval. See <https://iase.disa.mil/stigs/Pages/a-z.aspx>, for a listing of software with a currently supported STIG.

2.1.1 Antivirus/Antimalware Software

a. The computers on the control system shall include the most up to date DoD approved antivirus software with up to date signatures. See <https://www.niap-ccevs.org/Product/> for additional information.

b. Verify that the Antivirus/antimalware software will not negatively affect the operation of the control system. Computers and servers being installed on the system shall be configured with up-to-date antivirus signatures, not older than 10 days, prior to deployment.

c. Submit [Antivirus/Antimalware Scan \(Encrypted\)](#) test results to the KO as evidence of a clean scan, a minimum of 30 days prior to installing a computer onto the control system.

2.2 COMPLETE HARDWARE LISTING

a. Provide comprehensive hardware listings of all hardware devices to be utilized on the control system. The listing shall be compiled for the following:

1. All PLCs and Related Components.
2. Computers.
3. Network Accessible Devices.
4. Interface Converters.
5. Any Similar Devices.

b. Provide the following information, at a minimum:

1. Manufacturer.
2. Model Number.
3. Firmware Version Number, where applicable (major version number only, for Pre-Design Hardware Listing).
4. Installation Location. Includes physical location, and functional location in the control system.

c. Submit a [Pre-Design Hardware Listing \(Encrypted\)](#) a minimum of 30 calendar days prior to beginning of system design. Submit a [Complete Hardware Listing \(Encrypted\)](#) a minimum of 60 calendar days prior to installed operation of the hardware.

d. Hardware listed at the following DISA website meets Government cybersecurity requirements: <https://aplits.disa.mil/processAPList>. Hardware not listed is subject to Government review and approval

2.3 PORTS, PROTOCOLS, AND SERVICES LIST (Encrypted)

a. Provide a comprehensive listing of the Ports, Protocols, and Services necessary for normal operations, emergency operations, and troubleshooting of the control system. At a minimum, list shall include the following:

1. Vendors.
2. Justifications.
3. Executables.
4. Ports.
5. Protocols.
6. Services.

b. Submit a minimum of 30 calendar days prior to anticipated Government acceptance of the system.

2.4 SYSTEM NETWORK DOCUMENTATION

a. The Contractor shall provide a complete System [Network Diagram \(Encrypted\)](#) to include all network devices, control systems, and maintenance components. The diagram shall include the following for each device:

1. Labels of device type (e.g., workstation, server, PLC, etc.).
2. Component Manufacturer/model.
3. Operating System.
4. Operating System Version Number..
5. Firmware manufacturer.
6. Firmware version number.

b. In addition, submit a complete System Data Flow Diagram that shows all of the devices on the control network that communicate via routable protocols. Submit a [System Data Flow Diagram \(Encrypted\)](#) that indicates the normal system communications among the devices on the network, including the ports and protocols utilized for communications. Include the following in the System Data Flow Diagram:

1. Arrows to indicate direction of data flow between components. Define the physical media and protocol for each link.
2. Logical boundary of the system marked with a red line clearly defining components inside the boundary as well as components outside the boundary. Label any connections to external networks and indicate the boundary protection.
3. Indicate any VLAN segregation of the devices on the diagram.

c. Diagrams shall be provided electronically in formatted for 11" X

17" sheets. Develop diagrams using Microsoft Visio, Microstation, or other approved editable format. Submit copies of original electronic files as well as Portable Document Format (PDF) files.

2.5 DEFAULT PASSWORDS

a. The Contractor shall change any default passwords on the equipment provided under this contract, including any PLCs, HMI, and network devices. Submit a [Comprehensive Password List \(Encrypted\)](#) and a [Comprehensive Passphrase List \(Encrypted\)](#), required to properly operate, maintain, and troubleshoot the system, to the Government. See paragraph CONTRACTOR GENERATED PASSWORDS for password requirements.

b. Include, and clearly identify, any default passwords that cannot be changed on any configurable device provided under this contract.

2.6 ACCOUNT MANAGEMENT

a. Submit a [Comprehensive Account List \(Encrypted\)](#) for each configurable device on the control system. This include the following:

1. All Application Accounts.
2. Operating System Accounts.
3. Network Accessible Device Accounts.
4. Service Accounts.
5. Communications Accounts.

b. The listing shall provide the unique username and password for each account on each device on the system.

2.7 INITIAL BACKUPS

The Contractor shall provide complete [Initial Backups \(Encrypted\)](#) of each component. Backups shall be sufficient to restore all components to their delivered state. The backups of Windows-based components shall be stored on an encrypted external hard drive to be provided to the Government. The backups must be tested and verified as functional for restoring the system prior to submittal. Include verification of testing and functionality with submittal.

2.7.1 Backup Software

Backups of Windows-based components shall be performed with a Windows-based backup software. An acceptable Windows-based backup software must meet the following salient characteristics.

- a. Create full, incremental, and differential backup images of partitions, folders, and/or files.
- b. Restore and clone backup images
- c. Compressed backup images
- d. Compatible with approved editions of Microsoft Windows

Submit [backup software \(encrypted\)](#).

PART 3 EXECUTION

3.1 UNNECESSARY SOFTWARE AND SERVICES

a. Removal all unnecessary software (not required for the operation and maintenance of the SCADA system) from all Contractor provided computers on the system. Contractor shall not install unnecessary software or services on system computers, including, but not limited to, the following:

1. Games.
2. Entertainment.
3. Unnecessary Diagnostic Packages.

b. Remove or disable all services and ports on the supplied computers which are not required for normal, emergency, or troubleshooting operations. Unnecessary services on the automation hardware to be provided, such as web servers, shall be disabled in configuration when not required for normal or emergency operations or troubleshooting.

3.2 SECURITY CONFIGURATION AUTOMATION PROTOCOL (SCAP) TOOL

a. Document any [deviations from the STIGs \(Encrypted\)](#) required for proper system operation. Include reasons why STIG requirements cannot be met. Submit Deviations from the STIGs a minimum of 30 days prior to anticipated date of deviation operations. The Deviations from the STIGs report shall include the following:

1. Vulnerability Identification.
2. Rule Identification.
3. Control.
4. CCI.
5. Finding.
6. Deviation from the STIG justification.

b. Utilize the Security Configuration Automation Protocol (SCAP) tool, similar scanning tool, or a manual check, to scan the computers using the latest STIGS for the Operating System and Network-accessible Devices provided.

c. Submit the [SCAP Tool Scan \(Encrypted\)](#) results to demonstrate the secure configuration of all devices provided. SCAP Tool Scan results shall be submitted, and accepted by the Government prior to the equipment arriving at the Government facility. Equipment without an accepted SCAP Tool Scan will not be allowed at the Project Site.

3.3 FIELD QUALITY CONTROL

3.3.1 Training

Provide 8 (eight) hours of training for 6 (six) Government personnel. The Government will provide for the training location. Training shall cover, at a minimum, the procedures for applying software and firmware updates for the devices supplied, information on normal adjustments, and any essential maintenance activities. See Section 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS, paragraph "TRAINING" for additional information.

3.3.2 Cybersecurity Field Verification

- a. Field verify cybersecurity compliance before the Pre-Operational Phase of commissioning.
- b. Furnish the services of qualified cybersecurity personnel and all supplies and equipment necessary for verification. The Contracting Officer and cybersecurity specialist reserve the right to witness all system verifications for cybersecurity.

3.3.2.1 Cybersecurity Field Verification Request

Perform the cybersecurity field verification for applicable equipment and systems specified in the SECTIONS listed in paragraph GENERAL INFORMATION. Notify the Contracting Officer at least 15 calendar days in advance of each cybersecurity verification inspection.

3.3.2.2 Verification for Each System

- a. Field verify cybersecurity compliance at the field testing of each system installation. During field verification, assist Government personnel with changing job-specific passwords to Government assigned and controlled passwords. Group field verification tasks to minimize the number of Contracting Officer trips to witness verification.
- b. Complete field verification tasks within a maximum of 2 sessions.

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GENERAL ELECTRICAL WORK

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/NECA 1 (2000) Standard Practices for Good Workmanship in Electrical Contracting

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 780 (2001) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C80.1 (2020) American National Standard for Electrical Rigid Steel Conduit (ERSC)

NEMA FB 1 (2014) Standard for Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable

NEMA VE 1 (2017) Metal Cable Tray Systems

ANSI/NEMA FB 1 (2014) Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-STD-889 (2021; Rev D) Galvanic Compatibility of Electrically Conductive Materials

UNDERWRITERS LABORATORIES (UL)

UL 360	(2013; Reprint Aug 2021) UL Standard for Safety Liquid-Tight Flexible Metal Conduit
UL 514B	(2012; Reprint May 2020) Conduit, Tubing and Cable Fittings
UL 6	(2007; Reprint Sep 2019) UL Standard for Safety Electrical Rigid Metal Conduit-Steel

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Obtain approval for product data before fabrication and installation.

Cable Tray; G, EL

Liquid-tight Flexible Steel Conduit; I, EL

Rigid Steel Conduit; I, EL

Fittings; I, EL

Outlet Boxes, Pull Boxes, And Junction Boxes; I, EL

SD-05 Design Data

Obtain approval for design data before fabrication and installation.

Cable Tray Design; G, EL ST

SD-10 Operation and Maintenance Data

Operation and Maintenance Manual; G, EL

SD-11 Closeout Submittals

Data for Arc Flash Study; G, EL

1.3 PREVENTION OF CORROSION

Protect metallic materials against corrosion. Provide equipment enclosures with the standard finish by the manufacturer when used for indoor installations, except where specified. Do not use aluminum when in contact with earth or concrete and, where connected to dissimilar metal, protect by approved fittings and treatment. Ferrous metals such as, but not limited to, anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous spare parts not of corrosion-resistant steel must be hot-dip galvanized

except where other equivalent protective treatment is specifically approved in writing.

1.4 GENERAL REQUIREMENTS

1.4.1 Departures from Drawings

The contract drawings constitute the working drawings for construction and for purchase of required materials, and indicate the extent and general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the equipment shall be properly located and readily accessible. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and reasons therefore shall be submitted to the Contracting Officer for approval as soon as practicable but not later than 30 days before installation. No such departure shall be made without the prior written approval of the Contracting Officer.

1.4.2 Code

The installation shall be in accordance with the National Electrical Code (**NFPA 70**), and National Electrical Safety Code (**IEEE C2**) except where more stringent requirements are indicated herein or shown on the contract drawings. Omission of details on the drawings or in the specifications shall not be construed as permitting deviations from Code requirements.

1.4.3 Coordination

Raceways, cable tray, structural supports, and other equipment and materials shall be carefully coordinated with new and existing mechanical or structural features prior to installation and positioned accordingly. The Contractor shall coordinate the electrical requirements of the mechanical work and provide all power related circuits, wiring, hardware and structural support, even if not shown on the drawings.

1.4.4 Special Environments

1.4.4.1 Weatherproof Locations

Wiring, fixtures, and equipment in designated locations shall conform to **NFPA 70** requirements for installation in damp or wet locations.

1.4.5 Materials and Equipment

Materials and equipment shall be approved based on the manufacturer's published data. All electrical materials shall be new and unused. Defective equipment or equipment damaged in the course of installation shall be replaced or repaired without cost to the Government in a manner meeting the approval of the Contracting Officer. Insofar as practicable, equipment for the same, similar, or allied service shall be of the same make and type, and when of the same rating it shall be interchangeable.

1.4.6 Standard Products

Unless otherwise indicated, the materials and equipment to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such items and shall be the manufacturer's latest standard marketed design.

1.4.7 UL Listing

The materials and equipment to be furnished under this specification shall be UL listed. This includes other electrical and process control sections such as 26 24 19.00 28 and 40 94 43.00 28. The label or listing of the Underwriters Laboratories, Inc., shall be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from an OSHA-approved nationally recognized, adequately equipped testing laboratory (NRTL) indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all requirements of the governing authority will be accepted.

1.4.8 Identification Nameplates

Major items of electrical equipment and major components shall be permanently marked with an identification name to identify the equipment by type or function and specific unit number as indicated. Designation of motors shall coincide with their designation in the motor control center or panel. Unless otherwise specified, all identification nameplates shall be made of laminated plastic with black outer layers and a white core. Provide red laminated plastic label with white center core where indicated. Edges shall be chamfered. Plates shall be fastened with black- finished round-head drive screws, except motors, or approved nonadhesive metal fasteners. When the nameplate is to be installed on an irregular-shaped object, the Contractor shall devise an support, approved by the COR, suitable for the application and ensure the proper installation of the supports and nameplates. In all instances, the nameplate shall be installed in a conspicuous location. At the option of the Contractor, the equipment manufacturer's standard embossed nameplate material with black paint-filled letters may be furnished in lieu of laminated plastic. The following equipment, as a minimum, shall be provided with identification nameplates:

Minimum 1/4-Inch High Letters	Minimum 1/8-Inch High Letters
Motors	Control Power Transformers
Starters and VFDs	Control Devices
Safety Switches/Disconnects	Instrument Transformers
Motor Control Centers	Pilot Lights
Switchgear	Meters and displays
Panelboards	Process control devices
Transformers	Manual starting switches
Equipment enclosures	

Each panel, section, or unit in motor control centers, switchgear or similar assemblies shall be provided with a nameplate in addition to nameplates listed above, which shall be provided for individual compartments in the respective assembly, including nameplates which identify "future," "spare," and "dedicated" or "equipped spaces." Identification plates must be furnished for all line voltage enclosed circuit breakers, identifying the equipment served, voltage, phase(s) and power source.

1.4.9 Warnings

Circuits 480 volts and above must have conspicuously located warning signs

in accordance with OSHA requirements.

1.4.10 As-Built Drawings

Following the project completion or turnover, the Contractor shall furnish as-built drawings to the Contracting Officer in accordance with Section 01 78 00.00 28, CLOSEOUT SUBMITTALS.

1.5 WORKMANSHIP

All work shall be completed in a neat and workmanlike manner and shall conform to the best modern practice in the class of work regardless of any omission in the drawings and specifications. Accepted industry practices are as described in ANSI/NECA 1 and other ANSI approved installation standards.

1.6 QUALIFICATIONS

Electrical installation shall be performed by state-licensed electrician(s).

1.7 DELIVERY, STORAGE, AND HANDLING

Provide written notification to the Government 14 calendar days prior to shipment of equipment. Ship switchgear and motor control centers as completely assembled and wired as feasible. Contractor shall verify that all electrical equipment and preassembled motor control center sections pass through openings and doorways required to deliver the equipment to their specified installation locations. The switchgear, motor control centers, control panels, and any other equipment must be wrapped suitably or otherwise protected from damage during shipment. Until immediately prior to installation, all electrical material delivered to the site must be protected from damaging environmental and construction activities. Keep the equipment dry and free from precipitation and condensation during storage, installation, and after installation. Store all electrical equipment in completely enclosed containers and in a humidity-controlled environment. The Contractor must have a representative on site during all deliveries to verify the condition of all equipment received and to ensure the equipment is handled per the manufacturer's instructions for unloading. The Contractor will be required to dispose of all shipping crates, skids and packing materials.

1.8 DATA FOR ARC FLASH STUDY

Submit data for an arc flash study to be performed by others. For each piece of equipment, submit the following data in a tabular format.

1. Cables over 240 Volts

- a. Name
- b. Size
- c. Type of insulation
- d. Separate phases, bundled phases, or bus
- e. Magnetic or non-magnetic raceway
- f. Length, rounded to nearest 50 feet

2. Protective devices over 240 Volts

- a. Name

- b. Trip settings
 - c. Interrupt ratings
 - d. Brand and model
- 3. Transformers
 - a. Name
 - b. Percent impedance
 - c. Tap settings
 - d. Delta or wye
- 4. Starters:
 - a. Does it prevent the motor from back-feeding power to the fault location?
- 5. Motors
 - a. Motor type
 - b. Horsepower rating
 - c. Voltage
 - d. Full load amps
 - e. Locked rotor current

PART 2 PRODUCTS

2.1 CABLE TRAY

NEMA VE 1. Cable tray shall include all fittings, clamps, supports, bonding jumpers, dropouts, and other accessories necessary to provide a complete system. Cable tray shall be aluminum, ladder-type, uncovered, and finished free from burrs and sharp edges. Cable tray shall be suitable for use as an equipment grounding conductor. Cable tray shall have a minimum nominal depth of **4 inches**, minimum bend radius of **12 inches**, and a maximum rung spacing of **9 inches**.

The cable tray system shall be labeled with the cross sectional area, load class, and a warning against use of the tray as a support for personnel. Labels shall be visible after installation. Provide at least one label per **20 linear feet** of tray.

Maximum span between cable tray supports shall be **20 feet**. At most one cable tray splice may be located between supports. Supports and cable tray shall not pass under or over any hatches in the floor or ceiling. Cable tray shall be rated to support the load of the cables, the load of pulling cables during installation, and a 200-lb concentrated load at midspan. The concentrated load represents a person who may accidentally use the tray as a support. Provide seismic bracing per **13 48 00.01 28**.

Cable tray shall include a physical barrier between any medium-voltage cables and low-voltage cables. Medium-voltage cables shall be secured to the tray with clamps or other accessories. Zip ties are not permitted for medium-voltage cables. Conduits leading to and from the cable tray shall have bushings. Bond conduits to cable tray unless otherwise indicated.

Submit **cable tray** product data. Submit **cable tray design**, including label format, dimensional layout, load and seismic calculations, and fill calculations. Dimensional layout shall include cable spacing, cable tray splices, and supports. Fill calculations shall include an index of cables for each section and identify **lb/ft**, cross sectional area, and insulation

voltage class for each cable.

2.2 CONDUIT AND TUBING

2.2.1 Liquid-tight Flexible Steel Conduit

UL 360. Conduits 1-1/4 inch and smaller shall have an internal copper bonding conductor wound spirally in the space between each convolution for the equipment ground provided by the manufacturer.

2.2.2 Rigid Steel Conduit

UL 6 and **ANSI C80.1**. Minimum conduit size shall be 3/4-inch trade size. Conduit shall be zinc coated (galvanized) both inside and outside by the hot-dip method.

2.2.3 Fittings

ANSI/NEMA FB 1 and **UL 514B**. Conduit fittings shall be threaded and cadmium- or zinc-coated (by hot-dipped galvanizing or electroplating) on the inside and outside.

Expansion fittings shall be listed by an OSHA-approved NRTL, shall allow up to 4 inches of movement, and shall be required every 100 feet and at construction joints. Provide bonding jumper connecting conduit on each side of expansion fitting.

Fittings for flexible conduit shall provide positive bonding, and shall conform to **UL 514B**.

2.3 OUTLET BOXES, PULL BOXES, AND JUNCTION BOXES

Ensure outlet boxes for use with conduit systems are in accordance with **NEMA FB 1** and are not less than 1-1/2 inches deep. Furnish all pull and junction boxes with screw-fastened covers.

PART 3 EXECUTION

3.1 GROUNDING AND BONDING

3.1.1 Grounding Connections

Weld ground connections that are in inaccessible locations.

In accessible locations, bolt connections together. Split bolt type connectors shall not be used.

Clean, grease, and remove foreign matter from ground connection surfaces. Do not penetrate clad material in the cleaning process. Make connection between like metals where possible. Where dissimilar metals are welded, brazed, or clamped, follow the manufacturer's instructions. Ensure connections between dissimilar metals do not produce galvanic action in accordance with **MIL-STD-889**.

3.1.2 Equipment and Enclosure Bonding

Bond each metallic enclosure and all electrical equipment to ground. Make at least one copper connection from the system ground point to one or more enclosures in the area such that all enclosures and equipment provide a

low-impedance path to ground when properly bonded together.

3.1.3 Bonding of Conduit and Raceway Systems

Bond all metal conduit, fittings, junction boxes, outlet boxes, armored and metal sheathed cable, and other raceways. Take care to ensure adequate electrical contact at the joints and terminations.

For rigid metal conduit and terminations, ensure threaded connections are wrench-tight with no exposed threads. Ream all ends of the conduit to remove burrs and rough edges. Bond conduits entering boxes and enclosures to the box with locknuts and grounding-type bushings. Locknuts that gouge into the metal box when tightened are not acceptable.

Conduit systems that are interrupted by PVC dielectric links are bonded separately on either side of the link. Do not jumper the dielectric link.

Install flexible metal conduit with an integral grounding conductor.

3.1.4 Cable Tray Bonding

Bond cable tray sections together. Cable tray sections in tandem assembly are considered as having electrical continuity when these sections are bonded with the appropriate bolts. Install bond straps across expansion joints. Bond cable trays to the building ground system.

3.2 REPAIR OF EXISTING WORK

Repair of existing work, demolition, and modification of existing electrical distribution systems shall be performed as follows:

3.2.1 Workmanship

Lay out work in advance. Exercise care where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings, piping, and equipment using skilled craftsmen of trades involved.

3.2.2 Existing Concealed Wiring to be Removed

Existing concealed wiring to be removed shall be disconnected from its source. Verify with Government Representative before removing conductors or cutting conduits flush with floor, underside of floor, and through walls; and seal openings.

3.2.3 Removal of Existing Electrical Distribution System

Removal of existing electrical distribution system equipment shall include equipment's associated wiring, including conductors, cables, exposed conduit, surface metal raceways, boxes, and fittings, as indicated. Unless otherwise indicated, all removed equipment becomes the property of the contractor.

3.2.4 Continuation of Service

Maintain continuity of existing circuits of equipment to remain. Existing circuits of equipment shall remain energized. Circuits which are to remain but were disturbed during demolition shall have circuits wiring and

power restored back to original condition.

3.3 PAINTING AND FINISHING

3.3.1 Factory-Applied Paint

The enclosures for the following listed items shall be factory painted inside and outside using the manufacturer's standard practice.

<u>Item</u>	<u>Finish Color</u>
Panelboards	Manufacturer's
Motors	Manufacturer's
Motor controls	ANSI 61 - Light Gray
Electric heaters	Manufacturer's

3.3.2 Repair of Zinc Coatings

Application of zinc coatings shall be in a manner and of a thickness and quality conforming to [ASTM A 123/A 123M](#). In all cases where zinc coating is damaged by cutting, welding, or other causes, the affected areas shall be regalvanized by use of repair sticks or powders, as specified in [ASTM A 780](#), Type Zinc-based Solders, Annex A1. The repaired area shall be at least equal in thickness and protection as the original hot-dipped coating. Repairing of zinc coatings by painting with zinc-rich or other corrosion inhibiting paint will not be permitted.

3.4 OPERATION AND MAINTENANCE MANUAL

Submit in accordance with SECTION [01 78 00.00 28](#) CLOSEOUT SUBMITTALS. Include the following:

- (1) Calculations
- (2) Product data
- (3) Dimensional layouts for cable tray, including cable spacing, splices, and supports
- (4) Index of cables per section of cable tray, including [lb/ft](#), cross sectional area, and insulation voltage class for each cable.

Submit [Operation and Maintenance Manual](#).

3.5 CONCRETE EQUIPMENT PADS

Provide concrete equipment pads where indicated. Limit the size of the pad to no more than [1 inch](#) beyond the footprint of the equipment.

Do not obstruct floor drains. For each pad more than [6 inches](#) away from a wall, identify the nearest floor drain and measure the slope of the floor within [10 feet](#) of the pad. For any pad greater than [10 feet](#) wide which will obstruct drainage, include at least one channel through the pad. Channel shall be at least 3 inches wide and 1 inch tall. Channel shall be flush with the floor and oriented to maximize flow toward the drain.

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INSULATED WIRE AND CABLE

PART 1 GENERAL

All wire and cable used for power, control, metering, and relaying systems shall be provided by the Contractor and shall conform to the requirements specified herein.

1.1 REFERENCES

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

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)

AEIC CS8 (2013) Specification for Extruded Dielectric Shielded Power Cables Rated 5 Through 46 kV

ASTM INTERNATIONAL (ASTM)

ASTM B8 (2011; R 2017) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ASTM D 2275 (2017) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 383 (2015) Qualifying Class 1E Electric Cables and, Field Splices for Nuclear Power Generating Stations 2004

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS (2021) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA WC 63.1 (2005) Twisted Pair Premise Voice and Data Communications Cables

NEMA WC 70 (2021) Power Cable Rated 2000 V or Less for the Distribution of Electrical Energy

NEMA WC 74/ICEA S-93-639 (2012) 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4)
National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-568-C.1 (2009; Add 2 2011; Add 1 2012) Commercial Building Telecommunications Cabling Standard

TIA-568-C.2 (2009; Errata 2010) Balanced Twisted-Pair Telecommunications Cabling and Components Standards

UNDERWRITERS LABORATORIES (UL)

UL 1569 (2018) UL Standard for Safety Metal-Clad Cables

UL 44 (2018; Reprint May 2021) UL Standard for Safety Thermoset-Insulated Wires and Cables

UL 486C (2018; Reprint May 2021) UL Standard for Safety Splicing Wire Connectors

1.2 RELATED REQUIREMENTS

Section 26 08 00.00 28 APPARATUS INSPECTION AND TESTING applies.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Obtain approval of product data before fabrication and installation.

Installation Instructions; G, EL

Medium-voltage power cable; G, EL

Low-voltage power cable; G, EL

Multiconductor control cable; G, EL

Single-conductor control cable; G, EL

Instrumentation cable; G, EL

Grounding conductor; G, EL

Ethernet cable; G, EL

Wire and Cable; G, EL

SD-05 Design Data

Obtain approval of design data before fabrication and installation.

Cable and conduit schedule; G, EL

SD-06 Test Reports

Production Test Reports; G, EL

Field Test Reports; G, EL

Continuity Tests; G, EL

SD-10 Operation and Maintenance Data

Cable and conduit schedule; G, EL

1.4 DELIVERY, STORAGE, AND HANDLING

Furnish cables on reels or coils. Each cable and the outside of each reel or coil, shall be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number. Each coil or reel of cable shall contain only one continuous cable without splices. Shielded cables rated 2,001 volts and above shall be reeled and marked in accordance with Section I of [AIEC CS8](#) or [NEMA WC 74/ICEA S-93-639](#), as applicable. Reels shall remain the property of the Contractor.

PART 2 PRODUCTS

For products which are not specifically mentioned below, submit [wire and cable](#) data.

2.1 MEDIUM-VOLTAGE POWER CABLE

Medium-voltage power cable shall be Type MV-105 with ethylene-propylene rubber (EPR) insulation. The product must meet the following salient physical, functional, and performance characteristics in addition to the other requirements in this specification.

- a. Type MV-105
- b. Rated for 5000 volts
- c. Rated for cable tray use
- d. Copper conductors
- e. Shielded type cable

2.2 LOW-VOLTAGE POWER CABLE

Low-voltage power cable routed in cable tray shall meet the following salient physical, functional, and performance characteristics in addition to the other requirements in this specification.

- a. XHHW-2 insulation

- b. Rated for 600 volts
- c. Rated for cable tray use
- d. Copper conductors
- e. NEMA WC 70

2.3 MULTICONDUCTOR CONTROL CABLE

Power limited multiconductor control cable only to be used for 24VDC and 4-20mA applications. Multiconductor control cable shall meet the following salient physical, functional, and performance characteristics in addition to the other requirements in this specification.

- a. Type PLTC
- b. Rated for 300 volts
- c. Rated for cable tray use
- d. Shielded pairs or triads when used for analog signals
- e. Overall shield
- f. UL 1569, UL 44, NEMA WC 70

2.4 SINGLE-CONDUCTOR CONTROL CABLE

Single-conductor control cable shall be XHHW-2 per NEMA WC 70 and UL 44. The cable shall be sized as indicated in plans. Cable shall be tray-rated.

2.5 INSTRUMENTATION CABLE

Instrumentation cable shall meet the following salient physical, functional, and performance characteristics in addition to the other requirements in this specification.

- a. Rated for 600 volts
- b. Rated for cable tray use
- c. Shielded pairs or triads when used for analog signals
- d. Overall shield

2.6 GROUNDING CONDUCTOR

Grounding conductor shall be bare copper with ASTM B8 Class B stranding, except grounding conductors in cable tray shall be insulated to prevent corrosion. Stranding shall be concentric and not bunched or rope. Size grounding conductor per NFPA 70 unless otherwise indicated. Insulation, if required, shall be XHHW-2.

2.7 ETHERNET CABLE

Ethernet cable shall meet the following salient physical, functional, and performance characteristics in addition to the other requirements in this specification.

- a. NEMA WC 63.1 Category 5e or better
- b. EtherNet/IP compliant
- c. 100% overall shield

2.8 MATERIALS

2.8.1 Wire and Cable

Furnish wire and cable in accordance with the requirements indicated on the drawings. Wire and cable shall conform to the detailed requirements

specified herein.

2.8.2 Rated Circuit Voltages

All low-voltage wire and cable shall have minimum rated circuit voltages in accordance with NEMA WC 70.

2.8.3 Conductors

2.8.3.1 Material for Conductors

Conductors shall conform to all the applicable requirements of NEMA WC 70, as applicable, and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used.

2.8.3.2 Size

Minimum wire size shall be No. 12 AWG for power circuits up to 600 volts; No. 8 for power circuits over 600 volts; No. 14 for control circuits; and No. 16 for instrumentation circuits. Minimum wire sizes for rated circuit voltages of 2,001 volts and above shall not be less than those listed for the applicable voltage in NEMA WC 74/ICEA S-93-639, as applicable.

2.8.3.3 Stranding

Conductor stranding classes cited herein shall be as defined in NEMA WC 70, as applicable. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall have Class H or K stranding. All other conductors shall have Class B or C stranding, except that No. 12 AWG may be 19 strands of No. 25 AWG, and No. 10 AWG may be 19 strands of No. 22 AWG.

2.8.3.4 Conductor Shielding

Use conductor shielding conforming to NEMA WC 70, as applicable, on power cables having a rated circuit voltage above 2,000 volts. In addition, conductor shielding for shielded cables shall also comply with Section C of AEIC CS8. Strict precautions shall be taken after application of the conductor shielding to prevent the inclusion of voids or contamination between the conductor shielding and the subsequently applied insulation.

2.8.3.5 Separator Tape

Where conductor shielding, strand filling, or other special conductor treatment is not required, a separator tape between conductor and insulation is permitted.

2.8.4 Insulation

2.8.4.1 Insulation Material

Provide insulation which is a cross-linked thermosetting polyethylene (XLPE) of type XHHW-2 meeting the requirements of NEMA WC 70, as applicable; an ethylene-propylene rubber (EPR) type meeting the requirements of NEMA WC 70 or NEMA WC 74/ICEA S-93-639. For shielded cables of rated circuit voltages above 2,000 volts, the following provisions shall also apply:

- a. The insulation material and its manufacturing, handling, extrusion and vulcanizing processes, shall all be subject to strict procedures to prevent the inclusion of voids, contamination, or other irregularities on or in the insulation. Insulation material shall be inspected for voids and contaminants. Inspection methods, and maximum allowable void and contaminant content shall be in accordance with Section B of **AEIC CS8**, as applicable.
- b. Cables with repaired insulation defects discovered during factory testing, or with splices or insulation joints, are not acceptable.

2.8.4.2 Insulation Thickness

The insulation thickness for each conductor shall be based on its rated circuit voltage.

- a. Power Cables/Single-Conductor Control Cables, 2,000 Volts and Below - The insulation thickness for single-conductor cables rated 2,000 volts and below shall be as required by **NEMA WC 70**, as applicable. Some thicknesses of **NEMA WC 70** will be permitted only for single-conductor cross-linked thermosetting polyethylene insulated cables without a jacket.
- b. Power Cables, Rated 2,001 Volts and Above - Thickness of insulation for power cables rated 2,001 volts and above shall be in accordance with the following:
 - (1) Non-shielded cables, 2,001 to 5,000 volts, shall comply with **NEMA WC 70**, as applicable.
 - (2) Shielded cables rated 2,001 volts and above shall comply with Column B of Table B1, of **AEIC CS8**, as applicable.
- c. Multiple-Conductor Control Cables - The insulation thickness of multiple-conductor cables used for control and related purposes shall be as required by **NEMA WC 70**, as applicable.

2.8.4.3 Insulation Shielding

Unless otherwise specified, provide insulation shielding for conductors having rated circuit voltages of 2,001 volts and above. The voltage limits above which insulation shielding is required, and the material requirements, are given in **NEMA WC 70**, as applicable. The material, if thermosetting, shall meet the wafer boil test requirements as described in Section D of **AEIC CS8**, as applicable. The method of shielding shall be in accordance with the current practice of the industry; however, the application process shall include strict precautions to prevent voids or contamination between the insulation and the nonmetallic component. Voids, protrusions, and indentations of the shield shall not exceed the maximum allowances specified in Section C of **AEIC CS8**, as applicable. The cable shall be capable of operating without damage or excessive temperature when the shield is grounded at both ends of each conductor. All components of the shielding system shall remain tightly applied to the components they enclose after handling and installation in accordance with the manufacturer's recommendations. Shielding systems which require heat to remove will not be permitted unless specifically approved.

2.8.5 Jackets

All cables shall have jackets meeting the requirements of NEMA WC 70, as applicable, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common overall jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including jacket, afterward fully meets these specifications and the requirements of the applicable standards.

2.8.5.1 Jacket Material

The jacket shall be one of the materials listed below.

a. General Use

- (1) Heavy-duty black neoprene (NEMA WC 70).
- (2) Heavy-duty chlorosulfonated polyethylene (NEMA WC 70).
- (3) Heavy-duty cross-linked (thermoset) chlorinated polyethylene (NEMA WC 70).

b. Accessible Use Only, 2,000 Volts or Less - Cables installed where they are entirely accessible, such as cable trays and raceways with removable covers, or where they pass through less than 10 feet of exposed conduit only, shall have jackets of one of the materials specified in above paragraph GENERAL USE, or the jackets may be of one of the following:

- (1) General-purpose neoprene (NEMA WC 70).
- (2) Black polyethylene (NEMA WC 70).
- (3) Thermoplastic chlorinated polyethylene (NEMA WC 70).

2.8.5.2 Jacket Thickness

The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thicknesses specified below.

- a. Multiple-Conductor Cables - Thickness of the jackets of the individual conductors of multiple-conductor cables shall be as required by NEMA WC 70, and shall be in addition to the conductor insulation thickness required by Column B of Table 3-1 of the applicable NEMA publication for the insulation used. Thickness of the outer jackets or sheaths of the assembled multiple-conductor cables shall be as required by NEMA WC 70.
- b. Single-Conductor Cables - Single-conductor cables, if nonshielded, shall have a jacket thickness as specified in NEMA WC 70. If shielded, the jacket thickness shall be in accordance with the requirements of NEMA WC 70.

2.8.6 Metal-Clad Cable

2.8.6.1 General

The metallic covering shall be corrugated metal, conforming to the applicable requirements of NEMA WC 70. If the covering is of ferrous metal, it shall be galvanized. Copper grounding conductor(s) conforming to NEMA WC 70 shall be furnished for each multiple-conductor metal-clad cable. Assembly and cabling shall be as specified in paragraph CABLING. The metallic covering shall be applied over an inner jacket or filler tape. The cable shall be assembled so that the metallic covering will be tightly bound over a firm core.

2.8.6.2 Jackets

Metal-clad cables may have a jacket under the armor, and shall have a jacket over the armor. Jackets shall comply with the requirements of NEMA WC 70. The outer jacket for the metal-clad cable may be of polyvinyl chloride (PVC).

2.9 TERMINATIONS

Indented nylon-coated ring-tongue terminals or spring-clamp terminals shall be used on all low-voltage power and control conductors No. 18 and larger.

2.10 CABLE IDENTIFICATION

2.10.1 Color-Coding

Insulation of individual conductors of multiple-conductor cables shall be color-coded in accordance with NEMA WC 70, except that colored braids will not be permitted. Only one color-code method shall be used for each cable construction type. Control cable color-coding shall be in accordance with NEMA WC 70. Power cable color-coding for circuits rated 120 to 240 volts shall be black for Phase A, red for Phase B, blue for Phase C, white for grounded neutral, and green for an insulated grounding conductor, if included.

2.10.2 Shielded Cables Rated 2,001 Volts and Above

Marking shall be in accordance with Section H of AEIC CS8, as applicable.

2.10.3 Cabling

Individual conductors of multiple-conductor cables shall be assembled with flame-and moisture-resistant fillers, binders, and a lay conforming to NEMA WC 70, except that flat twin cables will not be permitted. Fillers shall be used in the interstices of multiple-conductor round cables with a common covering where necessary to give the completed cable a substantially circular cross section. Fillers shall be non-hygroscopic material, compatible with the cable insulation, jacket, and other components of the cable. The rubber-filled or other approved type of binding tape shall consist of a material that is compatible with the other components of the cable and shall be lapped at least 10 percent of its width.

2.10.4 Dimensional Tolerance

The outside diameters of single-conductor cables and of multiple-conductor cables shall not vary more than 5 percent and 10 percent, respectively, from the manufacturer's published catalog data.

PART 3 EXECUTION

3.1 INSTALLATION INSTRUCTIONS

Wire and cable shall not be pulled into conduit runs until the conduit has been checked and determined to be clean and dry by pulling a clean, dry, tight fitting rag through each run. Only approved lubricants may be used to facilitate pulling of conductors. Splices between the equipment termination point shall be the starting point to perform checking procedure.

Except for lighting conductors, splices will be permitted only where shown on the drawings, or with written approval from the Contracting Officer. All splices shall be made in accessible cabinets, boxes, or outlets and shall comply with **UL 486C**. No splices will be allowed inside conduits.

Submit cable manufacturing data. The following information shall be provided by the cable manufacturer for each size, conductor quantity, and type of cable furnished:

- a. Minimum bending radius, in inches - For multiple-conductor cables, this information shall be provided for both the individual conductors and the multiple-conductor cable.
- b. Pulling tension and sidewall pressure limits, in **pounds**.
- c. **Installation Instructions** for stripping semiconducting insulation shields, if furnished, with minimum effort without damaging the insulation.

3.2 CABLE AND CONDUIT SCHEDULE

Submit schedule of cable and conduit. Schedule shall include, at a minimum, cable designations, approximate cable length for the design data submittal, actual cable length for the as-built submittal, cable type and size, and conduit type and size. Cable shall be 10 times the diameter of the outer coverings.

3.3 TESTS, INSPECTIONS, AND VERIFICATIONS

3.3.1 Cable Data

Cable data shall be submitted for approval including dimensioned sketches showing cable construction, and sufficient additional data to show that these specifications will be satisfied.

3.3.2 Inspection and Tests

Inspection and tests of wire and cable furnished under these specifications may be performed by the manufacturer. The Government may perform further tests before or after installation. Testing in general shall comply with **NEMA WC 70**. Specific tests required for particular materials, components, and completed cables shall be as specified in the

sections of the above standards applicable to those materials, components, and cable types. Tests shall also be performed in accordance with the additional requirements specified below. Submit certified test reports.

3.3.2.1 High-Voltage Test Source

Where the applicable standards allow a choice, high-voltage tests for cables to be used exclusively on dc circuits shall be made with dc test voltages. Cables to be used exclusively on ac circuits shall be tested with ac test voltages. If both ac and dc will be present, on either the same or separate conductors of the cable, AC test voltages shall be used.

3.3.2.2 Shielded Cables Rated 2,001 Volts or Greater

Additionally, the following tests shall be performed. Section or paragraph references are to **AEIC CS8** as applicable, unless otherwise stated.

- a. High potential test voltages shall be as required by Table B1 of **AEIC CS8** as applicable, rather than by **NEMA WC 70**.
- b. If high potential testing is done with an ac test voltage as specified in paragraph HIGH-VOLTAGE TEST SOURCE, an additional test shall be made using a dc test voltage rated at 75 percent of the specified full dc test voltage, for 5 consecutive minutes.
- c. Partial discharge tests shall be performed in accordance with **ASTM D 2275**.

3.3.2.3 Flame Tests

All power and control cable assemblies shall pass **IEEE 383** flame tests. Single-conductor cables and individual conductors of multiple-conductor cables shall pass the flame test of **NEMA WC 70**. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted. In this case the reports furnished under paragraph REPORTS, shall verify that all of each cable's materials, construction, and dimensions are the same as those in the qualifying tests.

3.3.3 Field Quality Control

3.3.3.1 General

After completion of the installation and splicing, and prior to energizing the conductors, perform wire and cable continuity and insulation tests as herein specified before the conductors are energized. Commercially available pre-terminated wire and cable systems are exempt from these tests.

Isolate completely all wire and cable from all extraneous electrical connections at cable terminations and joints. Feeder breakers, disconnects in combination motor starters, circuit breakers in panel boards, and other disconnecting devices must be used to isolate the circuits under test.

Cables larger than 12 AWG and medium-voltage cables shall be tested in accordance with **NETA ATS** and Section **26 08 00.00 28 APPARATUS INSPECTION AND TESTING**. Tests shall include the items listed in paragraphs Large Low-Voltage Cables Tests and Medium-Voltage Cable Tests. Other cables

shall be tested as specified in paragraph Small Cable Tests. Contractor must provide all necessary test equipment, labor, and personnel to perform the tests, as herein specified.

3.3.3.2 Large Low-Voltage Cable Tests

A. Visual and Mechanical Inspection

1. Compare cable data with drawings and specifications.
2. Inspect exposed sections of cable for physical damage and correct connection in accordance with the single-line diagram.
3. Inspect bolted electrical connections for high resistance using a low-resistance ohmmeter in accordance with **NETA ATS**.
4. Inspect compression-applied connectors for correct cable match and indentation.
5. Inspect for correct identification and arrangements.
6. Inspect cable jacket insulation and condition.

B. Electrical Tests

1. Perform resistance measurements through bolted connections with low-resistance ohmmeter in accordance with **NETA ATS**.
2. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300-volt rated cable and 1000 volts dc for 600-volt rated cable. Test duration shall be one minute.
3. Perform continuity tests to insure correct cable connection.

3.3.3.3 Medium-Voltage Cable Tests

A. Visual and Mechanical Inspection

1. Compare cable data with drawings and specifications.
2. Inspect exposed sections of cables for physical damage.
3. Inspect bolted electrical connections for high resistance using a low-resistance ohmmeter in accordance with **NETA ATS**.
4. Inspect compression-applied connectors for correct cable match and indentation.
5. Inspect shield grounding, cable supports, and terminations.
6. Verify that visible cable bends meet or exceed ICEA and manufacturer's minimum published bending radius.
7. If cables are terminated through window-type current transformers, inspect to verify that neutral and ground conductors are correctly placed and that shields are correctly terminated for operation of protective devices.
8. Inspect for correct identification and arrangements.
9. Inspect cable jacket and insulation condition.

B. Electrical Tests

1. Perform resistance measurements through bolted connections with a low-resistance ohmmeter in accordance with **NETA ATS**.
2. Perform an insulation-resistance test individually on each conductor and each shield with all other conductors and shields grounded. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use **NETA ATS**.
3. Perform a shield-continuity test on each power cable.

4. Perform cable time domain reflectometer (TDR) measurements on each conductor.
5. Perform dielectric withstand and baseline diagnostic tests per manufacturer's instructions. In the absence of manufacturer's instructions, use an applicable option from [NETA ATS](#).

3.3.3.4 Small Cable Tests

3.3.3.4.1 Insulation-Resistance Test

Perform Insulation-Resistance Tests on each field-installed conductor with respect to ground and adjacent conductors. Applied potential must be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Take readings after 1 minute and until the reading is constant for 15 seconds. Minimum insulation-resistance values must not be less than 25 Megohms for 300 volt rated cable and 100 Megohms for 600 volt rated cable. For circuits with conductor sizes 8AWG and smaller insulation resistance testing is not required.

3.3.3.4.2 Continuity Test

Perform [Continuity Tests](#) to insure correct cable connection (i.e correct phase conductor, grounded conductor, and grounding conductor wiring) end-to end. Any damages to existing or new electrical equipment resulting from contractor mis-wiring will be repaired and re-verified at contractor's expense. All repairs must be approved by the CO prior to acceptance of the repair.

3.3.3.4.3 Phase-Rotation Tests

Conduct Phase-Rotation Tests on all three-phase circuits using a phase-rotation indicating instrument. Perform phase rotation of electrical connections to connected equipment clockwise, facing the source.

3.3.3.4.4 Link Tests

For all Ethernet cable which is not pre-terminated by the manufacturer, perform Category 5e Link Tests in accordance with [TIA-568-C.1](#) and [TIA-568-C.2](#). Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.

3.3.3.5 Acceptance

Final acceptance will depend upon the successful performance of wire and cable under test. Do not energize any conductor until the final test reports are reviewed and approved by the Contracting Officer.

3.3.4 Independent Tests

The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

3.3.5 Reports

Furnish [production test reports](#) and [field test reports](#). No wire or cable

shall be shipped until authorized. Lot number and reel or coil number of wire and cable tested shall be indicated on the test reports.

-- End of Section --

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APPARATUS INSPECTION AND TESTING

PART 1 GENERAL

1.1 REFERENCES

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

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS

(2021) Standard for Acceptance Testing
Specifications for Electrical Power
Equipment and Systems

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Acceptance tests and inspections; G, EL

SD-07 Certificates

Qualifications of organization, and lead engineering technician;
G, EL

Acceptance test and inspections procedure; G, EL

1.3 QUALITY ASSURANCE

1.3.1 Qualifications

Contractor shall engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and generation equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor. No work required by this section of the specification shall be performed by a second tier subcontractor.

- a. Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS.

- b. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

1.3.2 Acceptance Tests and Inspections Reports

Submit certified copies of inspection reports and test reports. Reports shall include certification of compliance with specified requirements, identify deficiencies, and recommend corrective action when appropriate. Type and neatly bind test reports to form a part of the final record. Submit test reports documenting the results of each test not more than 10 days after test is completed.

1.3.3 Acceptance Test and Inspections Procedure

Submit test procedure reports for each item of equipment to be field tested at least 45 days prior to planned testing date. Do not perform testing until after test procedure has been approved.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 ACCEPTANCE TESTS AND INSPECTIONS

Testing organization shall perform acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with **NETA ATS**, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in **NETA ATS** are not required unless otherwise specified. Equipment shall be placed in service only after completion of required tests and evaluation of the test results have been completed. Contractor shall supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Contracting Officer shall be notified at least 14 days in advance of when tests will be conducted by the testing organization. Perform acceptance tests and inspections on applicable equipment and systems specified in the following sections:

- a. Section **26 24 19.00 28** MOTOR CONTROL CENTERS
- b. Section **26 29 01.00 28** ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE
- c. Section **27 21 10.00 28** FIBER OPTIC DATA TRANSMISSION SYSTEM
- d. Section **26 05 19.00 28** INSULATED WIRE AND CABLE

3.2 SYSTEM ACCEPTANCE

Final acceptance of the system is contingent upon satisfactory completion of acceptance tests and inspections.

3.3 PLACING EQUIPMENT IN SERVICE

A representative of the approved testing organization shall be present when equipment tested by the organization is initially energized and placed in service.

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INTERIOR DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 709 (2001) Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Std 100 (2000) The Authoritative Dictionary of IEEE Standards Terms

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2020) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA ST 20 (2014) Dry-Type Transformers for General Applications

NEMA Z535.4 (2011; R 2017) Product Safety Signs and Labels

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

NFPA 70E (2021) Standard for Electrical Safety in the Workplace

UNDERWRITERS LABORATORIES (UL)

UL 489 (2016; Rev 2019) UL Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures

UL 50 (2015) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations

UL 508 (2018; Reprint Jul 2021) UL Standard for Safety Industrial Control Equipment

UL 6 (2007; Reprint Sep 2019) UL Standard for Safety Electrical Rigid Metal Conduit-Steel

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE Std 100.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Submittals shall include performance and characteristic curves.

Circuit Breakers; I EL

Panelboards; I EL

Transformers; G, EL

SD-10 Operation and Maintenance Data

Operation and Maintenance Data; G EL

SD-11 Closeout Submittals

1.4 OPERATION AND MAINTENANCE DATA

Submit operation and maintenance data on motor starters, circuit breakers, motor controllers, and panelboards in accordance with Section 01 78 00.00 28, CLOSEOUT SUBMITTALS and as specified herein. Submit draft copies of the operation and maintenance manuals at least 15 days prior to delivery or at least 60 days prior to schedule installation as required in Section 01 33 00, SUBMITTAL PROCEDURES.

1.5 QUALITY ASSURANCE

1.5.1 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.5.2 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in

satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.5.2.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.5.2.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, as a minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70.

2.2 CONDUIT AND FITTINGS

2.2.1 Rigid Metallic Conduit

Rigid metallic conduit shall comply with UL 6.

2.3 BOXES, PULL BOXES AND PULL ENCLOSURE

2.3.1 Junction Boxes

Boxes for use with raceway systems shall be minimum NEMA 4X size 12"x12"x4". Telecommunications outlets shall be a minimum of 4 inches square by 2 1/8 inches deep, except for wall mounted disconnect. Mount outlet boxes flush in finished walls.

2.3.1.1 Pull Boxes and Enclosures

Motor safety disconnect shall be NEMA 4X size 13"x11"x8" nominal. Construct of at least minimum size required by NFPA 70 of code-gauge galvanized steel. Provide boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

Boxes with volume greater than 100 cubic inches, shall comply with UL 50, hot-dip, zinc-coated, of sheet steel.

2.4 TRANSFORMERS

NEMA ST 20, general purpose, dry-type, self-cooled, ventilated, and have

copper windings. Provide transformers in NEMA 1 enclosure. Transformer 15 kVA and greater shall have minimum 220 degrees C insulation system with temperature rise not exceeding 115 degrees C. Transformers rated 10 kVA and less shall have minimum 180 degrees C insulation with temperature rise not exceeding 115 degrees C under full-rated load in maximum ambient of 40 degrees C. Transformer of 115 degrees C temperature rise shall be capable of carrying continuously 115 percent of nameplate kVA without exceeding insulation rating. Transformers of 80 degrees C temperature rise shall be capable of carrying continuously 130 percent of nameplate kVA without exceeding insulation rating. Transformers TSQ01-1 and TSQ01-2 shall have a delta primary windings and grounded wye secondary windings. Transformers TSQ01-1 and TSQ01-2 shall be rated for 750kVA with 4160VAC primary winding voltage and 480/277VAC secondary winding voltage.

2.5 DEVICE PLATES

Provide UL listed, one-piece device plates for outlets to suit the devices installed. For metal outlet boxes, plates on unfinished walls shall be of zinc-coated sheet steel or cast metal having round or beveled edges. For nonmetallic boxes and fittings, other suitable plates may be provided. Plates on finished walls shall be nylon or lexan, minimum 0.03 inch wall thickness. Plates shall be same color as receptacle or toggle switch with which they are mounted. Plates on finished walls shall be satin finish stainless steel or brushed-finish aluminum, minimum 0.03 inch thick. Screws shall be machine-type with countersunk heads in color to match finish of plate. Sectional type device plates will not be permitted. Plates installed in wet locations shall be gasketed and UL listed for "wet locations".

2.6 PANELBOARDS

2.6.1 Circuit Breakers

UL 489, thermal magnetic-type having a minimum short-circuit current rating equal to the short-circuit current rating of the panelboard in which the circuit breaker shall be mounted. Breaker terminals shall be UL listed as suitable for type of conductor provided. Series rated circuit breakers and plug-in circuit breakers without a self-contained bracket and not secured by a positive locking device requiring mechanical release for removal are unacceptable.

2.6.1.1 Multipole Breakers

Provide common trip-type with single operating handle. Breaker design shall be such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2.7 MOTOR SHORT-CIRCUIT PROTECTOR (MSCP)

Motor short-circuit protectors, also called motor circuit protectors (MCPs); shall conform to UL 508, UL 489 and shall be provided as shown in three line diagram and in oneline diagram. MSCPs shall consist of an adjustable instantaneous trip circuit breaker used only in conjunction with a combination motor controller which provides coordinated motor branch-circuit overload and short-circuit protection. MSCPs shall be rated in accordance with the requirements of NFPA 70.

2.8 MANUFACTURER'S NAMEPLATE

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

2.9 FIELD FABRICATED NAMEPLATES

ASTM D 709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, **0.125 inch** thick, white with black center core. Provide red laminated plastic label with white center core where indicated. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be **one by 2.5 inches**. Lettering shall be a minimum of **0.25 inch** high normal block style.

2.10 WARNING SIGNS

Provide warning signs for flash protection in accordance with **NFPA 70E** and **NEMA Z535.4** for switchboards, panelboards, industrial control panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized. Provide field installed signs to warn qualified persons of potential electric arc flash hazards when warning signs are not provided by the manufacturer. The marking shall be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

2.11 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of **NEMA 250** corrosion-resistance test and the additional requirements as specified herein. Interior and exterior steel surfaces of equipment enclosures shall be thoroughly cleaned and then receive a rust-inhibitive phosphatizing or equivalent treatment prior to painting. Exterior surfaces shall be free from holes, seams, dents, weld marks, loose scale or other imperfections. Interior surfaces shall receive not less than one coat of corrosion-resisting paint in accordance with the manufacturer's standard practice. Exterior surfaces shall be primed, filled where necessary, and given not less than two coats baked enamel with semigloss finish. Equipment located indoors shall be ANSI Light Gray. Provide manufacturer's coatings for touch-up work.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations, including weatherproof and hazardous locations and ducts, plenums and other air-handling spaces, shall conform to requirements of **NFPA 70** and to requirements specified herein.

3.1.1 Hazardous Locations

Work in hazardous locations, as defined by **NFPA 70**, shall be performed in

strict accordance with NFPA 70 for particular "Class," "Division," and "Group" of hazardous locations involved. Provide conduit and cable seals where required by NFPA 70. Conduit shall have tapered threads.

3.1.1.2 Service Entrance Identification

Service entrance disconnect devices, switches, and enclosures shall be labeled and identified as such.

3.1.2.1 Labels

Wherever work results in service entrance disconnect devices in more than one enclosure, as permitted by NFPA 70, each enclosure, new and existing, shall be labeled as one of several enclosures containing service entrance disconnect devices. Label, at minimum, shall indicate number of service disconnect devices housed by enclosure and shall indicate total number of enclosures that contain service disconnect devices. Provide laminated plastic labels conforming to paragraph FIELD FABRICATED NAMEPLATES. Use lettering of at least 0.25 inch in height, and engrave on black-on-white matte finish. Service entrance disconnect devices in more than one enclosure, shall be provided only as permitted by NFPA 70.

3.1.1.3 Wiring Methods

Provide insulated conductors installed in rigid steel conduit, IMC, rigid nonmetallic conduit, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor shall be separate from electrical system neutral conductor. Provide insulated green equipment grounding conductor for circuit(s) installed in conduit and raceways. Shared neutral, or multi-wire branch circuits, are not permitted with arc-fault circuit interrupters. Minimum conduit size shall be 3/4 inch in diameter for low voltage lighting and power circuits. Vertical distribution in multiple story buildings shall be made with metal conduit in fire-rated shafts. Metal conduit shall extend through shafts for minimum distance of 6 inches.

3.1.3.1 Pull Wire

Install pull wires in empty conduits. Pull wire shall be plastic having minimum 200-pound force tensile strength. Leave minimum 36 inches of slack at each end of pull wire.

3.1.1.4 Conduit Installation

3.1.4.1 Restrictions Applicable to RMC

EMT shall not be used and it is not allowed. Only RMC (Rigid Metal Conduit) shall be used.

3.1.4.2 Conduit Through Floor Slabs

Where conduits rise through floor slabs, curved portion of bends shall not be visible above finished slab.

3.1.4.3 Conduit Support

Support conduit by pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by

machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Load applied to fasteners shall not exceed one-fourth proof test load. Fasteners attached to concrete ceiling shall be vibration resistant and shock-resistant. Holes cut to depth of more than 1 1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints shall not cut main reinforcing bars. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems shall be supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Supporting means shall not be shared between electrical raceways and mechanical piping or ducts. Installation shall be coordinated with above-ceiling mechanical systems to assure maximum accessibility to all systems. Spring-steel fasteners may be used for lighting branch circuit conduit supports in suspended ceilings in dry locations. Support exposed risers in wire shafts of multistory buildings by U-clamp hangers at each floor level and at 10 foot maximum intervals. Where conduit crosses building expansion joints, provide suitable watertight expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means. For conduits greater than 2 1/2 inches inside diameter, provide supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction.

3.1.4.4 Directional Changes in Conduit Runs

Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

3.1.4.5 Locknuts and Bushings

Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Locknuts shall have sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.

3.1.4.6 Flexible Connections

Provide flexible steel conduit less than 3 feet in length for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow 20 percent slack. Minimum flexible steel conduit size shall be 3/4 inch diameter. Provide liquid tight flexible metallic conduit in wet and damp locations and in fire pump rooms for equipment subject to vibration, noise transmission, movement or motors. Provide separate ground conductor across flexible connections.

3.1.5 Boxes, Outlets, and Supports

Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub-type when located in wet

locations, when surface mounted on outside of exterior surfaces, when surface mounted on interior walls exposed up to 7 feet above floors and walkways and when specifically indicated. Boxes in other locations shall be sheet steel, and nonmetallic boxes may be used with nonmetallic sheathed cable conduit system. Each box shall have volume required by NFPA 70 for number of conductors enclosed in box or octagonal, except that smaller boxes may be installed as required by fixture configurations, as approved. Boxes for use in masonry-block or tile walls shall be square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature; fixtures shall be readily removable for access to boxes unless ceiling access panels are provided. Support boxes and pendants for surface-mounted fixtures on suspended ceilings independently of ceiling supports. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. Threaded studs driven in by powder charge and provided with lockwashers and nuts or nail-type nylon anchors may be used in lieu of wood screws, expansion shields, or machine screws. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from building structure or by bar hangers. Where bar hangers are used, attach bar to raceways on opposite sides of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

3.1.5.1 Boxes

Boxes for use with raceway systems shall be minimum 1 1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes for other than lighting fixture outlets shall be minimum 4 inches square, except that 4 by 2 inch boxes may be used where only one raceway enters outlet.

3.1.5.2 Pull Boxes

Construct of at least minimum size required by NFPA 70 of code-gauge aluminum or galvanized sheet steel, and compatible with nonmetallic raceway systems, except where cast-metal boxes are required in locations specified herein. Provide boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

3.1.5.3 Extension Rings

Extension rings are not permitted for new construction. Use only on existing boxes in concealed conduit systems where wall is furred out for new finish.

3.1.6 Mounting Heights

Mount panelboards, enclosed circuit breakers, motor controller and disconnecting switches so height of operating handle at its highest position is maximum 78 inches above floor.

3.1.7 Conductor Identification

Provide conductor identification within each enclosure where tap, splice,

or termination is made. For conductors No. 6 AWG and smaller diameter, color coding shall be by factory-applied, color-impregnated insulation. For conductors No. 4 AWG and larger diameter, color coding shall be by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves. Identify control circuit terminations in accordance manufacturer's recommendations.

3.1.8 Covers and Device Plates

Install with edges in continuous contact with finished wall surfaces without use of mats or similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of $1/16$ inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.

3.1.9 Electrical Penetrations

Seal openings around electrical penetrations through fire resistance-rated walls, partitions, floors, or ceilings with Firestopping Material as specified.

3.1.10 Equipment Connections

Provide power wiring for the connection of motors and control equipment under this section of the specification. Except as otherwise specifically noted or specified, automatic control wiring, control devices, and protective devices within the control circuitry are not included in this section of the specifications but shall be provided under the section specifying the associated equipment.

-- End of Section --

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MOTOR CONTROL CENTERS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.1 (2003; R 2018) Unified Inch Screw Threads
(UN and UNR Thread Form)

ASME B1.20.1 (2013; R 2018) Pipe Threads, General
Purpose (Inch)

ASTM INTERNATIONAL (ASTM)

ASTM B187/B187M (2020) Standard Specification for Copper,
Bus Bar, Rod and Shapes and General
Purpose Rod, Bar and Shapes

ASTM D709 (2017) Standard Specification for
Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (2017; Errata 1-2 2017; INT 1 2017)
National Electrical Safety Code

IEEE C37.20.1 (2015) Standard for Metal-Enclosed
Low-Voltage Power Circuit-Breaker
Switchgear

IEEE C37.20.7 (2017; Corr 2021) Guide for Testing
Switchgear Rated Up to 52 kV for Internal
Arcing Faults

IEEE C57.13 (2016) Standard Requirements for
Instrument Transformers

IEEE C63.2 (2009) Standard for Electromagnetic Noise
and Field Strength Instrumentation, 10 Hz
to 40 GHz - Specifications

IEEE C63.4 (2014) American National Standard for
Methods of Measurement of Radio-Noise
Emissions from Low-Voltage Electrical and
Electronic Equipment in the Range of 9 kHz
to 40 GHz

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS (2021) Standard for Acceptance Testing
Specifications for Electrical Power
Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA AB 3 (2013) Molded Case Circuit Breakers and
Their Application

NEMA ICS 1 (2000; R 2015) Standard for Industrial
Control and Systems: General Requirements

NEMA ICS 2 (2000; R 2020) Industrial Control and
Systems Controllers, Contactors, and
Overload Relays Rated 600 V

NEMA ICS 4 (2015) Application Guideline for Terminal
Blocks

NEMA ICS 6 (1993; R 2016) Industrial Control and
Systems: Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA
20-1; TIA 20-2; TIA 20-3; TIA 20-4)
National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 44 (2018; Reprint May 2021) UL Standard for
Safety Thermoset-Insulated Wires and Cables

UL 489 (2016; Rev 2019) UL Standard for Safety
Molded-Case Circuit Breakers, Molded-Case
Switches and Circuit-Breaker Enclosures

UL 506 (2017) UL Standard for Safety Specialty
Transformers

UL 508 (2018; Reprint Jul 2021) UL Standard for
Safety Industrial Control Equipment

UL 845 (2021) UL Standard for Safety Motor
Control Centers

UL 1063 (2017) UL Standard for Safety Machine-Tool
Wires and Cables

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Motor Control Center Equipment Drawings; G, EL

SD-03 Product Data

Motor Control Center Equipment; G, EL

Spare Parts; G, EL

SD-06 Test Reports

Factory Test Procedures; G, EL

Factory Test Results; G, EL

Final Test Reports; G, EL

Acceptance Tests; G, EL

SD-07 Certificates

Motor Control Center Certification; G, EL

SD-11 Closeout Submittals

Warranty; G, EL

Manufacturer's Instructions; G, EL

1.3 QUALITY CONTROL

1.3.1 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Ensure equipment, materials, installation, and workmanship are in accordance with the mandatory and advisory provisions of NFPA 70, IEEE C2 unless more stringent requirements are specified or indicated.

1.3.2 Qualifications

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Provide products which have been in satisfactory commercial or industrial use for 2 years prior to bid opening. Ensure the 2-year period includes applications of equipment and materials under similar circumstances and of similar size. Ensure the product has been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items must be products of a single manufacturer.

1.3.3 Standard Products

Ensure material and equipment are standard products of a manufacturer

regularly engaged in their manufacture and essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Ensure all materials conform to the requirements of these specifications. Materials are to be of high quality, free from defects and imperfections, of recent manufacture, and of the classification and grades designated. Ensure all materials, supplies, and articles not manufactured by the Contractor are the products of other recognized reputable manufacturers.

1.4 DELIVERY, STORAGE, AND HANDLING

Ship the [motor control center equipment](#) as completely assembled and wired as feasible so as to require a minimum of installation work. Ensure each shipping section is properly match marked to facilitate reassembly. Provide equipment with removable lifting channels with eye bolts for attachment of crane slings to facilitate lifting and handling.

Carefully pack and ship separately any relay or other device which cannot withstand the hazards of shipment when mounted in place on the equipment. Mark these devices with the number of the panel which they are to be mounted on and fully identified.

Wrap all finished painted surfaces and metal work to protect from damage during shipment. Prepare all parts for shipment so that slings for handling may be attached readily while the parts are in a railway car or transport truck.

Carefully package and clearly mark all spare parts and accessories.

Ensure sections of equipment are of such size that they will pass through a 111 by 111-[inch floor](#) hatch opening.

Locate motor control center equipment in well ventilated areas, free from excess humidity, dust and dirt and away from hazardous materials with ambient temperature between [minus 22 and 104 degrees F](#). Ensure motor control center equipment is protected to prevent moisture from entering enclosure. Handle motor control center equipment in accordance with [NEMA ICS 2](#).

1.5 MAINTENANCE

1.5.1 Accessories and Tools

Furnish a complete set of accessories and special tools unique to the equipment provided and required for erecting, handling, dismantling, testing and maintaining the apparatus.

1.5.2 Spare Parts

Submit a [Spare Parts](#) list as recommended by the manufacturer for all equipment for Government approval. Contractor shall provide all parts on approved spare parts list. Ensure all spare parts are of the same material and workmanship, meet the same requirements, and are interchangeable with the corresponding original parts furnished.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

These specifications include the design, fabrication, assembly, wiring, testing, delivery, installation and testing of the items of equipment and accessories and spare parts listed in the Schedule and shown on the drawings.

Submit [Motor Control Center Equipment Drawings](#) and [Motor Control Center Equipment](#) including all motor control units, high resistance grounding equipment, and protective devices. Provide a single-line diagram, equipment list and nameplate schedule. Includes descriptive data showing typical construction of the types of equipment proposed, including the manufacturer's name, type of molded case circuit breakers or motor circuit protectors, performance capacities and other information pertaining to the equipment. Ensure drawings show the general arrangement and overall dimensions of the motor control centers space requirements, details of any floor supports to be embedded in concrete and provisions for conduits for external cables. Include complete wiring diagrams for each motor control center. Provide wiring diagrams in a form showing physical arrangement of the control center with interconnecting wiring shown by lines or by terminal designations (wireless).

2.1.1 Compliance

Provide equipment conforming to the requirements of [NFPA 70](#) unless more stringent requirements are indicated herein or shown. NEMA rated and UL listed equipment has been specified when available. Equipment to meet NEMA and UL construction and rating requirements as specified. No equivalent will be acceptable. Immediately notify the Contracting Officer of any requirements of the specifications or proposed materials or assemblies that do not comply with UL or NEMA. International Electrotechnical Commission (IEC) rated equipment will not be considered an acceptable alternative to specified NEMA ratings.

2.1.2 Coordination

The general arrangement of the motor control centers is shown on the contract drawings. Any modifications of the equipment arrangement or device requirements as shown on the drawings is subject to the approval of the Contracting Officer. If any conflicts occur necessitating departures from the drawings, submit details of and reasons for departures and approved prior to implementing any change. Completely assemble all equipment at the factory. The motor control centers may be disassembled into sections, if necessary, for convenience of handling, shipping, and installation.

2.1.3 Nameplates

Provide nameplates of laminated sheet plastic in accordance with [ASTM D709](#). Ensure nameplates are melamine plastic [1/8 inch](#) thick, black matte finish with white center core and square corners. Fasten the nameplates to the equipment in proper positions with anodized round-head screws. Accurately align lettering and engrave into the core. Lettering is a minimum [1/2-inch](#) high normal block style. Nameplate designations are in accordance with lists on the drawings, and as a minimum provide for the following equipment:

- a. Motor Control Centers
- b. Individual items of equipment mounted in the Motor Control Centers

Provide equipment of the withdrawal type with nameplates mounted on the removable equipment in locations visible when the equipment is in place.

2.2 FABRICATION

2.2.1 Ratings

Provide equipment with the following ratings:

- a. Voltage rating: 480Y/277 volts AC, 3-wire three-phase.
- b. Continuous current rating of the main bus: 1200 amperes.
- c. Minimum short-circuit current rating: 42,000 rms symmetrical amperes.
- d. UL listed and labeled for its intended use.

2.2.2 Enclosures

Each motor control center consists of the required number of vertical sections of 90 inches nominal height, bolted together, with steel channel sills and suitable for mounting against a wall. Vertical sections are nominally 90 inches high and 21 inches deep with buses, control wiring, control transformers, small power transformers, terminal blocks, line terminals, cable supports, and clamps accessible from the front. Enclosure is NEMA Type 12. Fabricate the motor control centers from smooth select 12 gauge steel sheets shaped and reinforced to form rigid free-standing structures. Ensure metal thickness for enclosures is no less than specified in NEMA ICS 6 without exception. Fabricate and bolt vertical edges of sections exposed to view so that the joints do not pass a 1/16 inch gauge. Equip vertical sections with full length vertical isolating barriers between sections. Make provisions for leveling the assembled motor-control center sections and bolting them together so that they form a contiguous structural enclosure.

Provide removable 7 gauge lifting angles on the top of each section, extending the entire width of the section, capable of supporting the entire weight of the motor control center section without distortion. Provide base channels with holes to facilitate floor mounting and leveling.

2.2.2.1 Arc Resistant Enclosure

Provide arc resistant Type 2 enclosure tested in accordance with IEEE C37.20.7.

2.2.2.2 Unit Compartments

Provide each operating unit with equipment as shown on the drawings, mounted in an individual cell. The unit assembly, except main circuit breakers, panelboards and auxiliary control devices, is drawout type removed from the front, without rear access or disturbing other units in the control center assembly. Ensure all drawout type unit assemblies have a positive guide rail system to ensure alignment of connection to vertical bus. Mechanically interlock units with the door to prevent removal while in the energized position. Provide each removable unit with a provision

for padlocking in a position in which it is disconnected from the vertical bus, although not removed from the stationary structure. Provide all ventilating openings with corrosion-resistant insect-proof screens on the inside. Provide bus closing plugs for all unused openings in vertical bus barriers.

Ensure compartments for future motor-control units are complete with hardware, buses, and hinged doors ready to receive future draw-out units. Compartments for spare motor-control units are complete with buses, hinged doors, and draw-out units but without load terminal connections. Spare spaces are complete with buses and screwed-on front cover plates.

2.2.2.3 Motor Control Center Doors and Covers

Provide each unit compartment, including blank compartments for future use, with either a flange-formed or a rolled-edge door. Mount each door on fully-concealed or continuous full-length piano-type hinges and provide with positive fasteners. Prevent door sag by proper alignment of hinges made of sufficiently strong material. Interlock the door fastenings to prevent opening when the equipment is energized. Ensure the external operating handle clearly indicates whether the equipment is in an "ON", "OFF" or "TRIPPED" position.

2.2.2.4 Horizontal Wireways

Provide a structure with a minimum 9 inches high wireway at the top and a 9 inches minimum wireway at the bottom. Both horizontal wireways to run the length of the structure.

2.2.2.5 Vertical Wireways

Provide vertical wireways in all vertical sections. Connect vertical wireways with horizontal wireways at the top and bottom and be a minimum 4 inches wide. Provide barriers in sections containing both ac and dc circuits. Provide doors on each vertical wireway with the exposed surface of any door not deviating more than 1/16 inch from a true plane. Provide cable tie supports in the vertical wireway to hold cable and wiring in place.

If communication wiring is required, add metal shielding in the vertical wiring trough to provide isolation from power and control wiring within the vertical wiring trough.

2.2.3 Buses

Ensure all buses are copper, and all bolted splices and connections between buses and for extensions or taps for equipment are tin or silver-plated throughout. Copper bars and shapes for bus conductors conform to the applicable requirements of ASTM B187/B187M. Bolt all splices for field assembly with at least two bolts and employ the use of "Belleville" washers in the connection. Base the bus ratings on a 149 degree Fahrenheit maximum temperature rise in accordance with UL 845 requirements. Ensure bus has a short-circuit current rating of not less than 65,000 RMS symmetrical amperes. Support all bus work on wet process porcelain insulators, glass polyester, or suitable molded material.

2.2.3.1 Horizontal Bus

Provide each control center assembly with a three-phase main horizontal

bus, with a continuous current rating not less than 1,200 amperes, located across the top of each vertical section.

2.2.3.2 Vertical Bus

Provide each vertical section with a three-phase vertical bus with a continuous current rating of 1200 amperes connected to the horizontal bus by brazing, welding, or bolting. Where the incoming feeder breakers are located at the bottom of a control center, rate the vertical bus in that section the same as the main horizontal bus. Extend vertical buses from the horizontal bus to the bottom of the lowest available unit mounting space. Isolate the vertical bus from wireways and equipment in compartments.

2.2.3.3 Ground Bus

Provide a copper ground bus full width at the bottom of the motor control center line-up. Provide a full clamp-type solderless copper lug for stranded copper cable at each end of the bus for connection to the grounding system capable of carrying the rated short-circuit current available in the motor-control center.

2.2.4 Painting

Thoroughly clean the interior and exterior steel surfaces of equipment enclosures and then receive a rust-inhibitive phosphatizing or equivalent treatment prior to painting. Ensure exterior surfaces are free from holes, seams, dents, weld marks, loose scale or other imperfections. Interior surfaces receives not less than one coat of corrosion-resisting paint in accordance with the manufacturer's standard practice. Prime exterior surfaces, fill where necessary, and give no less than two coats baked enamel with semigloss finish. Ensure equipment located indoors is ANSI Light Gray. All touch-up work is done with manufacturer's coatings.

2.3 EQUIPMENT

2.3.1 Connections

Ensure bolts, studs, machine screws, nuts, and tapped holes are in accordance with [ASME B1.1](#). Ensure the sizes and threads of all conduit and fittings, tubing and fittings, and connecting equipment are in accordance with [ASME B1.20.1](#). Provide ferrous fasteners with rust-resistant finish, and all bolts and screws equipped with approved locking devices. Manufacturer's standard threads and construction may be used on small items which are integrally replaceable, except threads for external connections to these items meet the above requirements.

2.3.2 Molded Case Circuit Breakers

Ensure molded case circuit breakers conform to the applicable requirements of [UL 489](#). Provide manually-operated circuit breakers of the quick-make, quick-break, common trip type. Furnish automatic-trip breakers unless otherwise specified or indicated on the drawings. Provide the common-trip multipole circuit breakers having a single operating handle and a two-position on/off indication and with provisions for padlocking in the "Off" position. Provide personnel safety line terminal shields for each breaker. Ensure the circuit breakers are products of only one manufacturer, and interchangeable when of the same frame size. Where indicated on the drawings, provide circuit breakers with keyed interlocks

to operate as described on the drawings.

Size breakers as required for the continuous-current rating of the circuit. Provide the breaker class as required. The Government reserves the right to change the indicated trip ratings, within frame limits, of the trip devices at the time the shop drawings are submitted for approval.

Provide sufficient interrupting capacity maximum short-circuit current imposed on the circuit at the breaker terminals as indicated. Provide circuit breaker interrupting capacities with a minimum of 14,000 A and that conform to **NEMA AB 3**. Series rating of circuit breakers is not permitted.

Provide circuit breakers with temperature compensation for operation in an ambient temperature of **104 degrees F**. Provide circuit breakers that have root mean square (rms) symmetrical interrupting ratings sufficient to protect the circuit being supplied.

2.3.2.1 Trip Units

Except as otherwise noted, provide the circuit breakers, of frame sizes and the trip unit ratings as shown on the drawings, with inverse-time thermal-overload protection and instantaneous magnetic short-circuit protection or solid state trip units. Set nonadjustable instantaneous magnetic trip units as required by the associated motor starter.

2.3.2.2 480-Volt AC Circuits

Rate circuit breakers for 480-volt or 277/480-volt ac circuits 600 volts ac, and have an UL listed minimum interrupting capacity of 14,000 symmetrical amperes at 600 volts ac.

2.3.2.3 120/240-Volt AC Circuits

Rate circuit breakers for 120-volt ac circuits not less than 120/240 or 240 volts ac, and have a UL listed minimum interrupting capacity of 10,000 symmetrical amperes.

2.3.3 Wiring

Provide NEMA Class II, Type B. Where Type C wiring is required, locate the master terminal blocks at the bottom of the vertical section. Wire out combination starter units to split type terminal blocks for easy removal of the starter unit without disturbing either factory or field installed wiring. Ensure all control terminal boards are accessible from the front.

All control wire is stranded tinned copper switchboard wire with 600-volt flame-retardant insulation Type SIS meeting **UL 44** or Type MTW meeting **UL 1063**, and passes the VW-1 flame tests included in those standards. Hinge wire has Class K stranding. Current transformer secondary leads cannot be smaller than No. 10 AWG. The minimum size of control wire is No. 16 AWG. Power wiring for 480-volt circuits and below is of the same type as control wiring and the minimum size is No. 12 AWG. Give special attention to wiring and terminal arrangement on the terminal blocks to permit the individual conductors of each external cable to be terminated on adjacent terminal points.

2.3.4 Terminal Blocks

Use molded or fabricated circuit terminal blocks for wiring with barriers, rated not less than 600 volts. Provide terminals with removable binding, fillister or washer head screw type. Ensure terminals are no less than No. 10 in size and having sufficient length and space for connecting at least two indented terminals for 10 AWG conductors to each terminal. The terminal arrangement is subject to the approval of the Contracting Officer. Modular, pull apart, terminal blocks are acceptable provided they are of the channel or rail-mounted type. Submit data showing that the proposed alternate accommodates the specified number of wires, are of adequate current-carrying capacity, and are constructed to assure positive contact between current-carrying parts.

2.3.4.1 Short-Circuiting Type

Provide short-circuiting type terminal blocks for all current transformer secondary leads with provision for shorting together all leads from each current transformer without first opening any circuit.

2.3.4.2 Marking Strips

Provide white or other light-colored plastic marking strips, fastened by screws to each terminal block, for wire designations. Mark the wire numbers with permanent ink. Provide reversible marking strips to permit marking both sides, or furnish two marking strips with each block. Provide marking strips that accommodate the two sets of wire numbers. Assigned a device designation to each device to which a connection is made in accordance with NEMA ICS 1. Mark each device terminal to which a connection is made with a distinct terminal marking corresponding to the wire designation used on the Contractor's schematic and connection diagrams. The wire (terminal point) designations used on the Contractor's wiring diagrams and printed on terminal block marking strips may be according to the Contractor's standard practice; however, provide additional wire and cable designations for identification of remote (external) circuits for the Government's wire designations. Prints of shop drawings submitted for approval will be so marked and returned for addition of the designations to the terminal strips and tracings, along with any rearrangement of points required.

2.4 HIGH RESISTANCE GROUNDING EQUIPMENT

High Resistance Ground (HRG) equipment shall be installed at the main breaker sections for each bus of the motor control center (MCC). The HRG components shall be a regular catalog off-the-shelf units of a manufacturer regularly engaged in the design, manufacture, and testing of neutral grounding systems and shall be designed for use on this type of equipment with no less than five years of successful operation. A device assembled of discrete parts is not acceptable. The HRG shall be fully installed during MCC tests.

2.4.1 Grounding Equipment

- a. As a minimum, each set of grounding equipment shall include a grounding resistor and all associated controls and wiring. All connections and leads shall be insulated for 600 volts ac.
- b. The grounding resistors shall be sized to provide 1 to 5 amperes of ground current in the event a single-line-to-ground fault. The

resistors shall be tapped with taps wired out to a convenient accessible terminal block. Taps shall provide 1-5 amperes of ground current in 1 ampere increments. The resistors shall be rated for continuous duty. The resistors shall be heavy duty industrial stamped steel design. The resistors shall conform to IEEE C57.32 except that they shall be insulated for not less than 600 volts AC and the rated maximum temperature of the resistors shall not exceed 415 degrees C when mounted inside the MCC with natural air cooling. The resistors shall have mounting brackets for mounting in the MCC. All steel support materials shall be corrosion-resistant steel or hot-dipped galvanized.

c. Current transformers shall be window or bushing type rated 600 volts with full wave insulation of 10-kV BIL when installed, 1.33 continuous thermal current rating factor based on 30 deg C and shall conform to the applicable requirements of IEEE C37.20.1 and IEEE C57.13. Polarity shall be plainly marked and the current transformers shall be provided with a suitable means of mounting and for grounding the frame. Current transformer ratio can be as low as 1:1 Each current transformer secondary lead shall be connected to short-circuiting type terminal block with no less than No. 10 AWG and shall be conveniently located to permit short-circuiting the secondary windings without requiring access to the primary bus compartments. The current transformers shall be shorted at the terminals of each of the current transformers for shipping.

d. Each unit shall be enclosed in the 480V MCC, completely wired in the factory, in a location that will not interfere with the installation, operation, repair and maintenance of the MCC. Manufacturer's standard ventilating openings shall be provided as required for proper ventilation. Intake vents shall be filtered, and both intake and exhaust vents shall be provided with corrosion-resistant insect-proof screens on the inside.

e. Provide engraved nameplates for all devices mounted within the assembly corresponding to appropriate designation on manufacturer's drawings.

f. Submit with the MCC drawings: outline drawings, connection and assembly drawings, and schematic diagram of high resistance grounding system. Drawings to include overall dimensions, size and location of cable entrances, details for bolting equipment to the MCC, data for all equipment, nameplate schedule, wiring diagrams. Wiring diagrams shall be the wire-less type and shall be shown from the front as seen by the observer.

2.5 PROTECTIVE RELAY DEVICES

Install microprocessor based protective relays to perform the required functions as specified and required. The relay shall provide overcurrent protection of the main breakers as shown on the drawings The relay shall also provide ground detection alarm and tripping in conjunction with three 3-phase voltage transformers connected to each bus section. The protective relay shall have arc-flash light sensing with high speed detection and shall be used in conjunction of the fiber optic sensors. The relay shall be provided with adequate fiber sensor inputs to implement the required number of protective zones. The relay shall have a minimum 10 year warranty. Protective relays shall have programmable button on the

front of the relay labeled to "MAINT" for an Arc Flash maintenance mode. Additionally, a front indicating LED shall be labeled "ENABLED" to indicate when maintenance mode is active. The relay shall be used to perform the automatic bus transfer function and shall be compatible with SEL networking equipment. The relay shall be wired to the transformer temperature relay alarm and trip contacts to provide protection of the transformer and provide alarm on overtemperature. The alarm functions shall be connected into the existing annunciation system. Power to operate the protection relays shall be from 120 VAC from the Preferred AC system. Power consumption shall be not more than 25 Watts. The Protective Relays shall be Schweitzer Engineering Laboratories SEL-751 model.

2.6 COMPONENTS

Design motor control center for operation on 480-volts ac, 3-phase, 60-Hz system, and ensure that equipment conforms to all the applicable requirements of NEMA ICS 1, NEMA ICS 2, NEMA ICS 4, NEMA ICS 6, UL 845 and NFPA 70. List and label vertical sections and individual units under UL 845 where ever possible. In lieu of the UL listing, certification from any nationally recognized, adequately equipped, testing agency that the individual units and vertical sections have been tested and conform to the UL requirements of that agency will be acceptable when approved by the Contracting Officer. Provide NEMA Class II, Type B, motor control centers in accordance with NEMA ICS 2.

2.6.1 Motor Starters

Provide full-voltage, non-reversing combination motor controller units containing molded-case circuit breakers, auxiliary and pilot devices and a reduced voltage starter where indicated on the drawings. Show the ratings of circuit breakers, contactors, motor controllers and other devices on the drawings. Ensure all combination motor controller units have short circuit ratings equal to 14,000 amperes or greater. Where control push-buttons, indicating lamps, "Hand-Off-Automatic" switches, and similar control devices are associated with a unit, mount them on the unit compartment door. Door-mounted components cannot interfere with access within the compartments. Molded case circuit breakers for use in combination starters meet the requirements of paragraph MOLDED CASE CIRCUIT BREAKERS.

2.6.1.1 Reduced Voltage Starters

Provide an integrated unit with microprocessor logic board and digital display and keypad. Comply with UL 508.

Solid State soft-start starters are three phase SCR controlled for stepless reduced voltage starting of induction motors. Soft-start starters to be of "Heavy-Duty" rating type. Ensure controllers are equipped with a minimum of two SCRs per phase or use MOSFET or IGBT devices. Current transformers provide feedback signal to regulate torque during start up and to prevent overload conditions while motor is running. Provide the starter with a starting current of 300 percent of full load amps for thirty seconds, bypass/isolation contactor, and three phase thermal overload relay.

Provide manufacturer's standard front accessible keypad and digital display for programming the controller parameters, functions, and features. Include the following functions:

- a. Adjusting motor full-load amperes, as a percentage of the controller's rating.
- b. Adjusting current limitation on starting, as a percentage of the motor full-load current rating.
- c. Adjusting linear acceleration and deceleration ramps, in seconds.
- d. Setting initial torque, as a percentage of the nominal motor torque.
- e. Adjusting torque limit, as a percentage of the nominal motor torque.
- f. Adjusting maximum start time, in seconds.
- g. Adjusting stop time, in seconds.
- h. Adjusting voltage boost, as a percentage of the nominal supply voltage.
- i. Selecting stopping mode and adjusting parameters.
- j. Selecting motor thermal-overload protection class between 5 and 30.
- k. Activating and deactivating protection modes.
- l. Selecting or activating communications modes.

Provide manufacturer's standard front accessible digital display for showing motor, controller, and fault status. Include the following displays at a minimum:

- a. Controller Condition: Ready, starting, running, stopping.
- b. Motor Condition: Amperes, voltage, power factor, power, and thermal state.
- c. Fault Conditions: Controller thermal fault, motor overload alarm and trip, motor underload, overcurrent, shorted SCRs, line or phase loss, phase reversal, and line frequency over or under normal.

Provide integral controller diagnostics and protection to include:

- a. Microprocessor-based thermal protection system for monitoring SCR and motor thermal characteristics, and providing controller overtemperature and motor overload alarm and trip; settings selectable via the keypad.
- b. Protection from line-side reverse phasing; line-side and motor-side phase loss; motor jam, stall, and underload conditions; and line frequency excursions to over- or under-normal.

Provide the additional optional features:

- a. Start and stop push-buttons as well as running and stopped lights on the outside of the motor starter door panel.
- b. At least two additional field-assignable Form C contacts for alarm outputs.
- c. Full-voltage/BYPASS selector switch. Ensure power contacts are

totally enclosed, double break, made of silver-cadmium oxide, and assembled to allow inspection and replacement without disturbing line or load wiring.

2.6.1.2 Auxiliary Contacts

Provide each controller with a minimum of three auxiliary contacts which can be easily changed from normally open to normally closed. Where indicated on the drawings, provide a fourth auxiliary contact and red and green indicating lights.

2.6.1.3 Individual Control Power Supplies

Where 24 volt dc control of contactors is indicated or required, provide an individual control transformer and power supply on the load side of the unit disconnect. Rate the control transformers 480-115 volts and conform to the requirements for control transformers in [UL 506](#). Rate power supplies at 120 volts AC with 24 volts DC output and adequate power as required by associated controls. Verify control transformers have adequate volt-ampere capacity for the control functions indicated.

2.6.1.4 Control Circuit Disconnects

Arrange motor control circuits to ensure that all sources of supply power are disconnected when the disconnecting means is in the open position in accordance with [NFPA 70](#). Where separate disconnecting means are provided, locate disconnects immediately adjacent to each other.

2.6.2 Wiring for Motor Control Centers

Provide wiring meeting the requirements of paragraph WIRING. Provide heavy-duty type terminals for terminating all power cables entering the control centers.

2.6.2.1 Contractor's Wiring

Form wiring into groups, suitably bound together, properly supported and run straight horizontally or vertically with no splices in the wiring. The manufacturer's standard pressure-type wire terminations for connections to internal devices is acceptable. Add terminal blocks for wiring to devices having leads instead of terminals. Use ring tongue indented terminals on all wires terminated on control terminal blocks for external or interpanel connections and at shipping splits. Provide stud terminals with contact nuts and either locking nuts or lockwashers.

2.6.2.2 External Connections

Power and control cables enter the control centers at the where shown on the drawings.

2.6.2.3 Terminal Blocks

In no case, the terminals provided for circuit breakers or contactors accommodate less than the number or size of conductors shown on the drawings. Give special attention to wiring and terminal arrangement on the terminal blocks to permit the individual conductors of each external cable to be terminated on adjacent terminal points.

2.6.3 Control Power

Provide control power for motor control centers using an integrated control power transformer. Mount control power transformers for several starter units in a separate compartment and connect its primary windings to the main bus through a molded case circuit breaker of suitable rating. Rate the control power transformers 480-115 volts and conform to the requirements for control power transformers in [UL 506](#). Provide control power transformers with adequate volt-ampere capacity for the control functions indicated and an additional 10 percent capacity. Install control power transformers without primary fuses. Except as otherwise indicated, provide each unit compartment a fuse for control power in one secondary lead and have the other secondary lead grounded.

2.6.4 Accessories and Control Devices

Provide control accessories, and are suitable for mounting on the front of, or inside, the control centers as indicated on the drawings. Control accessories to meet the applicable requirements of [NEMA ICS 2](#). Mount relays and other equipment so that mechanical vibration does not cause false operation.

2.6.4.1 Control Stations

Ensure push-button stations and selector switches conform to [NEMA ICS 2](#), are of the heavy-duty, oil-tight type, rated 600 volts ac, and have a contact rating designation of A600. Provide switches with escutcheon plates clearly marked to show operating positions. Provide sufficient contact blocks to make up the electrically separate contacts required for lead-lag selector switches.

2.6.4.2 LED Indicating Lights

Furnish red and green LED's where shown on the drawings, indicating contact "open" and "closed" position. The LED's are accessible and replaceable from the front of the control center through a finished opening in the compartment door. The LED assemblies are the heavy duty oiltight, watertight, and dusttight type.

2.6.4.3 Control Relays

Control relays are the electrically operated, magnetically held, self-reset, open type, suitable for mounting inside the starter compartments, 24-volt dc. Contacts are as indicated on the drawings and have a contact rating designation of A600 or N600, as required, in accordance with [NEMA ICS 2](#).

2.6.4.4 Elapsed-Time Meters

Provide nonreset type hour-indicating time meters with 6- digit registers with counter numbers at least [1/4-inch](#) high. White numbers on black backgrounds provide hour indication with the last digit in contrasting colors to indicate tenths of an hour. Operating voltage is 24 volts dc.

2.6.5 Feeder Tap Units

Provide feeder tap units as indicated on the drawings. Feeder tap units include externally operable molded-case circuit breakers in combination motor-control unit enclosures for the protection of non-motor loads or

remotely located magnetic motor-controllers. Contain not more than two molded-case circuit breakers in feeder tap units.

2.6.6 Metering Section

Provide metering section with instruments as indicated on the drawings.

2.6.6.1 Instrument Transformers

Comply with the interference requirements listed below, measured in accordance with [IEEE C63.2](#) and [IEEE C63.4](#) for instrument transformers.

2.6.6.1.1 Current Transformers (CT)

Provide current transformers conforming to [IEEE C57.13](#) for installation in metal-clad switchgear. Use standard multi-ratio 5A secondary transformers. Ensure CTs are coordinated to the rating of the associated switchgear, relays, and instruments and CTs for relaying have a thermal rating factor of 2.0.

Provide bushing type transformers.

Provide transformers that are complete with secondary short-circuiting device.

Provide indoor dry type construction for window type transformers with secondary current ratings as indicated with specified burden, frequency, and accuracy.

2.6.6.1.2 Potential Transformers

Provide potential transformers conforming to [IEEE C57.13](#) for installation in metal-clad switchgear. Use standard 120-volt secondary, drawout type, 60 Hz transformers with voltage ratings and ratios coordinated to the ratings of the associated switchgear, relays, and instruments. Ensure potential transformers are equipped with two current limiting fuses in the primary sized as recommended by the potential transformer manufacturer.

Provide burden, frequency, and accuracy as required.

Provide indoor dry type two-winding construction for disconnecting potential transformers with integral fuse mountings and current-limiting fuses with primary and secondary voltage ratings as required.

2.7 TESTS, INSPECTIONS, AND VERIFICATIONS

Submit, within a minimum of 14 days prior to the proposed date of tests, a copy of manufacturer's routine [factory test procedures](#) and production line tests for all motor control centers.

Each item of equipment supplied under this contract is given the manufacturer's routine factory tests and tests as specified below, to insure successful operation of all parts of the assemblies. All tests required herein is witnessed by the Contracting Officer unless waived in writing, and no equipment shipped until it has been approved for shipment by the Contracting Officer. Notify the Contracting Officer a minimum of 14 days prior to the proposed date of the tests so that arrangements can be made for the Contracting Officer to be present at the tests. The factory test equipment and the test methods used conforms to the

applicable NEMA Standards, and is subject to the approval of the Contracting Officer. Reports of all witnessed tests are signed by witnessing representatives of the Contractor and Contracting Officer. Bear the cost of performing all tests and include in the prices bid in the schedule for equipment.

2.7.1 Motor Control Centers Tests

2.7.1.1 Dielectric Tests

Completely assemble the motor control center and perform dielectric tests in accordance with [NEMA ICS 1](#).

2.7.1.2 Operational Tests

Check the correctness of operation of each air circuit breaker or motor circuit protector and magnetic contactor and of all control devices, accessories and indicating lamps. These checks are made at rated voltage with power supplies to the main buses. Check all magnetic contactors for proper operation with power at 90 percent of rated voltage.

2.7.1.3 Short Circuit Tests

If the unit is not UL labeled for the specified short circuit, design tests may be submitted demonstrating that satisfactory short-circuit tests, as specified in [NEMA ICS 2](#), have been made on a motor control center of similar type of construction and having the same available short circuit current at the motor terminals, including any motor contributions, as the motor control centers specified to be furnished under these specifications.

2.7.1.4 Test Results

Submit two complete reproducible copies of the factory inspection results and two complete reproducible copies of the [factory test results](#) in booklet form, including all plotted data curves, all test conditions, a listing of test equipment complete with calibration certifications, and all measurements taken. Contractor's and Contracting Officer's Representatives to sign and date report.

Provide [Motor Control Center Certification](#) signed by official authorized to certify on behalf of the manufacturer, attesting that the motor control center meets the specified requirements. Ensure the statement is dated after the award of this contract, stating the Contractors name and address, name of the project and location, and list the specific requirements which are being certified.

PART 3 EXECUTION

3.1 INSTALLATION

Complete assembly is electrically and mechanically connected and assembled from coordinated subassemblies shipped in complete sections from the manufacturer. Align, level and secure the installation to the supporting construction in accordance with the manufacturer's recommendations.

3.2 FIELD TESTING

3.2.1 Acceptance Tests

Perform all applicable inspections and electrical tests, including optional tests, in accordance with [NETA ATS](#).

Engage a factory-authorized service representative to perform startup services. Verify complete system operation including all hardware, software and communication devices. Start units to confirm proper motor rotation and unit operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Perform final equipment adjustments:

- a. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload relay pickup and trip ranges.
- b. Adjust overload relay settings.
- c. Adjust the trip settings of motor circuit protectors and thermal-magnetic circuit breakers with adjustable.
- d. Set field-adjustable switches and program microprocessors for required start and stop sequences in reduced-voltage, solid state controllers.
- e. Verify functions of protective relays by injecting current and voltage.

Final acceptance depends upon the satisfactory performance of the motor-control centers under test. Do not energize the motor-control center until recorded test data have been approved by the Contracting Officer. Provide [final test reports](#).

3.3 CLOSEOUT ACTIVITIES

Submit [manufacturer's instructions](#) for the motor control units and protective devices including special provisions required to install equipment components and system packages. Detail within special notices hazards and safety precautions.

Provide the [warranty](#) to the Contracting Officer.

-- End of Section --

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ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 11 (2014) Load Ratings and Fatigue Life for Roller Bearings

ABMA 9 (2015) Load Ratings and Fatigue Life for Ball Bearings

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 43 (2013) Recommended Practice for Testing Insulation Resistance of Rotating Machinery

IEEE 85 (1973; R 1986) Test Procedure for Airborne Sound Measurements on Rotating Electric Machinery

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS (2021) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1 (2018) Motors and Generators

NEMA MG 3 (1974; Revised 2014) Sound Level Prediction for Installed Rotating Electrical Machines

1.2 SUMMARY

The work under this section includes providing all labor, equipment, and material and performing all operations required to design, manufacture, assemble, test, and package and deliver the vertical induction motors for driving pumps specified under Section 43 21 39.01 28 PUMPS: WATER, VERTICAL TURBINE.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Motors; G, EL

SD-03 Product Data

Motor Curves; G, EL
Duty Cycle; G, EL
Motors; G, EL
Antireverse Device; I, EL
Resistance Temperature Devices; G, EL
Vibration Sensors; G, EL
Hour meter; G, EL

SD-06 Test Reports

Factory Tests; G, EL
Field Tests; G, EL
Acceptance Checks And Tests; G, EL

SD-10 Operation and Maintenance Data

Instructions; G, EL

1.4 QUALITY ASSURANCE

1.4.1 Corrosion Prevention and Finish Painting

The equipment provided under these specifications shall be designed to render it resistant to corrosion. The general requirements to be followed to mitigate corrosion are specified below. Any additional special treatment or requirement considered necessary for any individual items is specified under the respective item. However, other corrosion-resisting treatments that are the equivalent of those specified herein may, with the approval of the Contracting Officer, be used.

1.4.1.1 Fastenings and Fittings

Where practicable, all screws, bolts, nuts, pins, studs, springs, washers, and other similar fittings shall be of corrosion-resisting material or shall be treated in an approved manner to render them resistant to corrosion.

1.4.1.2 Corrosion-Resisting Materials

Stainless steel, copper, brass, bronze, copper-nickel, and nickel-copper alloys are acceptable corrosion-resisting materials.

1.4.1.3 Corrosion-Resisting Treatments

Hot-dip galvanizing shall be in accordance with ASTM A123/A123M or ASTM A153/A153M as applicable. Other corrosion-resisting treatments may be used if approved by the Contracting Officer.

1.4.1.4 Frames

Motor frames, end bells, covers, conduit boxes, and any other parts, if of steel, and if they will be coated during the process of insulating the windings, shall be cleaned of rust, grease, millscale, and dirt, and then treated and rinsed in accordance with manufacturer's standard process. If any of the above-listed parts are not coated during the process of insulating the windings then, in addition to the above, they shall be given one coat of primer and then two coats of manufacturer's standard moisture-resistant coating, processed as required.

1.4.1.5 Cores

The assembled motor core shall be thoroughly cleaned and then immediately primed by applying a minimum of two coats of a moisture-resisting and oil-resisting insulating compound. Air gap surfaces shall be given a minimum of one coat.

1.4.1.6 Shafts

Exposed surfaces of motor shafts shall be cleaned of rust, grease, and dirt and, except for bearing surfaces, given one coat of a zinc molybdate or equivalent primer and two coats of a moisture-proof coating, each cured as required. Shafts of a corrosion-resisting steel may be used in lieu of the above treatment.

1.4.1.7 Finish Painting

Finish painting of all equipment shall be in accordance with the standard practice or recommendation of the manufacturer, as approved by the Contracting Officer.

PART 2 PRODUCTS

2.1 NAMEPLATES

Nameplate data shall include rated voltage, rated full-load amperes, rated horsepower, service factor, number of phases, RPM at rated load, frequency, code letter, locked-rotor amperes, duty rating, insulation system designation, and maximum ambient design temperature.

2.2 MOTORS

The motors to be supplied under these specifications shall be of the vertical shaft type as required by the pump manufacturer, normal or low starting torque, low starting current, squirrel-cage induction type, designed for the indicated conditions, of drip-proof construction, and shall conform to the applicable requirements of NEMA MG 1, except as

hereinafter specified.

- a. Submit equipment foundation dimensions; outline drawings with weights, nameplate data, and details showing method of mounting and anchoring the motor. Contracting Officer's approval shall be obtained in writing prior to the commencement of manufacture of motors.
- b. Submit complete descriptive specification of each type, size, and voltage of motor provided. Include necessary cuts, photographs, and drawings to clearly indicate satisfaction of the requirements listed below. It is not necessary to resubmit data covered by other submittals listed below.
- c. Submittal shall include all information required for selection of protective and control equipment and for operational setting, such as, but not limited to, normal and maximum operation temperature for windings and bearings, overload trip setting for motor at pump maximum head condition and starting times for starting at rated and 90 percent starter voltage.

Supply three unwatering and one drainage motor as shown in the plans. Motors to be provided complete with all accessories, spare parts, tools, and manufacturer's data and [instructions](#) as specified herein. Submit complete instructions for the proper installation, inspection, and maintenance of the machines provided for this particular service. Instruction manuals shall be submitted to the Contracting Officer not later than the date the equipment is shipped from the manufacturer's plant. The instructions shall include a cross-sectional drawing indicating the major component parts of the motor and the procedure for disassembly.

2.2.1 Rating

Each motor shall be wound for 3-phase, 60-Hz, alternating current, and for the indicated operating voltage. Motors shall be TEFC and suitable for an indoor environment.

The motor shall be designed for operation in a [105 degrees F](#) ambient temperature, and all temperature rises shall be above this ambient temperature. Motors shall have a service factor of 1.0 or shall be applied using a service factor of 1.0 if standard service factor is greater than 1.0. The temperature rise above the ambient temperature for continuous rated full-load conditions and for the class of insulation used shall not exceed the values given in [NEMA MG 1](#), paragraph 12.42 or paragraph 20.8.

System	Voltage	Horsepower	Speed	Sensors	Other
MNA - Drainage	480	100	1800	Winding RTDs; bearing RTD; vibration	Inverter rated
MNA - Unwatering	480	250	1200	Winding RTDs; bearing RTD; vibration	Inverter rated

2.2.2 Operating Characteristics

2.2.2.1 Torques

Starting torque shall be sufficient to start the pump to which the motor will be connected under the maximum conditions specified, but in no case shall the starting torque be less than 60 percent of full-load torque. Breakdown torque shall be not less than 150 percent of full-load torque.

2.2.2.2 Locked-Rotor Current

The locked-rotor current shall not exceed 700 percent of normal full-load running current.

2.2.2.3 Duty Cycle

Submit an analysis to verify that the motor, when operated in accordance with the duty cycle specified, will not undergo injurious temperature rise. If the duty cycle cannot be met with a standard NEMA design motor, the motor manufacturer shall provide a description of proposed modifications to provide such compliance. Each motor, when operating at rated voltage and frequency and on the basis of the connected pump load inertia Wk² and the speed-torque characteristics of the load during starting conditions as furnished by the pump manufacturer, shall be capable of performing on a continuous basis the indicated motor duty cycle without injurious temperature rise. Unless otherwise indicated, assume a running period at rated load of not less than 5 minutes and a standstill period of not less than 4 hours for drainage pumps. Unless otherwise indicated, assume a running period at rated load of not less than 10 minutes and a standstill period of not less than 20 minutes for drainage pumps. A starting information nameplate setting forth the starting capabilities shall be provided on each motor. This nameplate shall also include the minimum time at stand still and the minimum running time prior to an additional start.

2.2.2.4 Balance

The balance for each motor when measured in accordance with NEMA MG 1, paragraph 12.06 or paragraph 20.53, shall not exceed the values specified. Each motor's characteristics shall be such that the provisions of Section 43 21 39.01 28 PUMPS: WATER, VERTICAL TURBINE are met.

2.2.2.5 Noise

All motors shall operate at a noise level at most 80 decibels A-weighted mean sound pressure level (dBA). The specified noise limit applies for a reference distance of one meter for free-field conditions.

2.2.3 Frames and Brackets

Frames and end brackets shall be of cast iron, cast steel, or welded steel. The mounting ring, unless otherwise approved, shall be built integral with the frame or lower end bracket and arranged for direct mounting as required by the installation conditions. Treatment against corrosion shall be as specified in paragraph CORROSION PREVENTION AND FINISH PAINTING.

2.2.3.1 Stator Frame

The stator frame shall be rigid and sufficiently strong to support the weight of the upper bearing bracket load, the weight of the stator core and windings, and to sustain the operating torques without perceptible distortion. The stator frame shall be supported on a motor base or drive pedestal which in turn will be supported on sole plates or other suitable structure installed in the concrete foundation. The motor base or drive pedestal shall be provided with bolts and dowels for fastening to the sole plates or supporting structure for preserving the alignment.

2.2.3.2 Supporting Bracket

The upper bracket supporting the thrust bearing and upper guide bearings shall have sufficient strength and rigidity to support the weight of the entire rotating element of the motor, together with the pump impeller and shaft, and the hydraulic thrust of the pump impeller.

2.2.3.3 Antireverse Device

A self-actuated backstop device or antireversing ratchet, to prevent reverse rotation of the pump, shall be installed as an integral part of the motor. It shall have sufficient capacity to prevent reverse rotation with a back-flow through the pump due to the differential head of the sump. If the device requires a lubrication system, an oil reservoir independent of the one used for the thrust bearing and complete with visible oil level gauge and 120-volt a.c. rated high and low level contacts shall be provided. All electrical leads shall be terminated in the accessory terminal box specified in paragraph MOTOR TERMINALS AND BOXES. The lubricant for the antireverse device shall contain a corrosion inhibitor whose type and grade shall be shown on a special nameplate attached to the frame adjacent to the lubricating filling device.

2.2.3.4 Eyebolts

Eyebolts, lugs, or other approved means shall be provided for assembling, dismantling, and removing the motor from above using an overhead crane. All lifting devices required for use in conjunction with the crane shall be provided with the motor.

2.2.4 Cores

The cores for the stators and rotors shall be built up of separately punched thin laminations of low-hysteresis loss, nonaging, annealed, electrical silicon steel, assembled under heavy pressure, and clamped in such a manner as to insure that the assembled core is tight at the top of the finger plate of the laminated core. Laminations shall be properly insulated from each other. Only laminations free from burrs shall be used, and care shall be taken to remove all burrs or projecting laminations from the slots of the assembled cores. Cores shall be keyed, dovetailed, or otherwise secured to the shaft or frame. Treatment against corrosion shall be as specified in paragraph CORROSION PREVENTION AND FINISH PAINTING.

2.2.5 Insulated Windings

All motors shall have a nonhygroscopic, sealed, fungus-resisting insulation of a type designed and constructed to withstand severe moisture conditions, and insofar as practicable, to operate after long periods of

idleness without previous drying out. All windings and connections shall be of the sealed type as defined in [NEMA MG 1](#) paragraph 1.27.2. Submit motor design curves and motor speed-torque curves.

- a. The completed stator shall be of a type that is capable of passing the submerged or sprayed water test, as applicable, required by [NEMA MG 1](#) paragraph 20.18.
- b. Random wound coils may be used on motors supplied in NEMA frame size 445 TP and smaller. The components of the insulation system and the conductor insulation of the coils shall be Class F insulation with a 110 percent continuous overload factor as defined in [NEMA MG 1](#) paragraph 1.66. After winding, the completely wound stator shall be encapsulated with an insulating resin as defined in [NEMA MG 1](#) paragraph 1.27.1.
- c. Form wound coils shall be used on motors supplied in NEMA frames larger than 445 TP. The components of the insulation system and the coil insulation of the rectangular conductors shall conform to Class F insulation with a 110 percent continuous overload factor as defined in [NEMA MG 1](#), paragraph 1.66. The completed stator windings and connections shall be of the sealed type as defined in [NEMA MG 1](#) paragraph 1.27.2.
- d. Insulation to ground shall be processed on the coil. Slot tubes or cells are not acceptable. The insulation shall be of adequate thickness and breakdown strength throughout the length of the coil. Form wound coils shall be of such uniformity that the stator windings on motors of equal ratings shall be alike, in shape and size, and be interchangeable.
- e. Submit motor design (characteristic) curves or tabulated data (test or calculated), indicating the speed, power factor, efficiency, current, and kilowatt input, all plotted or tabulated against torque or percent load as abscissa. The base value shall be given whether ANSI or IEEE standard system is used. The maximum allowable reverse rotation speed for the motor shall also be provided.
- f. Submit motor speed-torque curves for the pump starting operation. The motor speed-torque curves shall be plotted for the rated and 90 percent of rated motor voltage at the motor terminals. The pump torque curve shall be plotted for starting and accelerating against maximum head. Computations shall be furnished to demonstrate that the motor furnished will carry the pump load under all the foregoing conditions.
- g. Coils of all windings shall be fully braced so that vibration is virtually eliminated during repeated starts as required by the duty cycle specified as well as during normal operation.

Submit [Motor Curves](#).

2.2.6 Shafts

Shafts shall be made of high grade steel, finished all over, and of ample size to drive the pumps under maximum load conditions. Shafts shall be of types required by the pump manufacturer. See paragraph CORROSION PREVENTION AND FINISH PAINTING for treatment against corrosion.

2.2.7 Bearings

2.2.7.1 Loading

Bearings shall be capable of withstanding all stresses incidental to the normal operation of the unit.

2.2.7.2 Thrust Bearings

Thrust bearings shall be of the antifriction type of either the ball or roller type. Tandem or series bearing assemblies shall not be used. Antifriction bearings shall conform to the requirements of [ABMA 9](#) and [ABMA 11](#).

2.2.7.3 Guide Bearings

Guide bearings shall be of the sleeve or antifriction type of either the ball or roller type or a combination of sleeve and antifriction bearings.

2.2.7.4 Lubrication

Bearings shall be either oil or grease lubricated and the lubricant used shall contain a corrosion inhibitor. Type and grade of lubricant used shall be shown on a special nameplate which shall be attached to the frame of the motor adjacent to the bearing lubricant filling device. In addition to the quantity of lubricant required to fill the system initially, spare lubricant shall be provided in sufficient quantity to purge and refill the system.

2.2.7.5 Housings

Bearing housings shall be of a design and method of assembly that will permit ready removal of the bearings, prevent escape of lubricant and entrance of foreign matter, and protected by the lubricant when the motor is idle. Except for prelubricated antifriction bearings of an approved type, suitable means shall be provided to apply and drain the lubricant. Oil-lubricated bearing housings shall be provided with oil-level indicator gauges that will be readily visible.

2.2.7.6 Cooling

All bearings shall be self-cooling.

2.2.7.7 Rating

Antifriction bearings shall be rated on the basis of a minimum life factor of 8,800 hours, based on the life expectancy of 90 percent of the group.

2.2.7.7.1 [Hour Meter](#) for Bearings

Provide a non-resettable electro-mechanical hour meter with at least 6 digits. Meter shall display tenths of an hour.

2.2.7.8 Shaft Currents

Bearings shall be insulated or otherwise protected against the damaging effects of shaft currents.

2.3 RESISTANCE TEMPERATURE DEVICES

Resistance temperature detectors (one per phase) shall be provided in accordance with **NEMA MG 1**, paragraph 33.3.2.2. Leads shall be terminated on the terminal blocks specified in paragraph MOTOR TERMINALS AND BOXES.

RTDs shall be suitable for the temperature ranges and mounting configurations of their respective motors. Continuously monitor temperature and provide 4-20 mA signals of temperature values. Submit product data and diagrams of proposed mounting location for each type of motor.

2.4 VIBRATION SENSORS

Vibration sensors and their mounting arrangement shall be suitable for detecting misalignment of the motor and pump shaft. Continuously monitor vibration provide 4-20 mA signal of vibration value. At a minimum, the sensor shall detect vibration frequencies between the minimum motor operating speed and three times the maximum motor operating speed. At a minimum, the sensor shall detect vibration amplitudes up to 1 in/sec RMS. Submit product data and diagrams of proposed mounting location for each type of motor.

2.5 MOTOR TERMINALS AND BOXES

2.5.1 Stator Terminal Box

Drip-proof cast iron or steel conduit terminal boxes, treated as specified for frames, shall be supplied for housing the stator lead connections and shall have adequate space to facilitate the installation and maintenance of cables and equipment. Boxes shall have a cover providing unrestricted access, be mounted on the motor frame, and shall have an auxiliary floor supporting structure, when required, supplied by the motor manufacturer. Conduit entrance shall be from the bottom. The boxes shall be designed to permit removal of motor supply leads when the motor is removed. A "HIGH VOLTAGE - 4160 VOLTS" or "HIGH VOLTAGE - 480 VOLTS" warning sign shall be provided on the cover of the box.

2.5.2 Stator Terminals

Insulated terminal leads shall receive a treatment equal to that of the motor winding. Leads shall be brought out of the stator frame and shall be provided with terminal lugs for connection to the motor supply wiring.

2.5.3 Accessory Leads and Boxes

Terminal leads for resistance temperature detectors and any other auxiliary equipment shall be brought into conveniently located terminal boxes provided with terminal blocks for extension by others. The terminal boxes shall be drip-proof and treated as specified for frames. All auxiliary wiring shall be stranded copper conductors with 600-volt flame-retardant insulation, except temperature detector leads may be in accordance with the manufacturer's standard practice. All wiring and terminals shall be properly identified.

2.6 WRENCHES, TOOLS, AND SPECIAL EQUIPMENT

Provide all nonstandard and special equipment required for dismantling, reassembly, and general maintenance of the motor units. Provide one

complete set of lifting attachments such as detachable eyebolts or special slings for handling various parts with a hoist.

2.7 FACTORY TESTS

One motor of each rating type shall be given a complete test. The remainder of the motors shall be given a check test.

- a. Submit test reports recording all data obtained during the tests specified for each motor used. Test reports shall include performance curves indicating the results of subparagraph COMPLETE TEST below.
- b. Submit results of a "Complete Test" for duplicate equipment. It will be accepted in lieu of the "Complete Test" as specified in subparagraph COMPLETE TEST below for equipment of the respective rating and type.
- c. No substitute will be accepted for the "Check Test." The base value shall be given whether ANSI or IEEE standard system is used. All complete tests shall be witnessed by the Contracting Officer unless waived in writing.

2.7.1 Complete Test

A complete test of a motor shall include the following:

2.7.1.1 Excitation Test

Including a plot of volts as abscissa versus amperes and watts as ordinates. Perform alternating current and direct current pole drop test, ductor test at the operating full-load current, and surge comparison/baker advance winding analyzer test.

2.7.1.2 Impedance Test

Including a plot of volts as abscissa versus amperes and watts as ordinates.

2.7.1.3 Performance Test

Including a plot of torque or percent load as abscissa versus efficiency, power factor, amperes, watts, and RPM or percent slip as ordinates.

2.7.1.4 Speed-Torque Test

Prony brake or other equivalent method. Including a plot of torque in foot-pounds as abscissa versus speed in RPM as ordinate.

2.7.1.5 Temperature Test

Made on completion of paragraph c above. (If screens are provided over openings, test will be made with screens removed and by thermometer).

2.7.1.6 Insulation Resistance-Temperature Test

Shall be taken following heat run, readings being taken at approximately 10 degrees C intervals. Temperature shall be determined by the resistance method. Test result values shall be plotted on semilogarithmic graphs, the insulation resistance values as logarithmic ordinates and the

temperature values as uniform abscissas. For comparison purposes, a curve indicating the safe operating value of insulation resistance shall be plotted on the same sheet with the insulation resistance-temperature test curve.

2.7.1.7 Cold and Hot Resistance Measurement

In accordance with IEEE 43.

2.7.1.8 High Potential Test

In accordance with NEMA MG 1 paragraph Section 1, Part 3.

2.7.1.9 Sound Level Test

In accordance with NEMA MG 3 and IEEE 85.

2.7.1.10 Vibration Measurement

In accordance with NEMA MG 1 paragraph Section 1, Part 7.

2.7.1.11 Conformance Tests

In accordance with NEMA MG 1 paragraph 12.62 and 12.63.

2.7.2 Check Test

A check test of a motor shall include the following:

2.7.2.1 Routine Test and Service Factor

Test in accordance with NEMA MG 1 paragraph 12.51 or NEMA MG 1 paragraph 18.226.

2.7.2.2 Cold Resistance Measurement

In accordance with IEEE 43.

2.7.2.3 Insulation Resistance and Winding Temperature

Insulation resistance and winding temperature at time the insulation resistance was measured.

2.7.2.4 Conformance Test

In accordance with NEMA MG 1 paragraph 12.62 and 12.63.

2.7.2.5 Vibration

Vibration measurement in accordance with NEMA MG 1 Section 1, Part 7.

2.7.3 Form Wound Coil Test

All form wound coils, either before or after they are placed in the slots, shall be tested for short circuits between turns of the individual coils by applying a high frequency voltage of not less than 75 percent of the voltage for which the machine is insulated, or by applying a surge test voltage of equivalent value to the terminals of each coil. Equivalent surge voltage shall be a wave whose peak value is equal to 1.06 times the

voltage for which the motor is insulated.

PART 3 EXECUTION

3.1 INSTALLATION

Install, align, balance, and connect motors in accordance with the equipment manufacturer's instructions. At a minimum, recheck alignment after at least 24 hours of operation.

Mount motor with bolts. Ensure base mounting points are accessible and adjustable to enable alignment. Provide alignment jack bolts. Correct limited movement of motor to ensure alignment capability without a bolt-bound condition. Do not undercut bolts.

Provide commercially die-cut shims, without seams or folds, made of corrosion resistant steel. Use no more than four shims at any single point.

3.2 FIELD QUALITY CONTROL

For each motor, perform field tests per [NETA ATS](#) and [SECTION 26 08 00.00 28 APPARATUS INSPECTION AND TESTING](#) to verify proper operation. Provide test equipment, labor, and personnel to perform the tests required. Submit reports of [acceptance checks and tests](#).

During the pump set test and operational test, the each pump must operate within acceptable current, speed, temperature, alignment, and vibration thresholds. If the motor has a VFD and bypass circuit, ensure the motor starts at least once with each method. Submit peak starting amps for each starting method; full-load amps; full-load power factor; observed duty cycle; and a summary of current, speed, temperature, alignment, and vibration observations.

Vibration observations shall include data in the axial, vertical, and horizontal direction for each motor bearing. Obtain two narrowband spectra for each data collection point with a minimum 400 lines of resolution. Spectra shall be 5 to 500 Hz and 5 to 2500 Hz.

Vibration analyzer shall use the Fast Fourier Transform (FFT) and have a minimum amplitude accuracy over the selected frequency range of +/- 20% or 1.5 dB.

Submit reports of [Field tests](#).

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FIBER OPTIC DATA TRANSMISSION SYSTEM

PART 1 GENERAL

This section applies to the fiber optic communication systems associated with industrial control systems.

This section provides requirements and details for the installation and testing of fiber optic (FO) cable and components for a FO communication network. Components include, but are not limited to:

- a. FO cable
- b. conduit
- c. liquid tight flex metal conduit (LFMC)
- d. pull boxes
- e. patch panels
- f. patch cords/cables
- g. connectors
- h. cabinets/enclosures

1.1 REFERENCES

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

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS (2021) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2020) Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-455-104 (2016b) Standard for FOTP-104 Fiber Optic Cable Cyclic Flexing Test

TIA-455-13 (1996a; R 2012) FOTP-13 Visual and Mechanical Inspection of Fiber Optic Components, Devices, and Assemblies

TIA-455-177 (2020c) FOTP-177 IEC-60793-1-43:

	Measurement Methods and Test Procedures - Numerical Aperture
TIA-455-58	(2001b) FOTP-58 Core Diameter Measurement of Graded-Index Optical Fibers
TIA-455-78-B	(2020c) FOTP-78 Optical Fibres - Part 1-40: Measurement Methods and Test Procedures - Attenuation
TIA-455-91	(1986; R 1996) FOTP-91 Fiber Optic Cable Twist-Bend Test
TIA/EIA-455-171	(2001a) FOTP-171 - Attenuation by Substitution Measurement for Short-Length Multimode Graded-Index and Single-Mode Optical Fiber Cable Assemblies
TIA/EIA-455-204	(2000) Standard for Measurement of Bandwidth on Multimode Fiber
TIA/EIA-455-25	(2016d) FOTP-25 Impact Testing of Optical Fiber Cables
TIA/EIA-455-41	(1993a; R 2013) FOTP-41 Compressive Loading Resistance of Fiber Optic Cables
TIA/EIA-455-88	(2001) FOTP-88 Fiber Optic Cable Bend Test
TIA-606	(2021d) Administration Standard for Telecommunications Infrastructure

UNDERWRITERS LABORATORIES (UL)

UL 1666	(2007; Reprint Sep 2021) UL Standard for Safety Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Fiber Test Plan; G, EL

Fiber Test Plan must be submitted at least 14 calendar days prior to the start of testing.

Quality Control Plan; G, EL

Cable Installation Plan; G, EL

Cable installation plan must be submitted at least 30 calendar

days prior to installation.

SD-03 Product Data

Manufacturer's Catalog Data; G, EL

Manufacturer catalog data shall be submitted at least 30 calendar days prior to installation.

Material And Equipment List; G, EL

Material and Equipment List shall be submitted 30 days after the award of the Contract.

SD-06 Test Reports

Fiber Test Report; G, EL

SD-07 Certificates

Fiber Optic Systems; G, EL

Qualifications; G, EL

SD-08 Manufacturer's Instructions

Installation Procedures; G, EL

SD-10 Operation and Maintenance Data

Operations And Maintenance Manuals; G, EL

The Operations and Maintenance Data shall be delivered 30 days after installation and testing of all fiber optic equipment.

1.3 MANUFACTURER'S CATALOG DATA

Manufacturer's Catalog Data composed of catalog cuts, brochures, circulars, specifications, product data, and printed information in sufficient detail and scope to verify compliance with the requirements of the Contract documents shall be submitted prior to construction. Standard catalog data will not be acceptable unless irrelevant parts are marked out and relevant parts are clearly identified. Manufacturer's catalog data shall be included in the required [operations and maintenance manuals](#).

1.4 MATERIAL AND EQUIPMENT LIST

A complete itemized listing of equipment and materials proposed for incorporation into the work shall be provided. Each entry shall include an item number, the quantity of items proposed, and the name of the manufacturer complete with make and model of each item. Materials and equipment shall conform to the respective publications and other requirements specified below and in the [material and equipment list](#). Materials and equipment not listed below shall be as specified elsewhere in this Section.

1.5 SYSTEM DESCRIPTION

1.5.1 General

Provide fiber optics (FO) components of a data transmission system (DTS). Interconnect the data transmission system components as shown.

1.5.2 Environmental Requirements

Rate equipment and cable to be utilized indoors for continuous operation under ambient environmental conditions of 32 to 122 degrees F dry bulb and 10 to 95 percent relative humidity, non-condensing. Rate all equipment and cable for continuous operation under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encountered for the installed location. Install cables in ducts, plenums, and other air-handling spaces per NFPA 70. Ensure cables installed are riser-rated or tray-rated cables listed for the use, unless the installed cable is identified as a permitted substitution for the required cable type.

1.6 QUALIFICATIONS

Technicians installing FO media, splices, and performing system tests must be journeyman cable splicer certified and trained in accordance with the Fiber Optic Association Certified Fiber Optic Technician and Certified Fiber Optic Specialist with Specializations in "Splicing optical fibers", "Installing fiber optic connectors" and "Fiber optic testing" or equivalent vendor or manufacturer certification. Technicians shall have a minimum of 3 years Fiber Optic experience in installing equivalent Fiber Optic systems in commercial and / or industrial environments. Submit FO technician qualifications for approval 30 days before splices and connection are to be made on the cable. Certification shall include the training, and experience of the individual on specific type and classification of FO media to be provided under this contract. Personnel working pursuant to this Section may, at the Contracting Officer's option, be required to demonstrate technical competence by performing sample work and/or by displaying their State qualifications/certificates, at no additional cost to the Government.

1.7 QUALITY CONTROL PLAN

A Quality Control Plan must be submitted for fiber optic cable systems consisting of detailed procedures defining methods to ensure compliance to Contract drawings and Specifications by drawing control, inspection and procurement records, Fiber Test Plan showing when and how each system will be tested, material testing, and certification records.

Prepare a quality control plan which provides a detailed outline of all testing to be accomplished. Quality control plan must address whether cladding modes have been stripped prior to testing, source wavelength (peak), spectral width full width/half maximum (FWHM), mode structure, fiber end penetration, and bandwidth measurements of fiber links both greater and less than 1 kilometer. Quality control plan must include, as a minimum, a schedule of when tests will be performed relative to installation milestones, specific test procedure that will be used, a list of test equipment that will be used including manufacturer, model number, range, resolution accuracy, certificate of calibration and must conform to the specific requirements.

PART 2 PRODUCTS

2.1 ENCLOSURES

Ensure the enclosures installed indoors meet the requirements of **NEMA 250** Type 12 or as shown. Use the manufacturer's standard finish color, unless otherwise indicated. Repair and refinish damaged surfaces using original type finish.

2.1.1 FO Pull Boxes

All pull boxes for FO optic control communications shall be provided with a hasp that allows covers to be padlocked in place.

2.2 OPTICAL FIBERS

2.2.1 General

Coat optical fibers with a suitable material to preserve the intrinsic strength of the glass. The outside diameter of the glass-clad fiber is nominally 125 microns, and concentric with the fiber core. Optical fibers shall meet **TIA-455-78-B**, and **TIA-455-177**.

2.2.2 50 Micron Multimode Fibers (OM3)

Fibers shall be OM3, multimode, graded index, solid glass waveguides with a nominal core diameter of 50 microns. The numerical aperture for each fiber must be 0.20. Ensure the fiber has transmission windows centered at 850 and 1300 nanometer wavelengths, with a numerical aperture minimum of 0.20. The attenuation at 850 nanometers is 3.5 dB/Km or less. The attenuation at 1300 nanometers is 1.5 dB/Km or less. For both transmission windows, the minimum bandwidth is 500 MHz-Km. Certify fiber optic cable to meet **TIA/EIA-455-204** and **TIA-455-58**.

2.3 CABLE CONSTRUCTION

2.3.1 General

Ensure the cable contains a minimum of two fiber optic fibers for each link circuit. The number of fibers in each cable shall not be less than as shown. Protect each fiber with a subcable jacket. Cables must have an overall jacket. Cable and fiber protective covering must be free from holes, splits, blisters, and other imperfections. Use a covering that is flame retardant, moisture resistant, non-nutrient to fungus, ultraviolet light resistant as specified, and nontoxic. Mechanical stress present in cables must not be transmitted to the optical fibers. Strength members must be non-metallic and must be an integral part of the cable construction. The combined strength of all the strength members must be sufficient to support the stress of installation and to protect the cable in service. The cables must have a storage temperature range of **minus 40 to plus 158 degrees F**. All optical fiber cables and all optical fiber raceways furnished must meet the requirement of **NFPA 70**. Fire resistant characteristics of optical fiber cables and optical fiber raceways must conform to Article 770. Provide cables from the same manufacturer, of the same cable type, of the same size, and of the same optical characteristics. Each fiber and protective covering must be continuous with no factory splices. The manufacturer must certify fiber optic cable assemblies, including jacketing and fibers, to have a minimum life of 30 years. Ensure cables meet **UL 1666**. Certify FO cable to meet the

following: TIA-455-13, TIA/EIA-455-25, TIA/EIA-455-41, TIA-455-78-B, TIA/EIA-455-88, TIA-455-91, TIA-455-104, TIA/EIA-455-171, and TIA-455-177.

2.3.2 Interior Cable

Cables installed in raceways shall be riser-rated. Cables shall be tight buffer type, indoor/outdoor rated, with low-smoke zero-halogen flame-retardant jacket.

- a. For tight buffer tube cable construction, use extrusion of plastic over each clad fiber, with a flame-resistant outer jacket for riser cables and vertical shaft installations. Cover optical fibers in near contact with an extrusion tube and an intermediate soft buffer to allow for the thermal expansions and minor pressures. Do not exceed manufacturer's recommended values for tensile strength, impact resistance, and crush resistance.

2.3.3 Distribution Cable

Distribution Cable is defined as optical fiber cable suitable for longer pulls. Individual fibers shall have color-coded tight-buffer. Cable assembly shall have an Aramid strength member and outer jacket with ripcord. Cable core shall be helically stranded. Termination of distribution cables shall be made with spider breakout kits.

2.3.4 Breakout Cable

Breakout Cable is defined as optical fiber cable suitable for shorter installations, with rugged and "installer friendly" design. Individual fibers have Aramid strength member and individual color coded, elastomeric subcable jacket. Cable shall have outer jacket with ripcord. Cable core shall be helically stranded.

2.3.5 Pigtail Cables

Use flexible fiber pigtail cables for connections to equipment having the same physical and operational characteristics as the parent cable. Ensure the cable jacket is FCP, which complies with NFPA 70 for OFNR applications. Maximum dB loss for pigtail cable is 3.5 dB/km at 850 nanometers, and 1.0 dB/km at 1300 nanometers.

2.4 PATCH PANELS

2.4.1 General

Install patch panels as a complete system of components by a single manufacturer; provide termination, splice storage, routing, radius limiting, cable fastening, storage, and cross-connection. Patch panel connectors and couplers must be the same type and configuration as used elsewhere in the system. Patch panels are wall-mounted type.

2.4.2 Wall-Mount Housing

Wall-mount patch panel housings must be capable of accepting a minimum of one adapter plate and include a 6-slot, 0.4-inch splice holder that accommodates up to 12 heat shrink splices.

2.5 FIBER OPTIC PATCH CABLES

Patch cable assemblies shall be pre-manufactured (factory terminated) with a UL rating OFNR. Patch cords shall meet all requirements listed above and match the type of the fiber optic cable in its associated run. Cables shall be of the length required for the application.

2.6 FIBER OPTIC CONNECTORS

FO connectors used for all fiber terminations including patch cables shall be LC, field installable, self-aligning, and centering unless stated otherwise in the drawings. FO connectors shall match the fiber core and cladding diameters. The connector housing shall be stainless steel, brass, or nickel-plated zinc and the alignment ferrule shall be ceramic. Connector insertion loss shall be nominally 0.3 dB and maximum loss less than 0.5 dB.

2.7 FAN-OUT KITS

For tight-buffered optical fibers, furnish and install fan-out kits using furcating tubes and which incorporate strain relief, if the connectorization is not contained within a protective enclosure such as a patch panel. Furcating tubes required to incorporate strain relief also provide increased pullout protection and shall be comprised of an inner tube, surrounded by a layer of nonconductive strength members, then surrounded by an enclosing outer jacket layer. Color code fan-out kits to match the industry fiber color scheme. Length of furcating tube is 24 inches minimum when installation is complete. Rate fan-out kits for the ambient conditions of the location as specified in paragraph ENVIRONMENTAL REQUIREMENTS. Provide terminations for each fiber, whether fiber is active or spare.

2.8 CONDUIT, FITTINGS AND ENCLOSURES

Ensure conduit and fittings are as specified in Section 26 05 00.00 28 GENERAL ELECTRICAL WORK, and as shown.

PART 3 EXECUTION

3.1 INSTALLATION PROCEDURES

a. Where installation procedures or part of the installation procedures are required to be in accordance with the manufacturer's instructions, submit printed copies of those instructions prior to installation. Installation of the items must not proceed until manufacturer's instructions are received. Failure to submit manufacturer's instructions shall be cause for rejection of the equipment or material.

b. System components and appurtenances must be installed in accordance with the manufacturer's instructions and as shown. Interconnections, services, and adjustments required for a complete and operable data transmission system must be provided. The installation and testing of fiber optic cable and associated components must be accomplished by an installer who has documented training and experience in the installation and testing of this equipment. See the qualifications paragraph within this specification for installer expertise requirements. Documentation must be furnished for review and approval prior to start of fiber optic equipment installations.

3.2 CABLE INSTALLATION

a. The Contractor shall obtain from the manufacturer an installation manual or set of instructions which addresses such aspects as cable construction, insulation type, cable diameter, bending radius, cable temperature, lubricants, coefficient of friction, conduit cleaning, storage procedures, moisture seals, testing for and purging moisture, etc. The Contractor shall then prepare a checklist of significant requirements, perform pulling calculations, and prepare a pulling plan which shall be submitted along with the manufacturer's instructions in accordance with paragraph 1.3.

b. Cable installation and applications must meet the requirements of **NFPA 70**, Article 770, Sections 52 and 53. Cables shall be installed in conduit or raceway in compliance with **NFPA 70** requirements for this type of installation. Cables not installed in conduits must be properly secured and neat in appearance, and, if installed in plenums or other spaces used for environmental air, must comply with **NFPA 70** requirements for this type of installation. The cable shall not be forced around sharp corners or tugged during installation.

c. The cable shall not be kinked or crushed and the maximum pulling tension and minimum bend radius of the cable shall not be exceeded at any time during installation. The minimum bend radius shall be as specified by the cable manufacturer, or 20 times the cable's outside diameter if not specified. If a cable lubricant is required, it shall be compatible with the cable sheathing material. Pulling fixtures shall be attached to the cable strength members. If the cable is pulled out of a junction or pull box the cable shall be protected from dirt and moisture by laying the cable on a ground covering in a figure-eight configuration such that the cable's minimum bend radius is not exceeded. The completed cable installation shall provide protection from abrasion and sharp edges. Spider fan-out kits shall be installed on the fiber optic, distribution-type cables terminating in the patch panels.

d. Cable shall be installed strictly in accordance with the cable manufacturer's recommendations. Each circuit shall be identified by means of a fiber, laminated plastic, or non-ferrous metal tags, or approved equal, in each cable vault, handhole, junction box, and each termination. Each tag shall contain the following information: cable type, circuit number, and cable destination.

e. The Contractor shall submit a **cable installation plan** for fiber runs longer than 150 ft. 30 days prior to construction. Cable installation plan must include at a minimum:

(1) Site layout cable installation drawing with pulls identified in numeric order of expected pulling sequence and direction of cable pull.

(2) List of cable installation equipment.

(3) Lubricant manufacturer's application instructions.

(4) Procedure for resealing cable ends to prevent moisture from entering cable.

- (5) Cable pulling tension calculations of all cable pulls.
- (6) Cable minimum bend radius and minimum diameter of pulling wheels used.
- (7) Maximum allowable pulling tension on the cable.
- (8) Maximum allowable pulling tension on pulling device.

f. The cable reel shall be inspected for correct storage positions, signs of physical damage, and broken end seals. If end seal is broken, moisture shall be removed from cable in accordance with the cable manufacturer's recommendations.

3.2.1 Service Loops

Each fiber optic cable run longer than 100 ft must have a 15 foot service loop at each end unless specifically indicated otherwise in the drawings. In addition, all fiber runs must have a minimum of 3 ft of contingency slack provided in each pull or junction box.

3.2.2 Splices

3.2.2.1 General

No splices will be permitted. Contractor shall be responsible for furnishing and installing new cable should any be damage during installation or fail required testing.

3.2.3 Connectors

Prior to and during installation of connectors, perform appropriate cleaning to ensure that any contaminant particulates larger than 0.06 microns in size are removed. Connectors shall be as specified in paragraph FIBER OPTIC CONNECTORS. Connectors which leave residue on the connector ferrule or optical connector "lens", are not permitted. All fibers, including spares, must have connectors installed at both ends of the cable. Ensure the mated connector pair loss does not exceed 1.5 dB. The pull strength between the connector and the attached fiber cannot be less than 50 pounds.

3.2.4 Identification and Labeling

Identification tags or labels must be provided for each cable and/or fiber. Markers, tags and labels, must use indelible ink or etching which does not fade in sunlight, or in buried or underground applications. Markers, tags, and labels must not become brittle or deteriorate for a period of 20 years due to moisture, sunlight, soil minerals, chemicals or other environmental elements. Label all termination blocks and panels with cable number or pair identifier for cables in accordance with TIA-606 and as specified. The labeling format must be as indicated on the drawings and a complete record must be provided to the Government with the type of signal being carried and termination points.

3.3 FIELD QUALITY CONTROL

3.3.1 General

Fiber testing must be performed in the presence of the Government Quality

Assurance Representative (GQAR) in accordance with the wire and fiber test plan. Notify the GQAR seven days prior to conducting tests. Furnish all personnel, equipment, instrumentation, and supplies necessary to perform testing. Perform all tests, including on-site tests and inspections recommended by the manufacturer, unless specifically waived by the GQAR. Maintain a written record of all tests that includes date, test performed, personnel involved, devices tested, serial number and name of the test equipment, and test results for test reports and installation test reports. All test reports must be signed and dated by the Contractor.

3.3.2 Fiber Test Plan

Contractor shall prepare and submit a fiber test plan that includes, at a minimum, a schedule of when tests will be performed relative to installation milestones, specific test procedure that will be used, a list of test equipment that will be used including manufacturer, model number, range, resolution accuracy, certificate of calibration and shall conform to the specified requirements. The plan must be submitted prior to installation.

3.3.3 Fiber Field Test

Verify the complete operation of the data transmission system equipment in accordance with **NETA ATS** and record in the Fiber Test Report. These tests must be performed on each link and repeated from the opposite end of each link (bi-directional). Test must be performed at both wavelengths (850 nm and 1300 nm).

3.3.3.1 Fiber Test Outline

A. Visual and Mechanical Inspection

1. Compare cable, connector, and splice data with drawings and specifications.
2. Inspect cable and connections for physical and mechanical damage.
3. Verify that all connectors and splices are correctly installed.

B. Optical Tests

1. Perform cable length measurement, fiber fracture inspection, and construction defect inspection using an optical time domain reflectometer.
2. Perform connector and splice integrity test using an optical time domain reflectometer.
3. Perform cable attenuation loss measurement with an optical power loss test set.
4. Perform connector and splice attenuation loss measurement from both ends of the optical cable with an optical power loss test set.

3.3.3.2 Fiber Test Report

The Contractor's written records of testing must be submitted in the form of formal test reports. Reports must identify each cable according to designations shown on the drawings. If no designation is shown, one will be provided by the Government. Test reports must be submitted 15 days after completion of field testing.

-- End of Section --

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SECTION 33 01 30.16 28

DRAINAGE HEADER DEBRIS REMOVAL

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 CCTV Video

CD or DVD storage media containing the recorded video.

1.1.2 Cleaning

To remove soil or solid deposited materials from a pipe segment.

1.1.3 Defects

Defects in the pipe, manholes, structures, and services include cracks, separation of joints, collapsed pipe, grade irregularities, leaks, roots, grease buildup, offset joints, reverse grades, obstructions, delamination, missing pipe, restrictions, fractures and similar structural irregularities.

1.1.4 Entry Point

The leading edge of the access point located at the clean out sump on elevation 176 or the leading edge of the header inside the drainage sump upon removal of the check valve.

1.1.5 Heavy Cleaning

To remove soil or solid deposited materials from a pipe segment when the materials in the pipe are between half full to full.

1.1.6 Hydraulically Propelled Cleaning Tools

Tools that depend upon water pressure to provide their cleaning force.

1.1.7 National Association of Sewer Service Companies (NASSCO)

National Association of Sewer Service Companies (NASSCO) identifies the generally accepted industry standards for CCTV inspection, observation coding, and certification.

1.1.8 Pipe Segment

The length of pipe from entry point to exit point along the main or service.

1.1.9 Pipeline Assessment and Certification Program (PACP)

A CCTV Inspection standardization certification and observation coding system sponsored by NASSCO.

1.1.10 Point Repair

The location of a failure where a repair has occurred.

1.1.11 TV Inspection Log

Information collected and recorded by the CCTV operator for each CCTV inspection effort and includes pertinent information for the respective inspection section; such as, date of inspection, location of site, CCTV technician, direction of CCTV inspection with manhole or structure identifiers, weather conditions, pipe size(s), pipe materials, conditions found, locations where the conditions were found.

1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Disposal Plan

Submit a disposal plan prior to performing any work that might generate waste materials. Include a complete description of the materials that are expected to be encountered and their proposed disposal sites. No changes to the disposal plan will be made without prior written acceptance by the Contracting Officer.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "I" classification. Submittals having an "I" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Cleaning Procedures; G, ME

SD-06 Test Reports

Documentation Of CCTV Inspection; G, ME

SD-07 Certificates

Disposal Plan; G, C

CCTV Technician's Qualifications; G, C

1.4 QUALITY CONTROL

1.4.1 CCTV Technician's Qualifications

Provide a CCTV technician with three years of total experience with the CCTV technology. Submit a current PACP Operator certification for personnel performing closed circuit television inspection and pipeline assessments.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Debris removal and un-clogging of 8 inch drainage header encompasses cleaning, heavy cleaning, CCTV inspection and video recording of the existing embedded drainage header that runs the length of the power house. Drainage header has a complete blockage approximately located between Main Units 7 and 8. The drainage header is 6 inches in diameter between Main Units 9 and 14. Additionally all drains in the 207 gallery shall be cleaned once the drainage header has been cleaned out.

It includes the mechanical equipment used to clean and dispose of the materials found in drainage header and structures, CCTV cameras and recording devices used to record the internal conditions of non-pressurized piping.

2.2 EQUIPMENT

2.2.1 Cleaning Equipment

Utilize mechanically powered equipment necessary for the proper rodding, brushing, and flushing of the drainage header, including a heavy duty power rodding machine that is compatible with the cleaning to be performed.

2.2.1.1 Rodding

Provide rodding equipment capable of rodding distances of up to 1500 feet in one set-up and having the following capabilities:

- a. The ability to spin the rod either clockwise or counter-clockwise, and be able to be pushed straight out or pulled back without rotating the machine.
- b. The capability of pulling pipe-size swabs or brushes back through the pipeline for cleaning and flushing purposes.

2.2.1.2 Hydraulic Flusher

Provide hydraulic high-pressure cleaners used for header cleaning, specifically designed and constructed for such cleaning, that have a minimum usable water capacity of 600 gallons and a pump capable of delivering at least 30 gallons per minute (gpm) at 100 psi and having the following capabilities:

- a. Pressure regulator nozzle capable of adjustment from 1 psi to 1500 psi.
- b. Constructed for ease of use and safety of operation with two or more high-velocity nozzles capable of producing a scouring action from 15 to 45 degrees in lines designated to be cleaned.
- c. A high-velocity gun for washing and scouring the clean out sump walls and floor capable of producing flows from a fine spray to a solid stream.
- d. Carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

2.2.2 CCTV Equipment

Provide a video system capable of producing a sharply focused, well-lit and color balanced picture in accordance with the following requirements:

2.2.2.1 Pipe Inspection Camera and Associated Equipment

- a. Provide a pipe inspection camera system that produces a video using a pan and tilt, radial viewing, that pans a minimum of 275 degrees and rotates 360 degrees. Illumination sensitivity of 3 Lux or less and a minimum of 460 lines of resolution is required.
- b. Utilize video cameras specifically designed and constructed for CCTV inspection.
- c. Provide a camera that is operative in 100 percent humidity conditions.
- d. Provide a camera with an accurate footage counter that displays on the monitor the exact distance of the camera to the nearest 1/10 of a foot.
- e. Provide a camera with a height adjustment so that the camera lens is typically centered in the pipe, or higher depending on water levels in the pipe.
- f. Provide equipment that will produce digital color images and allows the CCTV technician to remotely balance the iris and color to produce a clear and true video of the pipeline.
- g. Provide lighting for the camera that is suitable to provide a clear color picture of the entire periphery of the pipe.
- h. Provide a reflector in front of the camera as necessary to enhance the lighting on dark or large diameter pipes.
- i. Provide an accompanying computer and recording device capable of projecting and recording the facility location, project name, Contractor's name, date, line size, material type, line identification, manhole or structure ID numbers and ongoing footage counter onto the video screen.

PART 3 EXECUTION

3.1 PREPARATION

Within a minimum of 45 days prior to cleaning out the drainage header, the contractor shall submit [cleaning procedures](#). The cleaning procedures shall include all equipment used and the step by step process of cleaning out the drainage header.

3.1.1 Drainage Header Cleaning

Immediately prior to conducting CCTV activities, thoroughly clean the drainage header. Clean the header using hydraulically propelled, high-velocity jet, or mechanically powered equipment.

- a. During cleaning and preparation operations, undertake precautions to protect the system and property from damage. Restore property damaged as a result of such cleaning and preparation operations to pre-existing conditions.

- b. During the course of normal cleaning operations immediately report pre-existing damage such as broken or missing pipe to the Contracting Officer.
- c. When hydraulically propelled cleaning tools or tools which retard the flow in the drainage header are utilized, take precautions to ensure that the water pressure created does not damage or cause flooding on the adjacent site.

3.1.2 Flow Control

Approximately 40,000 gallons of water is stored in the draft tube valve pits, due to the drainage header clog. Sudden removal of this clog will result in an initial in rush of water. Ensure drainage sump is kept below elevation 176 during debris removal to ensure elevation 176 does not flood.

3.1.3 Material Removal and Disposal

Remove sludge, dirt, grease, and other solid or semi-solid material resulting from cleaning operations at the sump.

3.1.3.1 Sludge and Debris Storage

Under no circumstances is sludge or other debris removed during these operations to be stored, dumped or spilled into streets, ditches, storm drains, or other sanitary sewer systems.

- a. Dispose of solids and semi-solids resulting from the cleaning operations no less often than the end of each work day in accordance with the approved Disposal Plan.
- b. Under no circumstances will debris be allowed to accumulate on the work site beyond the end of each work day, except in totally enclosed containers and as acceptable by the Contracting Officer.
- c. Continuously maintain the haul route and work areas neat, clean, and reasonably free of odor. Clean up any spill which occurs during the transport of cleaning or surface preparation by-products. Perform the cleanup of any such material pursuant to this Contract and in accordance with applicable law and environmental regulations.
- d. Immediately notify the Contracting Officer of any spill and begin clean up of any such spill or waste.
- e. The Government will charge to the Contractor for any costs incurred or penalties imposed upon the Government as a result of the spill, dump or discard.
- f. Under no circumstances is this material to be discharged into the waterways or any place other than where authorized to do so in accordance with the approved Disposal Plan.

3.1.3.2 Hauling of Waste Material

Provide vehicles hauling such waste material that meet the following requirements:

- a. Provide transport vehicles of the type(s) approved for this application by the jurisdictions where those vehicles will be operated in the performance of activities associated with this Contract.
- b. Provide transport vehicles with watertight bodies equipped and fitted with seals and covers to prohibit material spillage or drainage.
- c. Clean vehicles to prevent deposits of material on roadways.
- d. Load vehicles within legal weight limits and operate safely within traffic speed regulations.
- e. The routes used for the conveyance of this material on a regular basis is subject to approval by the local governing bodies having jurisdiction over such routes.

3.2 APPLICATION

3.2.1 Inspection of Drainage Header

Inspection of drainage header lines applies to Pre-TV inspection, Post-TV inspection, RE-TV inspection and Warranty-TV inspection. Perform inspections of drainage header lines in the presence of the Contracting Officer. Broken piping must be repaired per SECTION 33 01 30.72 28 DRAINAGE HEADER POINT REPAIR.

3.2.1.1 Camera Operation

Set counter to 0.00 feet at the entry point. Move the camera through the line in either direction at a moderate speed, stopping to permit proper documentation of the drainage header condition or service connection locations. In no case will the camera be operated at a speed greater than 60 feet per minute. Slowly pan and tilt the camera at the beginning and ending, structure connections, service connections, joints, visible defects, and pipe arterial transitions. Provide a full 360 degree view of the pipe, joints, and service connections.

Utilize manual winches, power winches, cable, powered rewinds or other devices that do not obstruct the camera view or interfere with camera operation or CCTV inspection of the pipe conditions as the camera is moved through the drainage header line.

3.2.1.1.1 Recording Defects

During CCTV inspection, temporarily stop the camera at each defect or feature along the line.

3.2.1.2 Documentation of CCTV Inspection

Documentation of CCTV inspection applies to Pre-TV inspection, Post-TV inspection, RE-TV inspection and Warranty-TV inspection.

Utilize a data logger and reporting system that is PACP compliant to make a video and audio recording of the CCTV inspections. Submit video recordings, inspection logs and digital photographs as indicated below.

3.2.1.2.1 Video Recordings

Provide a color video showing the completed work and document the

inspection on a digital recorder. Capture inspection video in either MPEG4 or Windows Media Video (WMV) format with a minimum resolution of 352 x 240 pixels and an interlaced frame rate at a minimum of 24 frames per second. Save video on CD or DVD. However, the CCTV inspection video of a segment must be wholly contained on a single CD or DVD. The video recording must meet the following requirements:

- a. Provide a continuous and uninterrupted recorded video for the pipe segment being examined. Include the official project title, Contracting party, Contractor's name, street name, manhole or structure ID numbers, direction of video and flow, date and time video was recorded, continuous counter text, pipe size and material, material changes in the pipe segment, audio and text call outs of laterals, fixtures and problem areas in the recorded video.
- b. Include an audio track recorded by the CCTV technician during the actual inspection work with a description of the parameters of the line being inspected on the video recordings. The audio may be from the voice of the CCTV technician or it may be computer generated.
- c. Include the location, pipe diameter, pipe material, defects, service lateral locations and any unusual conditions found in PACP format.
- d. Submit labeled CDs or DVDs of the video inspections.
- e. Without exception, CCTV inspections must be continuous without video interruption or gaps for pipe segments.
- f. Clean, flush, and RE-TV pipe segments with video interruptions or gaps.

3.2.1.2.2 TV Inspection Logs

Submit computer generated records that clearly show the location and orientation.

Record other points of significance such as locations and orientations of service connections, missing or broken pipe, the presence of grease, scale or corrosion, bellies, fractures, cracks, and other discernible features using PACP designations.

3.2.1.2.3 Digital Photographs

Submit JPEG images at a minimum resolution of 640 x 480 pixels. Save digital photographs in JPEG file format on CD or DVD. Document noted defects and lateral connections as color digital files and hard copy print-outs. Photo logs are to accompany each photo submitted.

3.2.2 Check Valve Inspection

If contractor chooses to clean header out from the clean out sump, the check valve located at the end of the drainage header located inside the drainage sump must be inspected to ensure it is free of debris.

-- End of Section --

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SECTION 33 01 30.72 28

DRAINAGE HEADER POINT REPAIR

PART 1 GENERAL

Work in this SECTION is Option work. Refer to SECTION 01 22 00.00 28 MEASUREMENT AND PAYMENT, paragraph CLIN 0005 DRAINAGE HEADER POINT REPAIR (OPTIONAL). See also SECTION 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL, paragraph APPLICATION.

1.1 REFERENCES

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

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE MOP 120 (2009) Trenchless Renewal of Culverts and Storm Sewers

ASTM INTERNATIONAL (ASTM)

ASTM D790 (2017) Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

ASTM D2412 (2021) Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

ASTM D2990 (2017) Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

ASTM D5813 (2004; R 2018) Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

ASTM F1216 (2016) Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743 (2016) Standard Practice for Rehabilitation of Existing Pipeline and Conduits by Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

ASTM F2019 (2011) Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place

Installation of Glass Reinforced Plastic
(GRP) Cured-in-Place Thermosetting Resin
Pipe (CIPP)

1.2 DEFINITIONS

Use the definitions in the applicable standard. When the the applicable standard does not have a definition, use **ASCE MOP 120**.

1.3 ADMINISTRATIVE REQUIREMENTS

1.3.1 Scheduling

Minimize obstruction and inconvenience to traffic, pedestrians, and tenants.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. Designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G,C

Sequence Of Liner Installation; G,ME

Disposal Of Process Water; I,C

SD-03 Product Data

Lubricant; I,ME

Fabric Tube; I,ME

CIPP Product Data; G,ME

Catalyst; I,ME

Raw Resin Data; I,ME

Flexible Membrane; I,ME

SD-05 Design Data

Engineering Design Calculations; G,ME

Resin To Tube Ratio; I,ME

SD-06 Test Reports

IR Analyses; I,ME

Temperature Logs; I,ME

Curing Logs; I,ME

SD-07 Certificates

Certificate of QC Laboratory Accreditation; G,ME

Resin Dye; I,ME

Liner Manufacturer; I,ME

CIPP Installer's Qualifications; I,ME

Shipping Documents; I,C

Manufacturing Certificate; I,ME

SD-08 Manufacturer's Instructions

Manufacturer's Instructions; I,ME

1.5 QUALITY CONTROL

1.5.1 Qualifications

1.5.1.1 CIPP Installer's Qualifications

The lead personnel including the superintendent, the foreman and the lead crew personnel for the resin wet-out, the CIPP installation, liner curing and the robotic service reconnections each are to have a minimum of three years of total experience with the CIPP technology utilized.

1.5.1.2 Quality Control Specialist

The Quality Control (QC) Specialist is responsible for monitoring and documenting activities related to QC of the liner system from manufacturing through installation. The QC Specialist is to have a minimum of three years of continuous experience installing CIPP of similar size, length and configuration as contained in this contract. The QC Specialist is to be certified by the liner system supplier as qualified to perform work with the proposed liner system.

1.5.1.3 Liner Manufacturer

Use felt material manufactured by companies specializing in felt production for CIPP. The manufacturer is to have manufactured felt material for CIPP for at least two years as documented by references. Submit felt manufacturer, references and location of the manufacturing facility. The felt material manufacturer and facility cannot change during construction unless specifically approved by the Contracting Officer in writing and in advance of its use.

1.5.1.4 Quality Control Laboratory

Select a QC Laboratory that has provided QC testing for at least three completed projects with the proposed liner system; and is independent from, and not associated with, the Contractor. QC Laboratory must be certified to perform testing in accordance with the following standards: ASTM D790, ASTM D2412, ASTM D2990, ASTM D5813, and ASTM F1216. Submit the Certificate of QC Laboratory Accreditation.

1.5.2 Quality Control Plan

Submit a detailed [Contractor Quality Control \(CQC\) Plan](#) that fully represents and conforms to the requirements of these specifications. At a minimum the CQC is to include the following:

- a. Defined responsibilities, of the personnel, for assuring that quality requirements, for this Contract are met. Assign these responsibilities to specific personnel.
- b. Submit clearly defined proposed procedures for quality control, product sampling and testing as part of the plan.
- c. Proposed methods for product performance controls, including method of and frequency of product sampling and testing both in raw material form and cured product form.
- d. A scheduled performance and product test result review with the Contracting Officer at a regularly scheduled progress meeting.
- e. Prepare Inspection Forms and guidelines for quality control inspections in accordance with the standards specified in this Contract and submitted with the QCP.
- f. Outline specific repair or replacement procedures for potential defects that occur in the installed liner system, following repair or replacement procedures that are compatible with the system being used. Submit Repair or Replacement Procedures must adhere to the product manufacturer's written specifications for repair or replacement.

1.6 DELIVERY, STORAGE, AND HANDLING

Ship, store, and handle materials in a manner consistent with the written specifications of the liner system manufacturer to avoid damage. Damage may include, but is not limited to, gouging, abrasion, flattening, cutting, puncturing, or ultra-violet (UV) degradation. Select on site storage locations for approval by the Contracting Officer. Promptly remove and dispose of damaged materials.

1.6.1 Resin

[Ship the resin directly from the resin manufacturer's facility to the CIPP wet-out facility. Submit copies of the shipping documents from the resin manufacturer to the Contracting Officer showing dates of shipment, the originating location and the receiving location.](#)

1.7 PROJECT/SITE CONDITIONS

The use of the product is not to result in the formation or production of any detrimental compounds or by-products including cuttings and pipe coupons.

1.7.1 Environmental Requirements

Cool superheated water to below [100 degrees F](#) before discharge. Notify the Contracting Officer and identify any by-products produced as a result of the installation operations. Comply with local waste discharge requirements.

1.7.1.1.1 Disposal Of Process Water

Submit a procedure for the containment and disposal of process water for approval by the Contracting Officer.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Rehabilitate drainage header pipelines by the installation of CIPP.

2.1.1 Design Requirements

2.1.1.1 Structural Requirements

2.1.1.1.1 Cured-In-Place Pipe

Design the CIPP in accordance with the applicable provisions of ASTM F1216 for partially deteriorated gravity pipe conditions. Provide engineering design calculations, performed and sealed by a qualified, registered Professional Engineer in accordance with ASTM F1216 Appendix X1 Design Considerations for each length of liner to be installed, including the thickness of each pipe segment. It is acceptable to submit a design for the most severe line condition and apply that design to all of the line sections of the same diameter. Provide a CIPP system which meets or exceeds the minimum properties specified herein:

- a. Provide calculations supporting the liner thickness. The data is to include both the calculated thicknesses and the thicknesses proposed to be installed.
- b. The installed, cured liner thickness is the largest thickness as determined by calculations for deflection, bending, buckling and minimum stiffness. The minimum installed, cured liner thickness is as follows, regardless of what the calculations indicate as the required minimum thickness:

8 inch header: 7.5 mm up to 25 feet deep

- c. The physical properties and characteristics of the finished liner will vary considerably, depending on the types and mixing proportions of the materials used, and the degree of cure executed. Control these variables and provide a CIPP system which meets or exceeds the minimum properties specified herein:

- (1) Design the CIPP to meet or exceed ASTM F1216 Appendixes. The CIPP design is to assume no bonding to the original pipe wall.
- (2) The CIPP design engineer is to set the long term (50 year extrapolated) Creep Retention Factor at 50 percent of the initial design flexural modulus as determined by the ASTM D790 test method. Use this value unless the long term test data ASTM D2990 substantiates a higher retention factor is required.
- (3) At a minimum, the CIPP is to meet or exceed the structural properties, as listed below:

	MINIMUM PHYSICAL PROPERTIES	
Property	Test Method	Cured Composite (ASTM F1216)
Flexural Modulus of Elasticity (Short Term) (Felt Tubes) Felt/Fiberglass, Fiberglass meeting manufacturer's specifications	ASTM D790	250,000 psi
Flexural Strength (Short Term) (Felt Tubes) Felt/Fiberglass, Fiberglass meeting Manufacturer's specifications	ASTM D790	4,500 psi

- (4) As a minimum, base the required structural CIPP wall thickness on the physical properties of the cured composite and the design of the Contractor's Professional Engineer and in accordance with the Design Equations contained in the Appendix of the ASTM standards, and the following design parameters:

Design Safety Factor	2.0
Creep Retention Factor	50 percent
Ovality	2 percent or as measured by field inspection
Live Load	as applicable
Minimum service life	50 years

- (5) Prior to installation of the lining materials, submit certification of compliance with these specifications or the requirements of the pre-approved CIPP system. Include certified material test results that confirm materials conform to these specifications. Materials not complying with these requirements will be rejected.

2.1.2 Performance Requirements

Provide a continuous and tight-fitting liner throughout the entire length of the original pipe. Extend the CIPP the full length of the original pipe, from entry point to exit point, and provide a structurally sound and water-tight new pipe within a pipe. Cleanup, restore existing surface conditions and structures, and repair portions of the CIPP system

determined to be defective.

2.1.2.1 Cured-In-Place Pipe

- a. Provide a continuous and jointless CIPP at point repair, free of defects that will affect the long term life and operation of the pipe.
- b. Fit the CIPP sufficiently tight within the existing pipe so as to not leak.
- c. Design the CIPP for a life expectancy of 50 years or greater.
- d. Repair over-cut service connections to meet the requirements of these specifications. Re-establish the service openings utilizing a remotely controlled brushing device to smoothly cut and remove jagged edges, material and shavings resulting from the cutting operation.

2.1.3 Tolerances

Maintain the largest possible hydraulic capacity. At a minimum, the rehabilitated pipe is to equal or exceed the full flow capacity of the original pipe before rehabilitation.

All recommended values from the ASTMs referenced in this specification are required.

2.1.3.1 Cured-In-Place Pipe

The installed CIPP thickness tolerance is minus 5 percent to plus 10 percent as compared to the approved liner design.

2.2 MATERIALS

2.2.1 Lubricant

Submit a detailed description of the lubricant proposed for the insertion or inversion process. Ensure that the lubricant is compatible with the wastewater treatment plant operations and pre-treatment program.

2.2.2 Cured-In-Place Pipe

Provide a fabric tube manufactured of one or more layers of absorbent non-woven felt fabric, felt fiberglass composite or fiberglass and meets the requirements of ASTM F1216, ASTM F1743, ASTM D5813, and ASTM F2019. It must be capable of absorbing and carrying resins, constructed to withstand installation pressures and curing temperatures. It must have sufficient strength to bridge missing pipe segments and stretch to fit irregular pipe sections. Submit certified information from the felt manufacturer of the nominal void volume in the fabric tube that will be filled with resin.

When combined as a composite structure, the fabric tube, resins, tube coatings, and other materials must produce CIPP that meets the requirements of this specification. Fabricate the CIPP to a size that will tightly fit the internal circumference and the length of the original conduit when installed.

2.2.2.1 Resin-Impregnated Tube

Provide **ASTM F1216** resin-impregnated, flexible tube for installation by inversion. The flexible tube must consist of one or more layers of flexible needled felt, non-woven or woven material, or a combination of non-woven and woven materials, capable of carrying resin and withstanding installation pressures and curing temperatures. The tube must be compatible with the resin system used and have a plastic coated outside layer material that is compatible with the resin system used. Make allowance for circumferential stretching during inversion.

Use a thermoset resin and catalyst system or an epoxy resin and hardener that is compatible with the inversion process. The resin must be able to cure in the presence of water and the initiation temperature for cure should be less than 180 deg. F.

2.2.2.2 Thermosetting Resin Pipe

Provide **ASTM F1743** coated fabric tube filled with thermosetting resin installed by pull in place methods. The flexible tube must consist of one or more layers of flexible needled felt, non-woven or woven material, or both, capable of carrying resin and withstanding installation pressures and curing temperatures. The outside layer of the fabric tube should have an impermeable flexible coating whose function is to contain the resin during and after fabric tube impregnation. The outer coating must facilitate monitoring of resin saturation. Allowance should be made for circumferential and longitudinal stretching of the fabric tube during installation. All of the materials used must be compatible with the resin system used and have a plastic coated outside layer material that is compatible with the resin system used.

Use a chemically resistant isophthalic based polyester or vinyl ester thermoset resin and catalyst system or an epoxy resin and hardener that is compatible with the installation process. The resin must be able to cure in the presence of water and the initiation temperature for cure should be less than 180 deg. F.

2.2.2.3 Product Data

Submit **CIPP product data** from the CIPP manufacturer.

- a. Submit product data for the **Flexible Membrane** (coating) material including the manufacturer's recommended repair (patching) procedure.
- b. Include infrared spectrum (IR) analysis for proposed resin and confirmation that the resins meet **ASTM D5813**.
- c. **Catalyst** product data and quantity.
- d. **Raw Resin Data**, including the manufacturer and description of product components.

2.2.2.4 Test Reports

Include test reports certifying that the materials shipped to the project site conform to the applicable ASTM standards.

- a. Submit results of **IR analyses** of the proposed resin and resin catalyst mixture, performed and certified by the resin manufacturer, prior to

manufacturing CIPP.

- b. The results of the IR analyses (the resin's chemical fingerprint) will be used to verify that the resin and the resin catalyst composition and mixture being used is the approved resin and resin catalyst system.

2.2.2.5 Certificates

- a. Submit a **manufacturing certificate** that the CIPP was manufactured in accordance with these specifications and **ASTM D5813** with each shipment. The certifications are to include:
 - (1) The wet-out forms are to document the date and time of wet-out, the wet-out supervisor, the wet-out facility address, the location where the CIPP will be installed (by work order and manhole numbers), the CIPP diameter, the length of wet-tube and dry-tube, the thickness of the CIPP, the roller gap setting for establishing the liner thickness, the felt manufacturer, the resin used (by product name and batch or shipment number) and quantity, the catalyst(s) used (by product name) and quantity, quality control samples taken, and other information pertinent to the wet-out process.
- d. Submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility as part of the Catalyst product data submittal. Include the date of manufacture and the Heat Distortion Temperature.
- e. Submit certification that the **Resin Dye** quantity and type is compatible with the components of the lining system.

2.2.2.6 Manufacturer's Instructions

Submit manufacturer's instruction for installation, repair and patching of the CIPP.

2.2.2.7 Resin

- a. Provide a corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system that, when cured within the tube composite, meets the requirements of **ASTM F1216**, **ASTM F1743**, or **ASTM F2019**, the physical properties herein, and those, indicated in the design of the CIPP for this project. The resin is to produce CIPP which will comply with or exceed the structural and chemical resistance requirements of this specification.
- b. Submit the **resin to tube ratio**, by volume, as determined by the Design Calculations.
- c. Provide the polyester or vinyl ester resin that is PREMIUM, NON-RECYCLED resin only. Do not use Polyethylene Terephthalate (PET) resins, or those containing fillers, additives or enhancement agents. Old resin or reworked resin is not permitted.

- d. Do not use Quick-cure or accelerated resin systems that cure in half the specified time or substantially quicker than the minimum three hours.

PART 3 EXECUTION

3.1 EXAMINATION

Complete Pre-TV inspection in accordance with Section 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL.

3.2 PREPARATION

3.2.1 Set-Up and Sequence

Submit a Sequence of Liner Installation plan. Include proposed set-up locations in the plan that are coordinated with the Traffic Control Plan.

3.2.2 Bypassing Existing Flows

- a. Provide for the flow of existing mainline and service connection effluent around the section or sections of pipe designated for liner installation.
- b. Provide pump(s) and bypass line(s) of adequate capacity and size to handle peak flows.
- c. Plug service connections only after proper notification to the Contracting Officer. Service connections are not to remain plugged overnight.
- d. Begin work after plugs or a drainage header bypass system and pumping facilities have been installed and tested under full operating conditions, including the bypass of mainline and side header flows.
- e. Once the lining process has begun, maintain bypass flows until the resin/felt tube composite is fully cured, cooled down, fully televised and the CIPP ends are finished.

3.2.3 Cleaning

Select a cleaning method that will prepare the surface for the type of point repair or renewal work being performed taking into consideration the condition of the existing pipeline. Sewer cleaning includes the removal of roots, sediment and debris, incrustations from header walls, and removing protruding objects or lateral connections.

- a. Clean drainage header as indicated in SECTION 33 01 30.16 DRAINAGE HEADER DEBRIS REMOVAL.
- b. Remove internal debris from the existing pipe line that will interfere with the installation of the liner.

3.2.3.1 Line Obstructions

Remove obstructions, correct misalignments, repair broken or collapsed sections and sags that will prohibit the installation or will interfere

with the long-term performance of the lining materials by performing a point repair. Make point repairs by open cut repair methods or sectional point repair methods in accordance with ASTM F1216.

3.2.4 Protection

Prevent damage to the existing piping during cleaning.

3.2.5 Surface Preparation

Perform Pre-TV inspections of the pipelines after cleaning has been completed in accordance with SECTION 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL.

Confirm the locations of branch service connections prior to installing and curing the liner material. In the event the status of a service connection cannot be adequately defined, the Contracting Officer will make the final decision, prior to installation and curing of the liner, as to the status.

3.3 INSTALLATION

Stop or by-pass header flow prior to beginning renewal work such as cleaning, CCTV, installing liners, and re-instating service connections.

3.3.1 Cured-In-Place Pipe

- a. Prior to the installation of the liner, place temperature sensors in the host pipe in order to monitor the temperature of the liner wall and to verify correct curing. Place temperature sensors between the host pipe and the liner in the bottom of the host pipe (invert) throughout its length and monitor the temperature on the outside of the liner during the curing process.
- b. Place the temperature sensors at intervals as indicated in the sensor manufacturer's written specifications. Place additional sensors where significant heat sinks are likely or anticipated.
- c. Monitor the sensors by a computer using a tamper proof data base that is capable of recording temperatures at the interface of the liner and the host pipe.
- d. Install the liner in accordance with ASTM F1216 and ASTM F1743 with the following modification: Position the wet-out tube in the pipeline using the method indicated in the manufacturer's instructions. Pull-in or invert through an existing manhole or access point and fully extend to the next manhole or termination point. Prevent damage to the tube during installation.
- e. Install and cure the CIPP in the host pipe as indicated in the manufacturer's specifications and as described in the approved submittals.
- f. Accomplish curing by utilizing the medium in accordance with the cure schedule. Continuously monitor the curing source, or input and output temperatures and log the temperatures during the cure cycles. Use the manufacturer's recommended cure method and schedule for each line segment installed. Take the liner wall thickness and the existing ground conditions with regard to temperature, moisture level, and

thermal conductivity of soil into account during the curing process.

- g. For heat cured liners, if one or more temperature sensors do not reach the temperature specified by the manufacturer to achieve proper curing or cooling, the installer is to make necessary adjustments required to conform with the manufacturer's specifications.
- h. For UV Cured Liners, record all light train sensor readings along the entire length of the installed liner into a tamper proof computer. Follow the cure procedure in accordance with the manufacturer's written product data.
- i. Monitor and record temperatures and curing data throughout the installation process to ensure that each phase of the process is achieved in accordance with the product specifications. Provide curing logs from the system computer that specifically identifies each installed sensor station in the length of pipe, indicates the maximum temperature achieved and the sustained temperature time. Each sensor is to record both the maximum temperature and the minimum cool down temperature and comply with the manufacturer's written product data. Submit **temperature logs** and **curing logs** for each pipe segment.
- j. Cool in accordance with the approved product specifications.

3.3.1.1 Finish

- a. Provide a CIPP that is continuous over the entire length of a drainage header line, is free from visual defects such as foreign inclusions, dry spots, pinholes, major wrinkles and de-lamination, and is impervious and free of leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.
- b. Seal the beginning and end of the CIPP to the existing host pipe utilizing a hydrophilic end sealing material compatible with the existing (HOST) pipe and the liner.
- c. Provide watertight service connections.

3.3.2 Cured-In-Place Pipe

- a. The wet-out fabric tube is to have a uniform thickness and excess resin distribution that, when compressed at installation pressures, will meet or exceed the design thickness after cure.
- b. Install the fabric tube to a size and length that will tightly fit the internal circumference of the host pipe. It must allow for circumferential stretching during installation. The tube must be sized to the diameter of the existing pipe and the length of pipe to be rehabilitated, and be able to stretch to fit irregular pipe sections and negotiate bends. Prior to ordering, measure in the field the minimum tube length necessary to effectively span the designated run between manholes to ensure that the tube will have sufficient length to extend the entire length of the run. Measure the inside diameter of the existing pipelines in the field prior to ordering liner so that the liner can be installed in a tight-fitted condition.
- c. Coat the outside or inside layer of the fabric tube (before inversion or pull-in, as applicable) with an impermeable, flexible membrane that contains the resin and facilitates, if applicable, vacuum impregnation

and monitoring of the resin saturation during the resin impregnation (wet out) procedure.

- d. Do not include material in the fabric tube that may cause delamination in the cured CIPP. Dry or unsaturated layers are not acceptable upon visual inspection as evident by color contrast between the tube fabric and the active resin containing a colorant.
- e. Use a light reflective interior pipe surface color so that a clear detailed examination of the CIPP can be made with closed circuit television inspection equipment. Provide a hue of the color dark enough to distinguish a contrast between the fully resin saturated felt fabric and dry or resin lean areas.
- f. When seams in the fabric are required, sew them so that the seams are stronger than felt without seams.
- g. Spirally form and sew where the length requires joining.
- h. Mark the outside of the fabric tube every 5 feet with the name of the manufacturer or CIPP system, manufacturing lot and production footage.
- i. The installer will determine the minimum length of the fabric tube to effectively span the distance from the starting manhole to the terminating manhole or access point, plus that amount required to run-in and run-out for the installation process.
- j. As a minimum, provide the fabric tube wall thickness manufactured to the nearest 0.02 in increment, rounded up from the design thickness for that section of installed CIPP. Wall thickness transitions, in 0.02 in increments or greater as appropriate, may be fabricated into the fabric tube between installation entrance and exit access points. Provide a sufficient quantity of resin used in the impregnation to entirely fill the felt voids for the nominal felt thickness.

3.3.2.1 Resin

- a. Do not change resins, catalysts, resin/catalysts, or mixing ratios during this Contract unless specifically approved by the Contracting Officer in writing in advance.
- b. Use the resin as shipped. Do not add fillers or additives at the wet-out facility except for the required catalyst.
- c. Apply the resin to the felt tubing (wet-out) under factory conditions. Protect the materials against ultraviolet (UV) light, excessive heat and contamination at all times.

3.4 FIELD QUALITY CONTROL

All costs associated with inspection and the collection, transportation and testing of samples are the responsibility of the Contractor.

3.4.1 Inspection

3.4.1.1 Cured-In-Place Pipe

- a. Provide the Contracting Officer the opportunity to examine operations during the installation and impregnation of the liner throughout the

entire process.

- b. Provide full access to witness the CIPP wet-out process and provide information related to the manufacturing as requested by the Contracting Officer, without delay and without claims of confidentiality or product privacy.

3.4.2 Inspections

Provide Pre-TV, Post-TV, Warranty-TV and Re-TV inspections in accordance with Section 33 01 30.16 28 DRAINAGE HEADER DEBRIS REMOVAL.

- a. Complete Post-TV inspections and repairs to the installed liner before acceptance.
- b. Submit as-built drawings for the portions of the drainage header system that were rehabilitated showing complete detail with dimensions, both above and below grade, including invert elevations at the manholes in accordance with Section 01 78 00.00 28 CLOSEOUT SUBMITTALS.
- c. Include the identification of the work completed on one set of Contract Drawings. Keep legible as-built drawings on the project site at all times and maintain them as the work progresses. Continuously update the as-built drawings with accurate dimensions and notations concerning locations, sizes, pipe lengths and specific material types. Include dimensional location, size and type of point repairs on the as-built drawings.
- d. Within 10 working days of final acceptance of said work, provide as-built drawings and Inspection forms.

3.4.3 Repair Of Defects

3.4.3.1 Cured-In-Place Pipe

- a. Locate and succinctly define defects in the installed CIPP that will not affect the operation and long term life of the product. The warranty CCTV inspection will include pipe segments with noted defects that were not repaired.
- b. Locate and succinctly define repairable defects that occur in the installed CIPP based on approved product specifications, including a detailed step-by-step repair procedure.
- c. Clearly locate and define un-repairable defects in the CIPP based on the approved product specifications, including a recommended procedure for the removal and replacement of the CIPP.

3.5 ADJUSTING AND CLEANING

3.5.1 Lateral Connections

All active lateral connections must be re-opened and remain water tight.

-- End of Section --

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PROCESS CONTROL - PROGRAMMABLE LOGIC CONTROLLERS (PLC)

PART 1 GENERAL

1.1 REFERENCES

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

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Stds Dictionary (2009) IEEE Standards Dictionary: Glossary of Terms & Definitions

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60947-5-1 (2016) Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices

IEC 61000-4-5 (2017) Electromagnetic Compatibility (EMC) - Part 4-5: Testing and Measurement Techniques - Surge Immunity Test

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 5 (2017) Industrial Control and Systems: Control Circuit and Pilot Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 508 (2018; Reprint Jul 2021) UL Standard for Safety Industrial Control Equipment

UL 508A (2018; Reprint Aug 2021) UL Standard for Safety Industrial Control Panels

1.2 SCOPE

The scope of work covered in this SECTION includes the site-specific control system and does not cover any control systems provided in standard products offered by manufacturers of major equipment. However, it does cover site-specific control system components added to the equipment.

1.2.1 Symbols, Definitions, and Abbreviations

Symbols, definitions, and engineering unit abbreviations shall conform to **IEEE Std Dictionary** as applicable.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. A designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail drawings consisting of equipment drawings, illustrations, schedules, instructions, diagrams, and other information necessary to define the installation. Detail drawings shall show the rating of items and systems and how the components of an item and system are assembled, function together, and how they will be installed on the project. Information furnished with drawings shall include applicable design calculations, test curves, and operation procedures. Where drawings include items not applicable, those items shall be marked out. Data and drawings for component parts of an item or system shall be coordinated and submitted as a unit. Data and drawings shall be coordinated and included in a single submission. Multiple submissions for the same equipment or system are not acceptable except where prior approval has been obtained from the Contracting Officer. In such cases, a list of data to be submitted later shall be included with the first submission. Detail drawings shall show physical arrangement, construction details, connections, finishes, materials used in fabrication, provisions for conduit or busway entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and equipment weight. Drawings shall be drawn to scale and/or dimensioned. Optional items shall be clearly identified as included or excluded.

Electrical drawings including single-line diagrams, and schematics or elementary diagrams of each electrical system control wiring, and control logic; internal wiring and field connection diagrams of each electrical device when published by the manufacturer; wiring diagrams of cabinets, units, or separate mountings; interconnection diagrams that show the wiring between separate components of assemblies; field connection diagrams that show the termination of wiring routed between separate items of equipment; internal wiring diagrams of equipment showing wiring as actually provided for this project. Field wiring connections shall be clearly identified.

If departures from the contract drawings are deemed necessary by the Contractor, complete details of such departures, including changes in related portions of the project and the reasons why, shall be submitted with the detail drawings. Approved departures shall be made at no additional cost to the Government.

Control Cabinet Layout and Connection Drawing; G, EL
Control Wiring Diagrams; G, EL
HMI Programming License; G, EL

PLC Programming License; G, EL
PLC Ladder Logic Program; G, EL
Final PLC Ladder Logic Program; I, EL
HMI Program; G, EL
Screen Layouts; G, EL

SD-03 Product Data

Programmable Logic Controllers (PLC); G, EL
PLC Power Supply; I, EL
PLC Installation Manual; I, EL
Human Machine Interface (HMI) Display; G, EL
4-20mA Analog Input Module; I, EL
PLC Digital Input Module; I, EL
PLC Digital Output Module; I, EL
PLC I/O Wiring System; G, EL
Control Relays; G, EL
Selector Switches; I, EL
Push Buttons; I, EL
Indicating Lights; I, EL
Terminal Blocks; G, EL
Fuse Blocks; I, EL
Hour Meter (Run Time); I, EL
Emergency Stop; I, EL
Network Switch; G, EL
Stack Lights; G, EL
Insertion Magnetic Flow Meter; G, ME
Electronic Circuit Protector; G, EL
Water Pressure Switch; G, EL
Numeric Display; G, EL
Pipe Pressure Transducer; G, EL
Submersible Pressure Transducer; G, EL
Control Cabinet; G, EL
Thermostat; I, EL
Heater; I, EL
DC Power Supply; G, EL
Enclosure Lights; I, EL

SD-05 Design Data

Obtain approval for design data submittals prior to fabricating the respective control cabinet.

Control Cabinet Heat Calculation; G, EL

SD-06 Test Reports

Reports of field tests conducted in compliance with these specifications, including test procedures, analysis and interpretation of test results. All test reports to indicate presence of government representative during testing. Submit test report within 15 days of completion.

PLC I/O Check-Out Spreadsheet Form; G, EL
PLC manufacturers recommended check out procedures; G, EL
Shop Test Plan; G, EL
Field Test Plans; G, EL
Shop test results; G, EL
Field test results; G, EL

SD-07 Certificates

PLC Programmer Qualifications; G, EL
PLC Vendor Qualifications; G, EL
Manufacturer's Representative Qualifications; G, EL

SD-10 Operation and Maintenance Data

A manual or manuals shall be provided incorporating all systems and components listed in the paragraph; OPERATION AND MAINTENANCE MANUAL.

Operation And Maintenance Manual; G, EL
PLC Program Reports (I/O Tables); G, EL

1.4 QUALIFICATIONS

1.4.1 PLC Manufacturer Qualifications

All components comprising the controller system shall be manufactured by a company engaged in the manufacture of programmable logic controllers for at least 5 years. PLC supplier shall have a manufacturer certified service engineer on staff within 400 miles of project site.

1.4.2 PLC Programmer Qualifications

The programmer shall have documented training and minimum two years experience with the PLC programming software and the PLC equipment. Documentation shall be furnished for review and approval prior to start of programming.

1.4.3 PLC Vendor Qualifications

The PLC vendor shall have a supply facility within 400 miles of project site. Local vendor shall employ a PLC technician that is trained and certified by the PLC manufacturer as qualified to design, install, check-out, start-up and troubleshoot the PLC equipment to be provided.

1.5 IDENTIFICATION NAMEPLATES

Major items of electrical equipment and major components shall be permanently marked with an identification name to identify the equipment by type or function and specific unit number as indicated. Unless otherwise specified, all identification nameplates shall be made of laminated plastic with black outer layers and a white core. Edges shall be chamfered. Plates shall be fastened with black- finished round-head drive screws or approved nonadhesive metal fasteners. When the nameplate is to be installed on an irregular-shaped object, the Contractor shall devise an approved support suitable for the application and ensure the proper installation of the supports and nameplates. In all instances, the nameplate shall be installed in a conspicuous location. At the option of the Contractor, the equipment manufacturer's standard embossed nameplate material with black paint-filled letters may be furnished in lieu of laminated plastic. The following equipment, as a minimum, shall be provided with identification nameplates:

Minimum 1/4-Inch High
Letters

Minimum 1/8-Inch High
Letters

Equipment Enclosures
Panel, Circuit Breaker
Motor Starter
Programmable Controller Cabinet

Branch Circuit Transformer
Control Devices
Junction Boxes
Pilot Lights and Switches

Each enclosure or similar assemblies shall be provided with a nameplate in addition to nameplates listed above, which shall be provided for individual compartments in the respective assembly, including nameplates which identify "future," "spare," and "dedicated" or "equipped spaces."

PART 2 PRODUCTS

2.1 PROGRAMMABLE LOGIC CONTROLLERS (PLC)

2.1.1 PLC General Requirements

The PLC shall be Allen-Bradley ControlLogix 5580 1756-L83E with 1756-A10 chassis as manufactured by Rockwell Automation. The PLC must meet the following salient physical, functional, and performance characteristics.

1. The PLC shall be UL listed and shall be designed, manufactured, and tested to the latest applicable NEMA, IEC, ANSI, and IEEE standards.
2. The PLC shall be of a solid-state, modular, and field expandable compact design. The design shall allow for the expansion of the system by the addition of hardware and/or software. Modules shall be plugged into a chassis and keyed to allow installation in only one direction. The design shall prohibit upside-down insertion of the modules as well as safeguard against the insertion of a module into the wrong slot.
3. The program storage medium shall be a solid-state non-volatile type. The program storage capacity shall be at least 10 MB.
4. USB port for programming and diagnostics and ethernet port for communications.
5. At least 16 continuous, periodic, or event-driven tasks
6. Available settings must include RUN, PROGRAM, and TEST modes.
7. The CPU shall perform internal diagnostic checking and give visual indication to the user by illuminating a green indicator when no fault is detected and a red indicator when a fault is detected.
8. The entire PLC system shall immediately shut-down and annunciate (via LED) the occurrence of any of the following abnormal circumstances:
 1. Memory parity error.
 2. Loss of signal communication between CPU and I/O's.
 3. Loss of logic power to any portion of the system.
 4. Halt or interruption of memory scan.
 5. Detection of any "incomplete" relay ladder rungs in memory.

2.1.2 PLC Environmental Requirements

The packaged programmable logic controller shall be designed to operate in a free air flow environment. The packaged controller hardware shall function continuously in the relative humidity range of 5% to 95% with no condensation. All packaged controller hardware shall operate at an ambient temperature of 60°F to 110°F. The packaged controller system shall be designed and tested to operate in the high electrical noise environment of an industrial plant and must meet or exceed IEC 61000-4-5.

2.1.3 PLC Software Program

2.1.3.1 PLC Programming License

Provide one (1) licensed copy of PLC manufacturer's programming software which was used to develop the PLC ladder logic control program, reports, and documentation. The programming software shall become the property of the Government at the completion of the contract and shall be turned over to the Contracting Officer.

2.1.3.2 PLC Ladder Logic Program

Submit PLC Ladder Logic Program for approval at least 60 days before commissioning. Within 30 days of commissioning acceptance by Government, submit Final PLC Ladder Logic Program with all tags, notes, and revisions made before and during commissioning. The Contractor shall be responsible for developing a ladder logic software program which satisfies the intended performance described in the Sequence of Operations in the drawings as well as illustrated on the drawings. The programming means shall be an IBM or compatible desktop/portable, or industrial quality programming terminal.

The programmer shall develop the PLC program and a startup test procedure. The programmer shall be present during system startup to aid I/O check out, to debug program and for system operational testing in all modes using the approved test procedure. The programmer shall provide a copy of the final PLC program to the Government after commissioning. The provided copy of the PLC ladder logic program shall have the code commented by the programmer to explain the operation of the program to facilitate future modification and troubleshooting of the program code. At a minimum, the the program code shall include comments at the beginning of each routine that provide a description of that routine and its operation.

Provide submittal PLC Ladder Logic Program at least 30 days prior to Shop Demonstration Testing.

2.1.4 PLC Power Supply

The PLC shall operate on an electrical service of 120 VAC. 120VAC control power source to be powerhouse preferred AC. The power supply shall be 1756-PA72 as manufactured by Rockwell Automation. The power supply shall be capable of supplying all necessary power to all subsystems, (CPU, Memory, I/O, etc.). External power supplies shall not be needed to provide power to controller circuitry. The power supply shall mount to the PLC system chassis. The power supply shall be sized and selected for the current control configuration shown in the plans, for unused chassis slots as if filled equally with the same modules as shown in the plans.

2.1.1.5 PLC I/O Check-Out Spreadsheet Form

Provide a PLC I/O Check-Out Spreadsheet Form for all devices connected to the PLC I/O modules. The Form shall have a row of terminal data for each PLC I/O module terminal. The I/O module terminal (column) data shall include:

1. The PLC I/O (software)ladder logic program address,
2. Program I/O alias (if any),
3. PLC I/O module slot, type, and terminal name,
4. The first terminal block name,
5. Fuse block name (if applicable),
6. The field devices connected to the PLC I/O module terminal,
7. Show what (hardwire) test was performed (i.e. voltage or continuity test) to verify the end field device is correctly connected to the PLC I/O Module terminal, and
8. Show that the PLC (CPU) program is correctly indicating the field device.

Each PLC I/O terminal test shall be be initialed to show that the test was performed and the test showed proper continuity from the field device to the PLC I/O module terminal. Provide manufacturer's recommended check out procedures for equipment and devices provided.

2.1.1.6 4-20mA Analog Input Module

Analog input module shall be 1756-IF6I as manufactured by Rockwell Automation.

2.1.1.7 PLC Digital Input Module

Digital input module shall be 1756-IB16 as manufactured by Rockwell Automation.

2.1.1.8 PLC Digital Output Module

Digital output module shall be 1756-OB16I as manufactured by Rockwell Automation.

2.1.1.9 PLC RTD Input Module

RTD input module shall be 1756-IR12 as manufactured by Rockwell Automation.

2.1.1.10 PLC I/O Wiring System

The PLC I/O wiring system shall be 1492 as manufactured by Rockwell Automation. The PLC I/O wiring system shall meet the following salient physical, functional, and performance characteristics.

1. UL Listed
2. Manufacturer shall construct and test all wiring and terminations between PLI I/O module and terminal blocks before installation in the PLC cabinet.
3. All wiring between an I/O module and the respective terminal blocks shall be contained in an overall cable jacket.

2.2 HUMAN MACHINE INTERFACE (HMI) DISPLAY

The HMI shall be 2713P-T12WD1 as manufactured by Rockwell Automation.

2.2.1 HMI Programming Software

Provide a licensed copy of PLC manufacturers HMI programming software used to develop the HMI display program. The programming software shall become the property of the Government at the completion of the contract and shall be turned over to the Contracting Officer. Provide copies of the software via a CD (Compact Disc) and USB (Universal Serial Bus) data storage drive.

Submit [HMI Programming License](#).

2.2.2 Human Machine Interface (HMI) Display Program

Submit Human Machine Interface (HMI) Display Program at least 60 days before commissioning. Submit [HMI Program](#).

2.3 CONTROL CABINET

[UL 508A](#). Provide control cabinets that include, but are not limited to, NEMA 12 indoor-rated metal enclosures with hinged door, PLC-monitored door switches, door-activated enclosure lights, lockable handles, wire ducts, and backplanes. Include internal and external devices indicated on drawings.

Keep the internal enclosure operating temperature within the rated temperature range of the internally-mounted components and conductors. Measure ambient temperatures at each intended enclosure location. Assume an ambient temperature [2 F](#) greater than measured on site. Calculate internal enclosure operating temperatures. Identify the heat load in the enclosure and the maximum allowable operating temperature. Submit [Control cabinet heat calculation](#) for each control cabinet.

2.3.1 Control Cabinet Layout and Connection Drawing

Provide Control Cabinet Layout and Connection Drawing that shows all devices attached to the enclosure. Provide location, sizes, and connections to all enclosed and mounted devices, including terminal blocks, wireways, fuse blocks, push-buttons, selector switches, meters, indicator lights, cooling systems, and power supply.

2.3.2 Control wiring diagrams

Control wiring diagrams shall be submitted showing hardware interconnects between PLC, motor controls, motor starters, sensors, and instrumentation that are external to the PLC Cabinet.

2.4 DEVICES

2.4.1 Control Relays

Control relays shall meet or exceed the applicable requirements of [NEMA ICS 5](#) for Class A600 relays with convertible contacts or the requirements of [IEC 60947-5-1](#) AC-15. Relays shall be electrically-operated, magnetically-held, self-reset, and suitable for mounting on DIN rail. Device operating voltages shall match voltages shown in the plans.

2.4.2 Selector Switches

NEMA ICS 5. Unless otherwise indicated, selector switches shall be 30-mm diameter, black, unlit, heavy duty, and maintained. Device operating voltages shall match voltages shown in the plans.

2.4.3 Push Buttons

NEMA ICS 5. Unless otherwise indicated, push buttons shall be 30-mm diameter, black, unlit, flush, heavy duty A600, and momentary. Device operating voltages shall match voltages shown in the plans.

2.4.4 Indicating Lights

NEMA ICS 5. LED push-to-test lamps. Lamps shall be replaceable from the front of the panels, and any special tools required for lamp replacement shall be furnished. Unless otherwise stated, indicating lights shall be 30-mm diameter. Pushing to test the lamp shall not energize other parts of the control system. Device operating voltages shall match voltages shown in the plans.

2.4.5 Stack Lights

Provide pole-mounted stack lights using LED lamps. Lamps shall be at least 1-inch in diameter and non-flashing. Stack lights shall be UL Type 4/4X/13 IP65 that meets EN/IEC 60947-5-1, **UL 508**, and be UL listed. Provide colors as indicated on drawings. Device operating voltages shall match voltages shown in the plans.

2.4.6 Terminal Blocks

Terminal blocks shall be UL Listed.

Terminal blocks for the PLC I/O wiring system shall be DIN rail mounted and include LED status indication of digital channels. Channels shall be individually isolated.

2.4.7 Fuse Blocks

Fuse blocks shall be DIN rail mounted. Fuse blocks shall be UL Listed.

2.4.8 Hour Meter (Run Time)

Provide a rectangular hour meter that is UL Listed and displays at least 99999.9 hours.

2.4.9 Insertion Magnetic Flow Meter

Insertion magnetic flow meter shall include an isolation valve, have no moving parts, and be suitable for vertical and horizontal pipe runs moving river or ground water. Provide an isolated 4-20 mA output of flow rate. Provide certificate of calibration. Accuracy shall be within 3% (or better) of full scale. Flow meter shall be rated to measure from 1 ft/s (or lower) to the maximum flow of the pipe (or greater).

2.4.10 Electronic Circuit Protector

UL Listed and DIN rail mounted. Electronic circuit protector shall protect

sensitive loads from under-voltage by controlling the current to certain heavier loads. It shall also protect these heavier loads from overcurrent. Sensitive loads shall include, but not be limited to, the controller and and relay controls. Heavier loads shall include, but not be limited to, space heaters and any inductive loads such as circulation fans, air-conditioning compressors, and motors.

2.4.11 Water Pressure Switch

UL Listed. Rated for the pressure of the pipe in which it will be installed. Normally-open and normally-closed contacts.

2.4.12 Emergency Stop

UL Listed, maintained, normally closed contact, 50-mm red mushroom head, yellow back plate, labeled "EMERGENCY STOP".

2.4.13 Numeric Display

UL Listed. At least 5 digits which are at least 0.5-inch tall.

2.4.14 Network Switch

The Ethernet network switch shall be IE 2000-series IE-2000-8TC-G-B Managed 8 port Switch as manufactured by Cisco and must have the following salient characteristics.

- a. Layer 3 switch
- b. DIN rail mounting
- c. Ethernet ports
- d. SFP fiber optic ports

Include the indicated types and quantities of ports, including any indicated spare ports.

Provide a power supply for the network switch. Power supply shall be PWR-IE50W-AC as manufactured by Cisco.

2.4.15 Pipe Pressure Transducer

NPT connection to pipe. Rated for at least 0 to 100 PSI with accuracy of 0.25% of scale (or better). Analog loop-powered output signal.

2.4.16 Submersible Pressure Transducer

Solid-state submersible sensor for measurement of sump water level. Vented cable for automatic barometric compensation. Automatic temperature compensation. Rated for the range of submergence in which it will be installed. Accuracy of 0.25% of scale (or better). Analog loop-powered output signal.

2.4.17 Thermostat

Thermostat shall be adjustable with normally-open contacts which close upon rising temperature. The range of adjustment shall include 75°F to 120°F.

2.4.18 Heater

Enclosure heater shall be thermostatically controlled with an adjustable set point. The heating capacity and set point shall be suitable to prevent condensation in the enclosure.

2.4.19 DC Power Supply

Where DC power separate from PLC power supply is required provide power supplies that are UL recognized, DIN-rail mounted, have status LEDs, and have voltage sag protection.

2.4.20 Enclosure Lights

UL recognized. LED with motion activation. Light output shall be at least 400 lumens.

PART 3 EXECUTION

3.1 OUTAGE COORDINATION

Coordinate outages of existing control systems at least 4 weeks in advance with the Contracting Officer. Outages shall not exceed 4 hours each, and the Government reserves the right to require outages occur at night or on weekends.

Outages are anticipated for the "Combo" HMI in the control room and for the network switch in panel FSC.

3.2 PROGRAMMABLE LOGIC CONTROLLER INSTALLATION

The PLC shall be installed where indicated on the drawings. All wiring shall be neatly installed and wireways shall be used wherever possible. All wiring shall be identified at both ends by wire markers and identified with the applicable PLC address. Wire markers shall be printed, legible, durable, and permanently affixed. The PLC installation shall conform to the requirements of NFPA 70. Provide and follow PLC manufacturers recommended check out procedures.

3.2.1 Programmatic Fault Handling

For any major controller fault, produce an alarm and annunciate accordingly. Major faults shall include, at a minimum, the following conditions.

- A. Loss of required I/O communication
- B. Watchdog timer expired
- C. Project cleared from memory
- D. Chassis fault
- E. Unknown instruction encountered
- F. Stack overflow

For any minor controller fault, produce a warning and annunciate accordingly. Minor faults shall include, at a minimum, the following conditions.

- A. Task has not completed before it is time to run again
- B. Battery needs to be replaced
- C. Internal temperature is approaching operating limit

For any pumping system faults, produce an alarm, take the affected pump out of service, and annunciate accordingly. Pumping system faults shall include, at a minimum, the following conditions.

- A. High vibration of pump shaft
- B. High winding temperature
- C. High bearing temperature
- D. High motor amps
- E. Low motor speed
- F. Low discharge pressure
- G. Low discharge flow rate

Provide an annunciator panel to display pumping system faults. Annunciator shall be SEL-2533 as manufactured by Schweitzer Engineering Laboratories. Pumping system faults displayed on the annunciator shall include, at a minimum, the following conditions.

- A. Unwatering pump No.1 Trouble
- B. Unwatering pump No.2 Trouble
- C. Unwatering pump No.3 Trouble
- D. Drainage sump "High"
- E. Drainage sump "Low"
- F. Unwatering sump "High"
- G. Unwatering sump "Low"

3.3 HUMAN MACHINE INTERFACE MODIFICATION

Create required screens as described in the plans. Submit proposed layouts for each new or modified screen on the HMI. Include colors and labels in a scaled drawing. Include a description of the function of each display and control element.

Submit [screen layouts](#) for approval at least 60 days ahead of installation on the HMI.

3.4 INSTALLATION OF EQUIPMENT

The Contractor shall install equipment as specified, as shown and as required in the manufacturer's instructions for a complete and fully operational control system. Submit the manufacture's [PLC Installation Manual](#) within 20 days of contract award.

3.4.1 PLC Cabinets

PLC cabinets shall be located as indicated on the drawings. Devices located in the PLC cabinets shall be as shown on the drawings or as needed to provide the indicated control sequences. If internal cabinet temperatures will exceed equipment ratings, provide cooling systems.

3.5 SHOP TESTING

Submit [shop test plan](#) for review and approval at least 60 days before shop tests. Include each test to be performed and proposed test plans. Obtain approval before starting shop tests.

Notify the Government of testing dates and locations at least 30 days ahead. The Government reserves the right to require retesting of specified functions.

Wherever possible, perform tests using actual process variables, equipment, and data. Otherwise, provide means of simulation, such as analog and digital signal injection. Define simulation techniques in test plan.

Tests shall confirm (at a minimum) I/O mapping, communication system operation, data logging, HMI functions, alarms, and results for given inputs.

3.5.1 Unwitnessed Shop Test

Ensure the control system is operationally ready for the shop demonstration test. Test shall be performed at the Contractor's facility.

3.5.2 Shop Demonstration Test

Test shall be performed at the Contractor's facility. A Government representative will witness the shop demonstration test, unless waived in writing. Before testing, provide the Government representative with a copy of the shop drawings, test forms, test plan, and daily schedule. Begin each day with a meeting to review the day's schedule, and end each day with a meeting to summarize the findings and to identify the time and location of any subsequent shop demonstration test.

Tests shall confirm (at a minimum) the following items.

- a. Proper panel wiring to each field terminal. Tests shall include simulation of each discrete signal at the field terminal and simulation of analog signals over the full signal range at the field terminal.
- b. Application-layer communication per the OSI Model through all physical ports on all network switches
- c. All HMI screens and functions
- d. All manual control devices
- e. All alarm indications, system responses, and output signals
- f. Data logging of each required value to memory
- g. Warning and alarm thresholds for each data logging value
- h. Export of logged data, including a printed copy of the first page with data

A test shall be deemed successful if the required result is observed per the approved test plan. Repeat failed tests until no deficiencies are observed. Correct all deficiencies before shipment to the site.

Submit completed [shop test results](#) showing satisfaction of the approved test plans.

3.6 FIELD TESTING

Submit [field test plans](#) for review at least 60 days before field tests. Include each test to be performed and proposed test plans. Obtain approval before starting field tests.

Notify the Government of testing dates and locations at least 30 days ahead. A Government representative will witness shop tests, unless waived in writing. The Government reserves the right to require retesting of specified functions.

Tests shall confirm (at a minimum) sequence of operation in each control mode, all control interfaces, data logging of all required values, and all alarms.

Submit completed [field test results](#) showing satisfaction of the approved test plans.

3.7 MANUFACTURER'S FIELD SERVICES

The Contractor shall provide a manufacturer's technical representative to supervise the installation, startup, testing, putting into operation, and training of site personnel for PLC Check Out and Program Training (listed above). A letter of certification indicating the [manufacturer's representative qualifications](#) shall be submitted to the Contracting Officer for approval 30 days prior to performing the work specified.

3.8 TRAINING

The Contractor shall provide training on new equipment. See Section [01 11 01.00 28](#) SUPPLEMENTARY REQUIREMENTS, paragraph "TRAINING."

3.9 OPERATION AND MAINTENANCE MANUAL

[Operation And Maintenance Manual](#) shall be submitted, in accordance with and including all requirements of SECTION [01 78 00.00 28](#) CLOSEOUT SUBMITTALS. Emphasis shall be given to the following equipment and data:

- (1) PLC equipment. Include estimated PLC processing, PLC storage, HMI storage, and PLC network interface utilization percentages. Include percent remaining channels for analog input, analog output, discrete input, and discrete output modules.
- (2) PLC Control Cabinet Layout Drawing.
- (3) [PLC Ladder Logic Program](#).
- (4) [PLC Program Reports \(I/O Tables\)](#).
- (5) HMI Display.
- (6) HMI Display Program.
- (7) Oil-Water Separator System and Drainage-Unwatering Pump Instructions. Include the as-built sequence of operations. Also include a 25-page Government-furnished PDF document which will describe, at a minimum, interactions with other systems in the dam. Request the document at the pre-work meeting.

3.10 AS-BUILT DRAWINGS

The Contractor shall furnish as-built drawings in accordance with SECTION [01 78 00.00 28](#) CLOSEOUT SUBMITTALS.

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DRAINAGE AND SUBMERSIBLE PUMPS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 9 (2015) Load Ratings and Fatigue Life for Ball Bearings

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA E103 (2015) Horizontal and Vertical Line-Shaft Pumps

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.1 (2003; R 2018) Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B16.1 (2020) Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250

ASME B16.5 (2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 1940-1 (2003; R 2008) Mechanical Vibration - Balance Quality Requirements for Rotors in a Constant (Rigid) State - Part 1: Specification and Verification of Balance Tolerances

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Pumps of the same type shall be the product of one manufacturer.

1.2.2 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model, serial number, and catalog number on a plate secured to the item of equipment. In addition, the nameplate for each pump shall show the capacity in **gpm** at rated head in **feet** and speed in revolutions per minute. An arrow indicating the direction of pump rotation shall be cast into the pump casing. A corrosion resistant metal nameplate bearing the arrows shall be fastened to the pump casting.

1.2.3 Verification of Dimensions

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

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Verification of Site Conditions Report; G, C

Provide Verification of Site Conditions Report, state the date the site was visited and a listing of all discrepancies found or indicating that no discrepancies were found. Include any discrepancies noted with proposed solutions or include a request for information necessary to remedy the discrepancies.

SD-03 Product Data

Drainage Pump; G, ME

Manufacturer's descriptive data and technical literature, performance charts and curves, catalog cuts, and installation instructions.

Spare Parts; I, ME

Spare parts data for each different item of material and equipment

specified. Spare parts shall include the spare pump units as shown on the contract drawings.

[Long Term Storage Packaging; I, ME](#)

Spare pump units shall be provided in packaging suitable for long term storage as required by the manufacturer. All components shall be packaged such that they are protected from humidity and any other damage. All equipment shall be placed in wooden crates mounted on skids. Miscellaneous components shall be boxed, labeled and included with their respective spare pump unit.

[Submersible Sump Pump; G, ME](#)

[Pump Vacuum Breaker Air Relief Valve; I, ME](#)

[SD-06 Test Reports](#)

[Factory Test Reports; G, ME](#)

[Field Test Report; G, ME](#)

Test reports in booklet form showing all factory tests performed to prove compliance with the specified performance criteria.

[Field Test Procedures; G, ME](#)

[Factory Test Plan; I, ME](#)

[SD-10 Operation and Maintenance Data](#)

Submit operating data for each Drainage and Unwatering pump outlining the step-by-step procedures required for system startup, operation and shutdown. The data shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Submit maintenance data listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The data shall include simplified wiring, layout, and control diagrams of the system as installed. Submit data in accordance with specification SECTION 01 78 00.00 28 CLOSEOUT SUBMITTALS.

1.4 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

1.5 SPARE PARTS

The Contractor shall submit data for each [Spare Parts](#), after approval of the shop drawings and not later than 1 month prior to the date of occupancy. Data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of the parts recommended by the manufacturer to be replaced after 3 years of service. Data shall include the required spare part units as shown on the contract drawings. Spare part units shall be provided in [Long Term Storage Packaging](#).

PART 2 PRODUCTS

2.1 PUMP AND DRIVER REQUIREMENTS

2.1.1 Type of Installation

Furnish, install, and test vertical turbine drainage pump. Provide pump suitable for installation in the indicated sump and with the indicated capacity. Ensure line shaft is water lubricated.

2.2 PUMP PERFORMANCE

Pump shall be capable of discharging quantities of water while at maximum pump speed and total pump head with the minimum efficiency indicated. Total pump head, in feet, shall consist of the pumping level below datum as well as the static and friction head above datum at design capacity. Additional operating conditions to be met are indicated.

2.2.1 Drainage Pump

The Drainage Pump design point shall be 3,000 gpm at 110 feet of head with a minimum efficiency of 84 percent. The pump column and shafting shall be segmented into pieces no greater than 10 feet in length.

2.2.2 Submersible Sump Pump

The submersible sump pump installed in the sump located at elevation 176 shall be sized for 100 gpm at 40 feet of head pressure. Pump power requirements are not to exceed 1 hp and must be single phased 240 V. Pump will be rated for continuous submerged application and be controlled with an integrated float switch with a minimum 4 foot sump range.

2.3 LINE SHAFT VERTICAL TURBINE PUMPS

The drainage pump shall be a line shaft vertical turbine type and shall be constructed in accordance with AWWA E103 standards except as modified. Pumps shall be designed for flanged discharge. The pump setting or location of the pump suction shall be as indicated. The lower end of the suction pipe shall be equipped with a strainer. Strainer shall be as recommended by the pump manufacturer.

2.3.1 Pump Head Assembly

Pump head assembly shall consist of the pump baseplate, the discharge head, and the driver. Head assemblies shall be of low, rigid construction arranged for bolting to concrete foundations and shall be provided with at least two eyebolts, cast lugs or other means of securing slings to facilitate setting and lifting. Pump discharge head and baseplate shall be capable of withstanding all end and side thrusts imposed by the pump during operation and have adequate strength to resist vibration at any operating speed.

2.3.1.1 Pump Baseplate

Pump head baseplate shall be cast-iron or steel and shall serve as the sole plate for mounting the discharge head assembly. Drainage pump base plates for McNary shall be no greater in size than existing pump.

Baseplate shall mount to existing embedded plate. Provide base plate with leveling screws if needed, do not use shims.

2.3.1.2 Discharge Head

Discharge head flanges shall be designed for standard pipe connections conforming to [ASME B16.1](#) and [ASME B16.5](#). Below deck type discharge heads shall be designed for mounting on the baseplate or cast integrally with the baseplate. Discharge head shall be provided with a packed stuffing box with bronze lantern ring, a split gland follower, bronze follower nuts, and water lubrication. A lip to collect leakage from the stuffing box shall be provided with drilled and tapped connections for drainage pipe. Discharge head shall be designed to prevent contamination of the sump from the surface, and shall accommodate the required driver assembly. Space shall be provided for access to the coupling between the pump shaft and drive shaft. Pipe taps shall be provided on the discharge head for prelubrication and discharge pressure gauge connections. The discharge head shall be designed to support and align the driver, bowl assembly, shaft, column pipe, and suction strainer. The discharge head shall redirect the vertical flow to a horizontal direction, and as a minimum, contain a stuffing box and packing to seal around the drive shaft to prevent pumped water from entering the driver assembly.

2.3.2 Pump Bowl Assembly

Pump bowl assembly shall include the pump bowl, pump impeller, suction strainer, pump shaft and bearings and may be of single stage or multistage configuration.

2.3.2.1 Pump Bowls

Bowls shall be of close-grained cast-iron and shall have integrally-cast vanes with smooth, streamlined water passageways. The pump bowls shall be lined with porcelain enamel or epoxy coating. Suction bowl shall contain a bronze bearing permanently packed with nonsoluble grease and fitted with a sand collar to serve as the bottom bearing of the pump shaft. The discharge bowl shall have a seal to minimize the leakage of water into the shaft enclosing tube and shall have bypass ports of sufficient area to permit the escape of water which may leak through the seal or bushing. Casing wearing rings of bronze shall be installed for pumps with enclosed impellers.

2.3.2.2 Impellers

Impellers shall be carefully finished with smooth water passageways and shall not load the prime mover beyond the nameplate rating over the entire performance range of the pump. Impellers shall be securely attached in an axial direction to the pump shaft. No impeller shall contact the bowl under operating conditions. A suitable adjustable mechanism to achieve the proper axial position of the impeller with respect to the bowl shall be provided. Impellers shall be of the enclosed type and shall be constructed of bronze. Impellers shall be securely fastened by left-hand threaded nut or other suitable method to prevent the impeller from loosening from the impeller shaft. Impellers shall be keyed and/or set-screwed to prevent rotation in relation to the shaft. Stainless steel wear rings shall be installed on enclosed impellers. Impellers shall be statically and dynamically balanced per [ISO 1940-1](#), balance grade quality grade G6.3, or equivalent.

2.3.2.3 Pump Shafts

Shafts shall be of 316 or 416 stainless steel capable of transmitting the required thrust in either direction and the total torque of the unit encountered during start up as well as during operation. Shaft shall be designed to support the impeller and be provided with renewable shaft sleeves at the bearing surfaces in order to protect it against wear, erosion and corrosion. Shaft sleeves shall be of a hard bronze or other corrosion resistant material.

2.3.2.4 Pump Shaft Couplings

Line shaft sections shall be connected by threaded couplings or keyway couplings, composed of material similar or superior to those of the line shafts. Coupling threads shall not be tapered and shall tighten during pump operation.

2.3.2.5 Pump Shaft Bearings

Packing box bearing shall be of a split gland design and use manufactures preferred synthetic packing rings and be water lubricated. Intermediate bearings shall be water lubricated fluted rubber. Pumps shall have a water pre-lube system to prevent dry startup of bearings. Bearings shall be designed so that they are lubricated by the water in the discharge column pipe as the pump is in operation. Top bowl bearing shall be provided with sand collar to prevent intrusion of abrasive particles. Bearings shall be spaced no more than 10 feet apart and be designed so that the shaft is properly centered within the discharge pipe column. All bearings shall be designed for a minimum life of 100,000 hours under maximum applied load and maximum allowable misalignment in accordance with ABMA 9.

2.3.3 Suction Strainer

Suction strainer shall be fabricated from 304L or 316L stainless steel.

2.3.4 Discharge Column Pipe

Column pipe shall be of adequate size and strength to withstand the forces and stresses imposed during all pump operation conditions. To facilitate maintenance and repair, column piping is to be supplied with interchangeable lengths not exceeding 10 feet and coordinated with the line shaft bearing spacing. Column pipe connections shall provide accurate alignment and adequate water tightness. All discharge column pipe connections shall be flanged. The discharge column shall be coated in the pump manufacturer's standard coating for submerged applications.

2.4 PUMP ACCESSORIES

2.4.1 Pump Vacuum Breaker Air Relief Valve

Vertical turbine pump air valve shall be able to vent large quantities of air through an orifice when the pump starts and close tight when liquid enters. It must permit large quantities of air to re-enter through the orifice when the pump stops to prevent a vacuum from forming in the pump suction column. The main parts of the valve shall be shielded from the direct impact of water by a baffle. The float shall be stainless steel and be center guided. The discharge orifice shall have a double acting throttling valve which can restrict air from venting to establish a

pressure loading on the pump, and fully open automatically to allow unrestricted air entry to prevent the formation of a vacuum. The valve shall also be fitted with an air release valve which shall allow small quantities of air to escape during pump operation. The valve shall be designed for the intended purpose and for use with vertical turbine pumps. The valve body shall be made of cast iron. The valve shall be sized to match the pump requirements.

2.5 ELECTRICAL EQUIPMENT

2.5.1 General

Electrical motor-driven equipment specified shall be provided complete with motors, motor starters, and controls. Motor controls, equipment, and wiring shall be as specified in Section 26 05 00.00 28 GENERAL ELECTRICAL WORK.

2.5.2 Electric Motors

For additional motor requirements see specification section 26 29 01.00 28 ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE.

2.6 EQUIPMENT APPURTENANCES

2.6.1 Attachments

All necessary bolts, nuts, washers, bolt sleeves, and other types of attachments for the installation of the equipment shall be furnished with the equipment. Bolts shall conform to the requirements of ASTM A307 and nuts shall be hexagonal of the same quality as the bolts used. Threads shall be clean-cut and shall conform to ASME B1.1. Bolts, nuts, and washers specified to be galvanized or not otherwise indicated or specified, shall be zinc coated after being threaded, by the hot-dip process conforming to ASTM A123/A123M or ASTM A153/A153M as appropriate. Bolts, nuts, and washers specified or indicated to be stainless steel shall be Type 316. Where stainless steel is attached to dissimilar metals insulating washers or insulate bolts shall be used to limit galvanic action.

2.6.2 Equipment Guards

Equipment driven by open shafts, belts, chains, or gears shall be provided with all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. The guards shall conform in all respects to all applicable safety codes and regulations.

2.6.3 Special Tools

A complete set of all special tools which may be necessary for the adjustment, operation, maintenance, and disassembly of all equipment shall be furnished. Special tools are considered to be those tools which because of their limited use are not normally available, but which are necessary for the particular equipment. Tools shall be high-grade, smooth, forged, alloy, tool steel. Special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such special tools until completion of the work, at which

time they shall be delivered to the Contracting Officer.

2.6.4 Shop Painting

All motors, pump casings, discharge heads, and similar parts of equipment customarily finished in the shop shall be coated with the manufacturer's standard coating suitable for the intended service. Ferrous surfaces obviously not to be painted shall be given a coat of a suitable rust-resistant coating.

PART 3 EXECUTION

3.1 SITE CONDITIONS INSPECTIONS

The Contractor shall perform a field inspection of the existing equipment and submit a [Verification of Site Conditions Report](#). Contractor shall verify site conditions and clearances in order to identify potential obstructions and to select suitable equipment to be used during the installation of the pumps. The report shall also state the Contractor's ability to accomplish all required work in adherence to the plans and specification requirements.

3.2 PAINTING AND FINISHING

No factory finished equipment or appurtenances shall be field painted except that damaged factory finishes shall be retouched in an acceptable manner with paint obtained from the manufacturer. Nameplates shall not be covered with paint but shall be cleaned and legible at completion of the work.

3.3 FACTORY TEST

3.3.1 Factory Test Reports

Provide test reports in booklet form showing all factory tests performed for the drainage pump to prove compliance with the specified performance criteria. Reports shall include documentation describing any issues encountered during testing as well as the procedures that were implemented to solve them. Submit [factory test plan](#) 90 day prior to factory testing, showing test will conform to [AWWA E103](#). The Contractor shall submit the following:

[Factory Test Reports](#)

3.3.2 Factory Pump Test

Factory pump performance test shall be made in conformance with [AWWA E103](#) for the following:

- a. Mechanical test in which the Government is notified not less than ten (10) business days prior so that the test may be observed.
- b. Sample calculation from test readings.
- c. Shop inspection.
- d. Hydrostatic test of bowl assembly.
- e. Hydrostatic test of discharge head.

3.4 FIELD TEST REPORT

After the pumping unit is installed and prior to start-up, completely clean the sump area of any accumulated construction debris. Once final cleaning of the sump area is completed, the area will be reviewed by a representative of the Government. Correct any damage to the pumping units or related equipment during initial start-up due to foreign objects left in the sump areas.

Prior to proceeding with construction of the test setup but not later than 90 days after date of notice to proceed, submit [field test procedures](#) with a description of the test setup and test procedure proposed. Include dimensioned drawings and cross-sectional views of the setup and pump, respectively, with location of instruments and points of their connection shown. Identify which additional drain valves will be open.

3.4.1 Wet Tests

Test the drainage pump unit under load, at or near normal operating conditions, for at least 9 hours; the test will be witnessed by the Government. It may be necessary to open additional drain valves to perform a 9 hour test; coordinate valve opening with project. Provide all supplies and equipment required to conduct the test. During the test observe, measure and record the operation of the pumps during the test for sound, vibration, bearing temperatures, and current draw. Measured parameters must be within the pump manufacturer's published limits. Without additional costs to the Government, make all changes and correct any errors. If at any point during the test, the pump alarms on high temperature or vibration, the test will stop and corrective action will be taken by the contractor and the test will start over. Submit all results as part of the field test report.

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POWERHOUSE UNWATERING PUMPS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 9 (2015) Load Ratings and Fatigue Life for Ball Bearings

ABMA 11 (2014) Load Ratings and Fatigue Life for Roller Bearings

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.1 (2003; R 2018) Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B16.5 (2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard

ASME B40.100 (2013) Pressure Gauges and Gauge Attachments

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

ASTM D115 (2017) Standard Test Methods for Testing Solvent Containing Varnishes Used for Electrical Insulation

ASTM D1002 (2010; R 2019) Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)

ASTM D2240 (2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness

ASTM D4060 (2019) Abrasion Resistance of Organic Coatings by the Taber Abraser

HYDRAULIC INSTITUTE (HI)

HI ANSI/HI 14.6 (2011) Rotodynamic Pumps for Hydraulic Performance Acceptance Tests - A136

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 21940-11 (2016) Mechanical vibration -- Rotor balancing -- Part 11: Procedures and Tolerances for Rotors with Rigid Behavior

1.2 GENERAL REQUIREMENTS

1.2.1 Nameplates

Secure to each major item of equipment a corrosion resistant metal nameplate with the manufacturer's name, address, type or style, model, serial number, and catalog number of equipment. Additionally include on the name plate capacity in gallons per minutes, rated head in feet, and operating speed in revolutions per minute. Provide an arrow indicating the direction of pump rotation cast into the pump casing or as part of the nameplate.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation. Submittals having an "I" designation are for information only. The designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Operational Test Plan; G, ME

Installation And Removal Plan; G, ME

SD-02 Shop Drawings

Equipment Installation; G, ME

SD-03 Product Data

Spare Parts; I, ME

Long Term Storage Packaging; I, ME

Drivers; G, ME

Wear Resistant Coating; G, ME

Pump Isolation; G, ME

SD-05 Design Data

In-Kind Replacement; G, ME

SD-06 Test Reports

As Found Report; I, ME

Factory Test Reports; G, ME

Operational Test Report; G, ME

1.4 DELIVERY AND STORAGE

Ensure all equipment being transported or placed in storage is protected from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

1.5 SPARE PARTS

Provide the spare parts recommended by the manufacturer to be stocked at the project or replaced within 3 years of service. Submit product data for each spare part. Provide a complete list of parts and supplies in accordance with specification section 01 78 00.00 28 CLOSEOUT SUBMITTALS, paragraph SPARE PARTS. In addition to the parts recommended by the manufacturer, provide the following extra materials:

- a. One rebuilt pump complete with the modifications and upgrades specified herein.

1.5.1 Long Term Storage Packaging

Provide spare parts in packaging suitable for long term storage as required by the manufacturer. Ensure all components are packaged such that they are protected from humidity and any other damage. Place all equipment in wooden crates mounted on skids. Label packaging with the part name, nomenclature, serial number, and install location.

Submit a packaging description for each packaging arrangement used. Identify all items to be packaged in each arrangement. Include drawing, product data, and photos as required to demonstrate compliance with this specification.

PART 2 PRODUCTS

2.1 PUMP AND DRIVER REQUIREMENTS

2.1.1 Type of Installation

Provide one in-kind replacement for the existing Unwatering Pumps. Provide with material and equipment upgrades as specified herein. Ensure in-kind replacement is constructed of all new materials. Ensure pump and its appurtenances are sourced for the original equipment manufacturer (OEM).

Remove, rebuild, and reinstall the existing Unwatering Pumps in sequence, ensuring only one pump is out of service at a time. Provide with material and equipment upgrades as specified herein. Provide the final rebuilt pump as spare equipment, packaged for long term storage. Ensure pump rebuilds are preformed by the OEM.

2.1.2 Existing Equipment

The existing Unwatering Pumps are Bingham 12X14X26 SV pumps. The Bingham 12X14X26 SV is no longer made and Bingham is now a part of Sulzer Pump Services. Sulzer Pump Services, now the OEM of the Unwatering Pumps, has the capability to recreate an in-kind replacement. See contract information below:

Sulzer Pump Services (US) Inc.
3618 West 1820 South, Salt Lake City, UT 84104
Phone: 801-973-9508
FAX: 801-973-4574

Reference Sulzer RFQ number: OPID1570426

2.1.3 Pump Performance

Ensure both new and rebuilt pumps have capacities as indicated.

2.1.4 Drivers

Provide new drivers as supplied and recommended by the Unwatering Pumps' OEM. Submit product data for government approval prior to acquisition. Ensure product data adequately demonstrates compliance with this specification. Provide drivers with the following characteristics:

Rated Horsepower: 250 HP
Operating Speed: 900 RPM
Operating Voltage: 480V
Operating Current: 3Ph AC at 60Hz
Enclosure: TEFC
Service Factor: 1.15

2.2 VERTICAL CENTRIFUGAL PUMPS

Provide new and rebuilt overhung flexibly-coupled vertical centrifugal pumps as indicated and recommended by the pump manufacturer. Provide with flanged suction and discharge connections conforming to ASME B16.5.

2.2.1 Pump Casing

Provide or recondition a cast iron pump casing for each pump. Do not use a reconditioned pump casing for the in-kind replacement. Provide with tapped and plugged holes for venting and draining pump. Ensure casing is capable of withstanding pressures 50 percent greater than the maximum operating pressure. Ensure the volute has smooth passages. Coat wetted surfaces with approved wear resistant coating. Provide with lifting eyes for pump handling.

2.2.2 Impeller

Provide impeller constructed from type 316 stainless steel for each pump, both rebuilt and in-kind replacement. Provide impeller with smooth water passageways. Ensure impeller is keyed to a compatible stainless steel shaft with a locking arrangement whereby the impeller cannot be loosened by torque from either forward or reverse direction. Ensure impeller does not contact the volute or other stationary parts during normal operation. Statically and dynamically balance impellers per ISO 21940-11, balance grade quality grade G1, or equivalent.

2.2.3 Wear Plate

Provide with type 316 stainless steel replaceable wear plates.

2.2.4 Pump Shaft

Provide each pump with a solid type 316 stainless steel pump shaft. Ensure shaft is of adequate size and strength to transmit the full driver horsepower with a safety factor greater than 3. Ensure shaft runout does not exceed 0.001 in. Ensure axial float does not exceed 0.005 in.

2.2.5 Suction Elbow

Provide or recondition a suction elbow for each pump. Provide with flanged connections conforming to [ASME B16.5](#). Coat wetted surfaces with approved wear resistant coating.

2.2.6 Wear Resistant Coating

Provide a wear resistant coating designed to be used on pump internals and to improve pump life. A proper coating provides increased protection to coated surfaces from wear and corrosion. Ensure coating provides a smooth, uniform surface. Ensure neither the coating nor the application method distort or otherwise damage the substrate material. Apply coating per the coating manufacturer's instruction. Ensure coating has the following properties:

Harness - Shore D of at least 80 per [ASTM D2240](#)
Tensile Shear Adhesion- Steel of at least 3500 psi per [ASTM D1002](#)
Dielectric Strength of at least 600volts/mil per [ASTM D115](#)
Wear Index less than .03 with a CS-17 wheel per [ASTM D4060](#)

Submit product data for wear resistant coating. Ensure product data demonstrates compliance with this specification. Include instruction for repairing damaged coatings.

2.2.7 Bearings

Provide with ball or roller type bearings designed to handle all thrust loads in either direction. Ensure bearings have an ABMA L-10 life of 100,000 hours minimum at normal operating speed in accordance with [ABMA 9](#) or [ABMA 11](#). Reuse of existing bearings is prohibited.

2.2.8 Shaft Couplings

Provide heavy-duty flexible type couplings, keyed or locked to the shaft. Ensure it is possible to disconnect the coupling without removing either the driver half or the pump half of the coupling from the shaft. Ensure couplings are per Unwatering Pump OEM recommendation.

2.2.9 Line Shaft

Provide new solid line shaft and couplings for each pump. Ensure shaft is of adequate size and strength to transmit the full driver horsepower with a safety factor greater than 3. Ensure isolation is provided for dissimilar metals. Ensure shaft runout does not exceed 0.001 in. Ensure axial float does not exceed 0.005 in.

2.2.10 Line Shaft Bearings

Provide cylindrical bearing cartridges as recommended and supplied by the Unwatering Pump OEM.

2.2.10.1 Housings

Provide cast iron bearing housing as recommended and supplied by the Unwatering Pump OEM. Ensure housing prevents spatter and directs used grease to a discharge line for easy collection and cleanup.

2.2.11 In-kind Replacement

Submit a design package for the in-kind replacement. Include shop drawings, calculations, product data, photos, and factory test reports as required to demonstrate compliance with this specification.

2.3 PUMP ACCESSORIES

2.3.1 Lubrication System

Provide an automatic grease system for each pump not designated as spare equipment. Provide system as recommended by the Unwatering Pump OEM. Ensure system provides adequate lubrications to all pump and line shaft bearings. Provide automatic grease system suitable for 115 / 230 VAC power. Provide with supply and return lines to each lubrication point as specified by the Unwatering Pump OEM. System must be compatible with Kluber Bio AM 12-501.400 G. Coordinate location automatic grease system location with the Contracting Officer (KO). Route 115 / 230 VAC power for automatic grease systems as coordinated with the KO. Assume power will be routed from CR01, elevation 254, and that the existing conduits can be used.

2.3.2 Pressure Transducer

Provide a pressure transducer as indicated for each pump not designated as spare equipment. For additional pressure transducer requirements see specification section 40 94 43.00 28.

2.3.3 Pressure Gauge

Provide across each pump that is not designated as spare equipment a differential pressure gauge of the direct-reading type, equipped with a shut-off cock and snubber. Ensure pressure gauge conforms to ASME B40.100 and is calibrated in psi in not more than 2 psi and 5 foot increments from zero to a minimum of 5 psi and 10 feet above the shut-off head of the pump. Ensure the rating point is approximately at the mid-point of the scale.

2.3.4 Pump Isolation

Provide vibration and dielectric isolation as recommended by the Unwatering Pump OEM. Ensure vibration is limited to 20 to 40 percent of the lowest equipment rpm.

Submit details of vibration and dielectric isolation features. Include arrangement, foundation plan, dimensions, specifications, product data, and calculations as required to demonstrate compliance with this specification.

2.4 ELECTRICAL EQUIPMENT

2.4.1 General

Provide electrical motor-driven equipment complete with motors, motor starters, and controls. Ensure motor controls, equipment and wiring are specified in Section 26 05 00.00 28 GENERAL ELECTRICAL WORK.

2.4.2 Electric Motors

Ensure motor is designed to support line shaft unless line shaft is provided with trust bearings. For additional motor requirements see specification section 26 29 01.00 28 ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE.

2.4.3 Motor Sole Plate

Fabricate sole plates to suit motor and grout in place per 03 30 70.00 28 CONCRETE DEMOLITION, REPAIR OF CONCRETE SURFACES, AND EQUIPMENT FOUNDATIONS. Provide sole plates with leveling screws, shims are not allowed.

2.5 EQUIPMENT APPURTENANCES

2.5.1 Attachments

Furnish all necessary bolts, nuts, washers, bolt sleeves, and other types of attachments required for installation with the equipment. Provide bolts conforming to the requirements of ASTM A307 and hexagonal nuts of the same quality as the bolts used. Ensure threads are clean-cut and conform to ASME B1.1. Unless otherwise indicated or specified, hot-dip galvanize all bolts, nuts, and washers in accordance with ASTM A123/A123M or ASTM A153/A153M as appropriate. For bolts, nuts, and washers specified or indicated to be stainless steel provide Type 316. Where stainless steel is attached to dissimilar metals provide insulating washers or insulate bolts to limit galvanic action.

2.5.2 Equipment Guards

For all equipment driven by open shafts, belts, chains, or gears provide all-metal guards enclosing the drive mechanism. Guards must be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Secure guards in position by steel braces or straps which will permit easy removal for servicing the equipment. Ensure the guards conform in all respects to all applicable safety codes and regulations.

2.5.3 Special Tools

Provide a complete set of all special tools necessary for the adjustment, operation, maintenance, and disassembly of all furnished equipment. Special tools are those tools which because of their limited use are not normally available, but which are necessary for the particular equipment. Ensure tools are high-grade, smooth, forged, alloy, tool steel. Deliver special tools at the same time as the equipment to which they pertain. Properly store and safeguard special tools until completion of the work, at which time deliver them to the Contracting Officer.

2.5.4 Shop Painting

All motors, pump casings, discharge heads, and similar parts of equipment customarily finished in the shop must be given coats of paint filler and enamel, or other acceptable treatment customary with the manufacturer and suitable for the intended service. Ensure ferrous surfaces not to be painted are given a shop coat of grease or other suitable rust-resistant coating.

PART 3 EXECUTION

3.1 PREPARATION

The Contractor is responsible for the coordination and proper relation of the contracted work. Become familiar with all details of the work, verify site conditions and clearances to identify potential obstructions. Advise the Contracting Officer of any discrepancy before performing the work.

3.1.1 Installation and Removal Plan

Submit an Installation and Removal Plan at least 30 days prior to beginning work on the Unwatering Pumps. Include a description of the anticipated activities required to complete the work along with anticipated schedules and durations. Include the following:

- a. A high-level sequence of operations. Include sequencing for removals, installations, and driver changeovers. Provide anticipated timeframes.
- b. A plan for how each pump will be isolated for removal.
- c. A plan for the on-site disassembly. Indicate how the pumps will be removed from the system, including the level of disassembly and a plan to support components during disassembly.
- d. A plan to transport each pump out of the powerhouse. Include a description of any significant equipment that will be required.
- e. A plan to transport each pump to and from the OEM's service center. Indicate how the pumps will be protected and secured during transport.
- f. A plan to transport each pump to the pump room for installation. Include a description of any significant equipment that will be required.
- g. A plan for installation of each pump. Include the OEM's written instructions.

Include drawings, schematics, calculations, and cut-sheets as necessary to accurately describe the plan.

3.2 INSTALLATION AND REMOVAL

Remove, rebuild, and reinstall the existing Unwatering Pumps in sequence. Ensure in-kind replacement is onsite and ready for installation prior to removing the first pump from service. Ensure only one pump is out of service at a time and minimize pump down-time to the extent possible. Do not remove subsequent pumps from service until the previous is rebuilt, returned to site, fully installed, tested, and ready for use.

3.2.1 Equipment Installation

Submit drawings containing complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Show on the drawings the proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

3.2.1.1 Pump Installation

Install pumping equipment and appurtenances in the position indicated and in accordance with the manufacturer's written instructions. Provide all appurtenances required for a complete and operating pumping system, including such items as piping, conduit, valves, wall sleeves, wall pipes, concrete foundations, anchors, grouting, pumps, drivers, power supply, seal water units, and controls.

3.2.2 Dissimilar Metals

Provide dielectric fittings and isolation joints as required to protect equipment. Install in accordance with the manufacturer's instructions.

3.3 REBUILD

The existing Unwatering Pumps are to be rebuilt by the OEM to a like new condition as specified herein.

3.3.1 As Found Report

For each pump provide a report from the OEM documenting dimensional and visual inspections. Include an inventory of components with the report and a component by component repair assessment.

3.4 FACTORY QUALITY CONTROL

Ensure a high level of quality control is maintained for the rebuilds and the in-kind replacement.

3.4.1 Shop Assembly

After repairing or fabricating pump components to a new or like new condition, perform dimensional and visual inspections for all repaired and fabricated components. Document the results and include as part of the factory test report. Fully assemble the pump in the shop to determine the correctness of the fabrication and repairs. Measure and record all necessary clearances. Ensure that binding does not occur in any moving part. Arrange for a final shop inspection to be performed in the presence of the Contracting Officer, unless waived in writing. Provide the Government a minimum of 30 days notification prior to the inspection date.

3.4.2 Factory Testing

Perform factory performance pump tests for flow rate, total dynamic head, and efficiency. Demonstrate conformance with [HI ANSI/HI 14.6](#) acceptance grade 2B or better. Third party testing is permissible.

3.4.3 Factory Test Reports

Provide a report showing all factory tests performed for each pump to prove compliance with the specified performance criteria. Include the dimensional and visual inspection reports. Document any issues encountered during testing as well as the procedures that were implemented to solve them.

3.5 FIELD QUALITY CONTROL

3.5.1 Operational Test

Prior to acceptance, perform an operational test of all pumps, drivers, and control systems to determine if the installed equipment meets the purpose and intent of the specifications. Perform tests in accordance with the approved plan. Demonstrate that the equipment is not electrically, mechanically, structurally, or otherwise defective; is safe and in satisfactory operating condition; and conforms with the specified operating characteristics. Prior to applying electrical power to any motor driven equipment, rotate the drive train by hand to demonstrate free operation of all mechanical parts. Include checks for excessive vibration, leaks in all piping and seals, correct operation of control systems and equipment, proper alignment, excessive noise levels, and power consumption.

3.5.1.1 Operational Test Plan

Submit an operational test plan at least 30 days prior to the anticipated beginning of operational testing. Include a list of the tests to be performed with a brief description of each. Provide documentation showing that planned tests are sufficient to reveal common defects, ensure safe and satisfactory operating conditions, and demonstrate the system conforms to the specified operating characteristics.

3.5.1.2 Operational Test Report

For each pump, submit an operational test report showing all tests performed, the data collected from each, the adjustments made to each component, and conclusions that resulted from the test.

3.5.2 Deficiencies

If an inspection or test shows a defect, the defect must be replaced or repaired as necessary, and inspections and tests repeated.

3.6 MANUFACTURER'S SERVICES

Provide the services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the equipment specified. Ensure the representative supervises the installation, adjustment, and testing of the equipment. The representative must be on-site during final adjustments and during the Operational Test.

3.7 CLOSEOUT ACTIVITIES

3.7.1 Operation and Maintenance Manuals

In addition to the items specified in Section 01 78 00.00 28 include: the As Found Reports, Factory Test Reports, and Operational Test Reports for

each pump as a part of the Operation and Maintenance Manuals submittals.

3.7.2 Framed Instructions

Post, where directed, framed instructions showing wiring and control diagrams. Include condensed operating instructions, prepared in typed form. Provide under glass or in laminated plastic. Post the framed instructions before acceptance testing of the system. If more than one page is required post documents side by side.

3.7.3 Training

Provide training for the Unwatering pumps in accordance with SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENTS.

-- End of Section --

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