AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
J	1		8

2. AMENDMENT/MODIFICATION NUMBER	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQUISITION NUMBER	5. PROJECT NUMBER *(If applicable)*
0003	01 MAY 2026		513664

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
W071 ENDIST PORTLAND KO CONTRACTING DIVISION, 333 SW FIRST AVE PORTLAND, OR 97204-3495 UNITED STATES KRISTEL FLORES, EMAIL: KRISTEL.M.FLORES@USACE.ARMY.MIL TELEPHONE: (503) 808-4664	W9127N	SCD: PAS:	

8. NAME AND ADDRESS OF CONTRACTOR *(Number, street, county, State and ZIP Code)*

CODE | FACILITY CODE

(X)

☒ 9A. AMENDMENT OF SOLICITATION NUMBER: W9127N26BA001

9B. DATED *(SEE ITEM 11)*: 07 APR 2026

☐ 10A. MODIFICATION OF CONTRACT/ORDER NUMBER

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended. ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

SEE SECTION G - CONTRACT ADMINISTRATION DATA

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NUMBER AS DESCRIBED IN ITEM 14.

CHECK ONE	
☐	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NUMBER IN ITEM 10A.
☐	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
☐	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
☐	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (*Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

The purpose of this amendment is to:
- Extending the due date from 13 May 2026 to 20 May 2026 @ 1300
- Bid opening rescheduled from 13 May 2026 to 20 May 2026 @ 1400. Please contact Kristel Flores at Kristel.M.Flores@usace.army.mil if you would like to attend the bid opening no later than 18 May 2026 @ 1400
- Include clause RFO 52.222-90, Addressing DEI Discrimination by Federal Contractors
- Incorporate clarifications to bidder inquiries and associated revisions to the specifications and appended drawings

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
		CORY R. PFENNING	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		*(Signature of Contracting Officer)*	01 MAY 2026

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Section 00 00 00 - Procurement and Contracting Requirements

The following changes have been made:

INFORMATION	FROM	TO
Response Due Date	13 May 2026	20 May 2026

Section 00 72 00 - General Conditions

Miscellaneous text in this section has been modified to:

Period of Performance

The contractor shall begin work within 10 calendar days of receiving the Notice to Proceed (NTP), diligently prosecute the work, and complete all work, including final cleanup and all required closeout documentation (including as-built drawings), within 965 calendar days of receiving the NTP, and strictly complying with all provided Unit Outage Windows. The NTP will be issued as soon as practicable after bid opening, but no specific issuance date is guaranteed.

Commencement, Prosecution, and Completion of Work - Construction *(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 (NTP), (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 965 calendar days of receiving the NTP.* The time stated for completion shall include final cleanup of the premises.

(End of condition)

Physical Data *(Apr 1984)*

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by oil sample testing, alignment testing, and vibration testing using ASTM approved machinery condition monitoring techniques.

(b) Weather conditions - Weather records and reports may be obtained from the National Weather Service. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project (see table 1.)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of Days	3	1	0	0	1	1	0	0	0	0	1	3

(End of condition)

Site Visit (Construction) ***(Feb 1995)***

(a) The conditions, Differing Site Conditions, and 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 --

27 April 2026 @ 1000 Pacific Time

(c) Participants will be meet at --

John Day Dam

John Day Dam Road

I-84 Exit 109

Rufus, OR 97050

(d) Additional Site Visit Requirements

(1) All prospective offerors intending to attend the site visit **must** send an RSVP to:

Kristel Flores at Kristel.M.Flores@usace.army.mil,

Cory Pfenning at Cory.R.Pfenning@usace.army.mil,

Marina Reilly-Collette at marina.i.reilly-collette@usace.army.mil,

Blaise Jones at Blaise.S.Jones@usace.army.mil, and

Adrian Mariscal-Arellano at Adrian.MariscalArellano@usace.army.mil

at *before 20 April 2026 @ 1400 Pacific Time* with the following information

(i) Company Name

(ii) Number of attendees

(iii) Name of each attendee

(iv) Citizenship of each attendee (Only U.S. citizens will be permitted to attend)

(2) The following safety gear is required at the site: Steel toed boots, hardhats, safety vests, safety glasses.

(3) Each individual must have picture identification on his/her person while at the project site. **Real ID, passport or TWIC is required**. 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.

(End of Condition)

252.203-7001 Prohibition on Persons Convicted of Fraud or Other Defense Contract-Related Felonies.

As prescribed in 203.570-3 , use the following clause:

PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE-CONTRACT-RELATED FELONIES (JAN 2023)

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

(1) "Arising out of a contract with the DoD" means any act in connection with--

(i) Attempting to obtain;

(ii) Obtaining; or

(iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).

(2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.

(3) "Date of conviction" means the date judgment was entered against the individual.

(b) Any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--

(1) In a management or supervisory capacity on this contract;

(2) On the board of directors of the Contractor;

(3) As a consultant, agent, or representative for the Contractor; or

(4) In any other capacity with the authority to influence, advise, or control the decisions of the Contractor with regard to this contract.

(c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than 5 years from the date of conviction.

(d) 10 U.S.C. 4656 provides that the Contractor shall be subject to a criminal penalty of not more than $500,000 if convicted of knowingly--

(1) Employing a person under a prohibition specified in paragraph (b) of this clause; or

(2) Allowing such a person to serve on the board of directors of the contractor or first-tier subcontractor.

(e) In addition to the criminal penalties contained in 10 U.S.C. 4656, the Government may consider other available remedies, such as --

(1) Suspension or debarment;

(2) Cancellation of the contract at no cost to the Government; or

(3) Termination of the contract for default.

(f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--

(1) The person involved;

(2) The nature of the conviction and resultant sentence or punishment imposed;

(3) The reasons for the requested waiver; and

(4) An explanation of why a waiver is in the interest of national security.

(g) Subcontracts. The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial products, commercial services, or commercial components.

(h) Pursuant to 10 U.S.C. 4656(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone 301-937-1542; www.ojp.usdoj.gov/BJA /grant/DPFC.html.

(End of clause)

52.222-90 Addressing DEI Discrimination by Federal Contractors.

As prescribed in 22.2203, insert the following clause:

Addressing DEI Discrimination by Federal Contractors (Deviation DATE)

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

Program participation means membership or participation in, or access or admission to: training, mentoring, or leadership development programs; educational opportunities; clubs; associations; or similar opportunities that are sponsored or established by the contractor or subcontractor.

Racially discriminatory diversity, equity, and inclusion (DEI) activities means disparate treatment based on race or ethnicity in the recruitment, employment (e.g., hiring, promotions), contracting (e. g., vendor agreements), program participation, or allocation or deployment of an entity's resources.

(b) In connection with the performance of work under this contract, the Contractor agrees as follows:

(1) The Contractor will not engage in any racially discriminatory DEI activities;

(2) The Contractor will furnish all information and reports, including providing access to books, records, and accounts, as required by the Contracting Officer, for purposes of ascertaining compliance with this clause;

(3) In the event of the Contractor's or a subcontractor's noncompliance with this clause, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor or subcontractor may be declared ineligible for further Government contracts;

(4) The Contractor will report any subcontractor's known or reasonably knowable conduct that may violate this clause to the Contracting Officer and take any appropriate remedial actions directed by the Contracting Officer; and

(5) The Contractor will inform the Contracting Officer if a subcontractor sues the Contractor and the suit puts at issue, in any way, the validity of this clause.

(6) The Contractor recognizes that compliance with the requirements of this clause are material to the Government's payment decisions for purposes of 31 U.S.C. 3729(b)(4).

(c) The Contractor must include the substance of this clause, including this paragraph (c), in subcontracts at any tier, including those for commercial products and commercial services, except those where the place of delivery or performance is outside the United States.

(End of clause)

Section 01 00 00 - General Requirements

Miscellaneous text in this section has been modified to:

Attachments:

Amendment 0001

- ODJ Fish Pumps Rehabilitation FOR REFERENCE ONLY DRAWINGS

Amendment 0002

- AMD0002_Technical Sections
- Specifications - John Day Fish Pumps Appendix A - Work Space Access Trailer and Parking Locations
- ODJ Fish Pumps Rehabilitation FOR REFERENCE ONLY DRAWINGS_BCOES_SAM_rev002

Amendment 0003

- JDD So Fish U-3_O and M Manual

- JD-63-391-50

- Propeller_Condition
- Pump_Access
- Water Piping and Secondary Access Point FIO drawings

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DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION

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FISHWATER PUMP REHABILITATION

PART 1 GENERAL

1.1 GENERAL INFORMATION

The work scope for fish pump Unit 2 and optional work for fish pump Unit 1 and fish pump Unit 3 covered under this specification includes the following:

a. Preparation of drawings and data.

b. Destructive removal of the existing pump shaft.

c. Fabrication and final machining of a new pump shaft.

d. Repair of the existing propeller for mounting to new pump shaft.

e. Fabrication and machining of new stainless steel sleeves for the rehabilitated upper and lower bearing assembly.

f. Fabrication of new upper and lower fish pump bronze bearing housings for the insertion of new greaseless bearing liners.

g. Providing new rough cut greaseless bearing material and final machining for the rehabilitated upper and lower bearing assemblies.

h. Drilling and tapping the existing bearing housing for insertion of the new greaseless bearing liners, mounting of the liners in the housing, and measuring the inner diameter of the mounted liner.

i. Providing new standard fasteners and dowel pins for assembly.

j. Providing other parts and materials as necessary for rehabilitation.

k. Machining the existing upper shaft flanges, rabbets, and indicating bands to attain plumb and straight shaft.

l. Prepare the existing upper shaft, lower shaft, hub, and blades to manufacturer's recommendation for application of new paint.

m. Application of new water immersable paint coating to the upper shaft, lower shaft, hub, and blades.

n. Cleaning the mounting locations of the upper and lower bearing housings to sound metal.

o. Machining the spigot diameter on the lower bearing housing and aligning and doweling to the diffuser mounting location.

p. Machining the spigot diameter on the upper bearing housing and aligning and doweling to the pump cover plate.

q. Assembly of the fish pump and mounting to the gearbox.

r. Measurement and recording of plumb and runout of free hanging shaft and blade tip clearances.

s. Performing the final shimming and doweling of the gearbox and mounting in it's final location.

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 FOR NONDESTRUCTIVE TESTING (ASNT)

ASNT SNT-TC-1A	(2020) Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2025) Structural Welding Code - Steel

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

ANSI/IEEE Std 810	(2015) Standard for Hydraulic Turbine and Generator Integrally Forged Shaft Couplings and Shaft Runout Tolerances

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

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" 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-01 Preconstruction Submittals

Installation and Alignment Procedure; G, DO

Commissioning; G, DO

Pre-Functional Checklist

Functional Checklist

Support Method; G, DO

SD-02 Shop Drawings

Drawing Index; G, DO

General Layout Drawings; G, DO

Bill of Materials; G, DO

Shop Drawings; G, DO

As-Built Drawings; G, DO

SD-03 Product Data

Shipping Bills

SD-06 Test Reports

Final Operating Test; G, DO

Startup and Acceptance Test; G, DO

Inspection Log

Shop Assembly and Tests

Balancing Procedure; G, DO

SD-07 Certificates

Equipment Warranty

Erecting Engineer Installation and Operation; G, DO

Nondestructive Examination Certification

Commissioning Document; G, DO

Equipment Manufacturer's And Fabricator's Qualifications; G, DO

SD-10 Operation and Maintenance Data

Operations and Maintenance (O&M) Manual; G, DO

1.4 QUALITY ASSURANCE

1.4.1 Drawing Index

Submit a Drawing Index for all drawings related to the work performed in this specification. The information provided in the index must include drawing numbers, revisions and titles for each manufacturer drawing listed. The index must also be inserted as an appendix to the new Operation and Maintenance manuals.

1.4.2 General Layout Drawings

Provide General Layout Drawings for work performed under this specification. General layout drawings must include all details related to fishwater pump rehabilitation, and must include the general assembly views of all components of the pump shaft assembly and propeller assembly

with each part item number referenced to a bill of materials listing that will be included on the drawing. Bill of materials must include listing of part item numbers, quantity required, part name, material spec, and individual part number. Drawings must be submitted in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. A set of 11- by 17-inch final approved versions of the general layout drawings must also be inserted as an appendix to the new Operation and Maintenance manuals.

1.4.3 Verification of Dimensions

The Contractor must become familiar with details of the work, verify dimensions at the shop and on-site, and advise the Contracting Officer (CO) of any discrepancy before performing any work.

1.4.4 Manufacturer and Assembler

Manufacturing and assembly of the fish pump unit is to be performed by a Contractor and fabrication company that has been normally and regularly engaged in assembly, and manufacture of heavy machinery over the preceding five years. Changes to the dimensions shown on the drawings and in the Bill of Materials for the fish pump (including structural supports) requires written approval from the CO. Submit Equipment Manufacturer's and Fabricator's Qualifications showing evidence and years of experience for each of the equipment manufacturers and fabricators. Identify any certifications, standards, and/or professional organizations the manufacturers comply with or are members of.

1.4.5 Erecting Engineer Services

a. Provide the services of one or more erecting engineers onsite during the installation and startup of each defined major piece of equipment and subassembly. The erecting engineer(s) are responsible to technically supervise and provide instruction for the equipment to be installed and operated. The major pieces of equipment and subassemblies requiring engineering services is defined as follows:

(1) Fish Pump Gearbox

(2) Pump Shaft Assembly

(3) Pump Propeller Assembly

b. Upon completion of the work and at a time designated, provide the services of one or more erecting engineers for training Government personnel in accordance with the requirements of paragraph FIELD TRAINING.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery, Storage and Handling of Equipment

Protect equipment and components from corrosion, deformation, and other types of damage. Store items in enclosed and secured areas free from contact with soil. Provide moisture proof weather protection for all equipment stored in outdoor locations. Transport, handle and store all equipment in accordance with the manufacturer's written instructions. Remove and replace damaged items with new items. Ship each subassembly completely assembled. Submit the shipping bills with the delivery of finished pieces to the site. The major pieces of equipment and

subassemblies for this Contract are defined to include the following:

a. Fish Pump Gearbox

b. Pump Shaft Assembly

c. Pump Propeller Assembly

1.5.1.1 Packaging

Package equipment and subassemblies in accordance with 15 00 00.02 25 FISHWATER PUMP GEARBOX, except as noted below.

a. The finish machined bearing housings and Contractor provided parts must not be prepared for shipment back to the Project until they have been inspected and signed off by the Contractor and the Contracting Officer's Representative (COR). The sign-off sheet must be included in the shipment packing list.

b. The housing must be shipped to the Contractor's shop with the two halves bolted together and tightened to snug tight. The housing must be shipped back to the Project with the liner mounted inside the housings and the housing bolted together and tightened to snug tight.

c. All other pump components that are shipped to the Contractor's shop must be protected from damage in accordance with 15 00 00.02 25 FISHWATER PUMP GEARBOX. A pre-shipment inspection report must be submitted and signed by both the Contractor and the CO or the COR.

d. Heavy parts or machines must be mounted to skids or crated and any articles or materials that might otherwise be lost must be boxed or wired in bundles and plainly marked for identification. All parts exceeding two hundred (200) pounds of gross weight must be prepared for shipment so that slings for handling by crane may be readily attached while the parts are on the car or transport truck.

1.6 CONTRACTOR WORK PLAN AND PROCEDURES

Provide a detailed work plan for this rehabilitation work. Provide detailed procedures for each individual section. Do not arbitrarily perform machining or other permanent changes to the pump components without Government approval. All changes must be reflected in the 'as-built' drawings. Include the following items for each individual section:

a. Personnel required and description of job function.

b. Equipment required and access requirements for equipment, if applicable.

c. Step by step procedure for performance of the work.

PART 2 PRODUCTS

2.1 Pump Shaft Assembly

The pump shaft assembly consists of the new pump shaft, lower bearing assembly, keys, fasteners, dowels, sleeves and other components necessary to assemble the the new pump shaft assembly.

2.2 PUMP PROPELLER ASSEMBLY

The pump propeller assembly consists of the pump propeller, hub, pump shaft assembly, diffuser, diffuser extension cone and other components necessary to assemble the rehabilitated pump propeller with the new pump shaft assembly.

2.3 PAINTING

Paint all exposed ferrous surfaces in accordance with Section 09 97 02.00 25 PAINTING. Paint equipment and components not otherwise specified by Section 09 97 02.00 25 PAINTING with the manufacturer's standard coating system. Standards coatings are to be compatible with the lubrication and environmental conditions specified or recommended. Touch up all damaged painted surfaces after installation.

2.4 SHOP ASSEMBLY AND TESTS

2.4.1 General

a. The upper and lower bearing assembly, pump shaft assembly, and pump propeller assembly Pump Shaft Assembly consisting of the new pump shaft, lower bearing assembly, and pump propeller assembly is to be completely assembled in the shop and tested prior to shipment to John Day Lock and Dam. Testing should consist of measuring clearances between the self-lubricated bushing and the shaft sleeve, a check of the fit and tolerance of the pump shaft into the propeller with keys installed, static balancing of the pump propeller, and dynamic balancing of the pump propeller. The CO or a designated representative may choose to witness shop assembly and testing. Notify the CO at least 14 calendar days before testing of each machinery unit. This notification includes information on what tests are to be performed and the estimated time frame involved with each test.

b. The witnessing of a particular test may be waived by the CO; however, the approved commissioning shop test procedures, notification, and documentation should still be performed as required by these specifications. Once informed that Government personnel will witness the test(s), notify the CO that a particular test is scheduled as planned a minimum of 48 hours prior to the test(s). Perform all necessary preparations and preliminary testing prior to issuing the 48 hour notification.

c. Commence testing upon the arrival of Government personnel at the scheduled location and time. Design and furnish a test rig and facilities (within the continental United States) suitable for performing the tests. Submit details of the test rig and its location. Address in the submittal aspects including adequacy of rig strength, including, but not limited to, foundations; access to the test rig; availability of suitable power and cranes; how the work will be protected; how the test measurements will be made; and how test results can be verified. Clean all bearing surfaces and lubrication lines and lubricate components as needed before tests are begun. Test and ship the components to the job-site fully assembled.

d. Machinery that is not tested or arrives on site without being fully assembled will be rejected. Reimburse the Government for all travel,

lodging and per diem costs incurred for any Government witness tests that fail to meet the contract specifications or performance requirements and result in the shop testing being terminated, postponed or rescheduled to correct the deficiencies.

2.4.2 Alignment

Conform alignment of interconnecting shafts from the Francis turbine to the fish pump propeller to the installation requirements of the coupling and gear manufacturers in accordance with standard AGMA practices. Accurately align each machinery or structural unit by the use of stainless 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 is to be true within the respective manufacturer's tolerances required. Set machines true to the elevations indicated.

2.4.3 Balance

Balance the propeller with the two-plane balancing technique. Balance the propeller at rated operating speed. Check the balance at 110 percent of balance speed, and make needed corrections. Amount of allowable unbalance is in accordance with grade G6.3 of ISO 1940-1. Securely fasten weights needed to obtain the required level of balance to the inside cavity of the propeller hub. Weight may be added by welding additional material inside the hub or by grinding material from the propeller blades. In no case can weights be added to the outside of the hub, vanes, or water passages. Submit balancing procedure at least four weeks prior to the date of balancing. Weigh the finished propeller and weight stamped on the bottom of the hub with weight accurate to 0.5 percent of the total weight of the propeller. Weighing and balancing will be witnessed by the CO. Submit all propeller weights and the results of propeller balancing.

2.4.4 Anti-Seize Lubricant

Assemble threaded portions of the assemblies using an anti-seize lubricant that prevents galling of parts and corrosion, allows for easy disassembly of parts, and reduces friction unless otherwise noted or specified. Select anti-seize lubricant that is a standard product designed for the intended use.

2.4.5 Acceptance

All readings taken from the equipment, components or assemblies are required to be within the specified limits and in accordance with the Contract Specifications. Failure of any part to meet these Contract requirements is cause for rejection of the entire quantity until action is taken to correct defects and prevent recurrence and such actions have been approved by the CO. Retesting is subject to the same random sampling and testing procedures as the original lots.

2.4.6 Gages

Make gages available to the Government at the fabrication site for use in checking critical dimensions. Gages are steel tape, vernier, micrometer, Gar S22 Surface Finish Comparator, etc.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Instrument Calibration

Take all measurements with instruments capable of measuring to the nearest 0.001" without interpolation, unless otherwise stated and approved. Instruments must have been calibrated within last 90 days prior to the measurements being taken, unless otherwise approved. Furnish certification of calibration data to the Government no later than 20 days after Contract award.

3.1.2 Shop Drawings

Submit Shop Drawings. Each shop drawing must be a detailed dimensional sheet showing all as-built dimensions of each of the fabricated parts covered under this Section. Submit As-built Drawings of the rotating components of the pump assembly and any stationary components modified by this work.

3.2 FABRICATION

3.2.1 General

a. Fabricate components and assemblies in compliance with the requirements of Section 05 50 14.00 25 METAL FABRICATIONS unless otherwise specified herein. Where specification requirements are similarly covered in both sections the specification section, apply the more stringent requirements.

b. Fabricate and install items described in this section and on the Contract Drawings for the south shore fish pump at John Day Project. Fabricate new upper and lower bearing housings. Machine the new housings for insertion of greaseless bearing liners. Drill and tap the housings for liner insertion. Provide finish machined greaseless bearing liners. Mount the liners into their respective housings and taken measurements of the inner diameter of the liners with the housings bolted together in a snug tight condition. Provide machined spare greaseless bearing liners. Package and transport the mew bearing housings with greaseless bearing liners and spare greaseless bearing liners to the John Day Project upon completion.

3.2.2 Material

Straighten material before being laid off or worked. If straightening is necessary, straighten by methods that do not impair or alter the metal. Sharp kinks, bends, or overcuts of material are cause for rejection of the material. Material with welds will not be accepted except where welding is specified, indicated, or otherwise approved. Flame cutting of material is not allowed. Shearing is to be accurately done and all portions of the work neatly finished. Ensure corners are square and true unless otherwise indicated.

3.3 MACHINE WORK

Perform machine work in compliance with the requirements of Section 05 50 14.00 25 METAL FABRICATIONS unless otherwise specified herein. Where specification requirements are similarly covered in both sections

the specification section, apply the more stringent requirements

3.4 FASTENER PRELOAD

Tighten all major fasteners to a minimum preload of two thirds yield strength, with a tolerance of plus or minus five percent, unless otherwise approved. The Contractor must note tightening torque on the 'as-built' drawings.

3.5 WORK DESCRIPTION

3.5.1 New Upper and Lower Pump Bearing Housing

Furnish and install new Upper Pump Bearing Housing per Informational Drawing 54225-1 and 54225-2. Furnish and install new Lower Pump Bearing Housing per Informational Drawing 54226-1 and 54226-2. Fabricate bearing housings from C95400 aluminum bronze per ASTM B271/B271M. Note changes made due to field verification on the Shop Drawings and notify the COR as required by this Section.

3.5.1.1 Furnish Mounting Hardware

Furnish all new fasteners, washers, piping, and fittings for the Upper and Lower Bearing Housings needed for the assembly of the housing halves, mounted in the diffuser, and fitted and piped as necessary for attachment of the water piping to the housing at the diffuser housing interface.

3.5.2 New Upper and Lower Bearing Housing Greaseless Bearing Liners

Furnish and install new greaseless bearing liners for the upper and lower bearing housing per Informational Drawing M-003. All bearing liners must comply with 35 05 40.17 25 SELF-LUBRICATED MATERIALS, FABRICATION, HANDLING, AND ASSEMBLY. Each bearing liner half becomes a matched set after fabrication and machining. Match mark each bearing liner to its mated housing after mounting in the bearing housing. Furnish one spare greaseless bearing liner per housing. Notify the Government 30 days prior to beginning installation of the new greaseless bearing liners for connection of the water piping.

3.5.3 Lower Pump Assembly Rehabilitation

3.5.3.1 General

a. The Government will be responsible for connection of water and oil piping to the gearbox. The Government will also be responsible for electrical connection of the pump and gearbox. The Contractor will be responsible for the disassembly and reassembly of the pump components and all work associated with it. The Government will provide cooling water to the top of the cover plate by the base ring for both the packing box and the upper bearing liner. The Contractor must plumb the water lines from the upper bearing housing to this location and perform the coupling. The Government will provide cooling water to the top of the diffuser by the extension cone for the lower bearing liner. The Contractor must plumb the water lines from the lower bearing housing to this location and perform the coupling. There must be two water intakes to each liner positioned at 180 degrees from each other.

b. Most existing stationary and some existing rotating parts were painted

with a red lead primer. Properly clean the diffuser, cover plate, propeller, and other components and dispose of the cleaning residue in accordance with local requirements and 09 97 02.00 25 PAINTING.

c. Paint the propeller.

d. Provide new stainless steel sleeves and perform rough machining such that the new stainless steel sleeves match the dimensions of the stainless steel sleeves shown in the Informational Drawings.

e. Perform final machining of the new stainless steel sleeves to meet fit and finish per bearing liner material manufacturer recommendation.

3.5.3.2 Pump Cover Plate

Match mark the cover plate to the base ring prior to removal. Remove the pump cover plate and place it in a staging area designated by the Government. Clean the cover plate and diffuser in the designated staging area outside of the Powerhouse. Clean the staging area to the as-found condition upon completion of work. Carefully clean and prepare the mounting surface of the upper bearing housing in preparation for mounting the bearing housing to the cover plate. All cleaned surfaces must be protected with a rust preventative compound.

3.5.3.3 Diffuser Decking

Provide safe access to all pump components. Access to the extension cone, diffuser, pump shaft, and propeller is typically accomplished with removable deck plating that is temporarily installed above the diffuser.

3.5.3.4 Component Removal

Match mark diffuser to the embedded casing prior to removal. The Government will supply a crane and crane operator that must be used to remove the pump components including the gearbox and gear base. The Government will provide a jib crane and transfer carriage that must be used to remove the pump components including the gearbox and gear base. The Contractor must provide a Class 2 certified crane operator to operate the transfer carriage and riggers with appropriate training and experience. The Government will designate a staging area for landing the pump components. The diffuser must be removed from the pump shaft and placed in the designated staging area for clean-up. The diffuser and propeller must be removed without causing damage to the components or adjacent structures and adjacent components along the travel path. The Contractor will be responsible for repair or replacement of all such damaged components and structures at their own cost.

3.5.3.5 Propeller Shipment

Prepare the pump propeller for shipment to the Contractor's shop. Protect the propeller from damage both in shipment to the Contractor's shop and back to the John Day project. The pump shaft may be cut off above the propeller hub prior to shipment. Perform a pre-shipment damage inspection with the COR and provide an inspection sheet. The inspection sheet must be signed by the Contractor and the COR prior to shipment to the Contractor's shop.

3.5.3.6 Clean and Inspect Embedded Pump Components

Clean and inspect mounting surfaces and holes for the diffuser, extension, bearing housing, and other surfaces as necessary. Protect the mounting surface for the diffuser in preparation for reassembly. Visually inspect discharge liner inner diameter surface. Measure discharge liner diameter at a minimum of two elevations in two positions 90 degrees from each other. Take other measurements and checks as necessary. Protect mounting surfaces with a rust-preventative coating. Transfer to an area designated by project personnel after clean-up of the cover plate and diffuser.

3.5.3.7 Shop Cleaning and Preparation for Inspections

a. Propeller: Protect working surfaces of the propeller. Sand blast other surfaces to remove corrosion build-up. Remove existing pump shaft. Perform 100 percent NDT of the propeller using the PT or MT method. Take measurements of the hub bore and keyways and the blade tip to tip diameter, and determine the circularity and concentricity to the hub bore. Salvage or dispose of the existing pump shaft in accordance with local requirements.

b. Propeller Nut and Rotor Support Ring: Thoroughly clean the propeller nut and rotor support ring. Nicks and dings must be filed flush with the surface. Perform 100 percent NDT of these components using the PT or MT method. Visually inspect the threads and surface condition of the propeller nut and perform 100 percent NDT using Eddy Current Testing. Inspect the surface condition of the rotor support and measure the ID and the OD in two places that are 90 degrees apart from each other.

c. Inspection Report: Submit an inspection report showing the condition of the components, field measurements, results of the NDT, and recommendations for repair or replacement as necessary.

3.5.3.8 Provide New Pump Shaft and Components

a. Furnish and install new pump shaft in accordance with Informational Drawing 54192-1, 54192-2, and 54192-3. The shaft must be machined to leave stock on the propeller fit diameters, flange face, and rabbet fit diameters. The flange faces must be stress relieved per ANSI/IEE Std 81.0. Machine new keyways in the shaft per the drawings. Drill/bore the shaft flange for coupling with machining allowance. Coupling holes must be 0.030 inch under planned finished diameter. Coupling bores must be finish reamed in the shop at final assembly. The flange face, rabbet diameter, bearing sleeve, propeller fit diameters, indicating band, and general shaft surface OD must be finish machined to the appropriate dimensions according to the field as-found conditions and Informational Drawings. Pay special attention to the rabbet fit with the pump shaft and the propeller fit up.

b. Provide anti-rotation screw: The anti-rotation screw must be provided from AISI 1040 steel, 5/8"-11 NC. The shear plane must be the screw head.

c. Provide pump shaft keys: The pump shaft keys must be from AISI 1118 key stock. Final machine the keys to meet the tolerance requirements of the Shaft and the propeller as shown on the Worthington Reference Drawings. RX-137991, Pump Shaft drawing and Propeller drawing respectively.

3.5.3.9 Lower Bearing Sleeve Installation

Thermal interference fit the lower bearing sleeve onto the propeller shaft. The design interference on the existing pump units is 0.005-0.006 inch. The final diameter of the sleeve after installation must be 11.000/11.001. Drill, tap, and center bore the sleeve and shaft for installation of the anti-rotation screw.

3.5.3.10 Pump Propeller Refurbishment

Perform pump propeller refurbishment after lower shaft fabrication. Coordinate fit between lower shaft and propeller. Machine the propeller center bore as necessary so bore and mounting surface of the propeller nut are true and perpendicular to each other. Perform welding and grinding necessary to repair cavitation damage as identified in the Inspection Report.

3.5.3.11 Shop Assembly

Assemble the bearing housing with greaseless bushing insert installed around the pump sleeve and check clearances. Install the pump shaft into the propeller with keys and nut to check fit and tolerances. Debur and cleanup shaft and propeller in preparation for shipment and painting.

3.5.3.12 Painting of Lower Rotating Components

Paint the lower rotating components in compliance with Paragraph CLEAN AND PAINT ROTATING PARTS OF THE PUMP ASSEMBLY of this Section.

3.5.4 Extension Shaft Repair and Installation of New Sleeve

Prepare and ship the extension shaft to Contractor's shop and inspect for damage. Perform necessary machining on the extension shaft, install the sleeve, and final machine the sleeve OD. Paint the shaft, prepare shaft for shipment, and ship shaft back to the project for installation.

3.5.4.1 Upper Shaft Sleeve

Furnish and install a new upper shaft sleeve for the extension shaft in compliance with the Information Drawings. The sleeve is fabricated in two pieces and must be welded along the vertical splits when installed on the shaft. The sleeve must be welded to the shaft along the top and bottom edge. The ID of the sleeve must be finish machined and read to install over the mounting area of the shaft. Field measure the diameter of the existing extension shaft and machine the ID of the sleeve per the Informational Drawings to achieve the fit specified by the Information Drawings. Perform final machining of the sleeve OD after installation on the extension shaft.

3.5.4.2 Extension Shaft

a. Securely protect the extension shaft for shipment to the Contractor Shop. Perform a pre-shipment inspection of the extension shaft for damage with the COR. Both parties must sign off on the inspection sheet prior to shipment.

b. Blast the shaft to remove corrosion and other surface damage. Protect the shaft end faces, bolt holes, and mounting location of the sleeve

during the blasting operation.

c. Perform NDT of the shaft surface using PD and/or MT. Pay special attention to the change in cross section at the flanges.

d. Dimensionally inspect the shaft. Measure the upper and lower flange coupling bolt hole diameters and locations relative to the rabbet diameters. Measure the rabbet diameters, length, and bearing sleeve fit area. Perform a run-out check between centers with rabbet diameter aligned. Take run-outs of flange faces and bearing sleeve area. Complete and submit inspection reports with recommendations.

e. Field measure the OD where the sleeve is to be mounted and the finished ID of the sleeve. Mount the new stainless steel sleeve and weld the longitudinal splits. Weld the top and bottom edges to the shaft. Machine the OD of the sleeve to the required diameter.

f. Perform a machine clean-up skim cut on the upper and lower rabbet diameters if necessary. The lower rabbet must fit the upper rabbet on the pump shaft. The upper rabbet must fit the rabbet on the gearbox being rehabilitated. No machine cut is to be performed on the upper rabbet of the extension shaft until positive communication with the gearbox manufacturer on final dimensions has been completed.

g. Perform a skim machine cut on the extension shaft coupling faces to make them true as per tolerances in ANSI/IEEE Std 810 if necessary. Perform a skim cut on the indicating bands near the shaft coupling. Any step formed on the shaft must be radiused to 1/32 inch. Shop assemble the upper bearing housing over the sleeve after the final machine cut on the sleeve and check clearances.

h. True bore and ream the lower coupling holes on the extension shaft with the pump shaft in the Contractor's Shop. Body face machine the bolts to match the bolt holes. Assemble the two shafts in the shop. Match mark the bolts to bolt holes and extension shaft to pump shaft for assembly in the field.

i. Paint the extension shaft as described in Paragraph CLEAN AND PAINT ROTATING PARTS OF THE PUMP ASSEMBLY of this Section. Perform final inspections of the shaft and securely crate and ship back to the project for field assembly.

3.5.5 Clean and Paint Rotating Parts of the Pump Assembly

Clean metal surfaces of the upper and lower shaft, pump hub, and blades of rust, corrosion, grease, oil, and other contaminates. Protect the mounting locations of the shaft sleeve, flange faces, and other machined or pertinent surfaces. Apply system 21-A-Z in accordance with Specification 09 97 02.00 25 PAINTING or submit an alternative coating system for approval. Alternative system must be a minimum of three coats. The first coat must be a primer or base coat. The next two coats must be protective overcoats. All three coats must be of a cavitation, corrosion, erosion resistant paint designed for underwater use. Adhere to the surface preparation directions from the paint supplier when preparing the surface for alternative coating system application. Submit a procedure including recommended practices from the paint manufacturer, MSD sheet, and the proposed procedure for application of the coating.

3.5.5.1 Shop Painting

Use the manufacturer's recommendations to prepare the surfaces of the propeller, the extension, and pump shafts for application of the paint and for painting the surfaces. All surfaces that can be finish painted in the shop must be done in that location. Some surfaces will require field painting, including the top of the flanges after fasteners have been installed and the indicating bands. .

3.5.5.2 Field Painting

Field paint all areas marred from shipment and handling, the indicating bands, top of flanges with fasteners installed, interfaces between two flanges or the flange and propeller, the propeller hub end cover and the main fastener under the propeller, etc, with three paint coats. Surfaces must be shop prepared in anticipation of field painting. Notify the Government of surfaces that cannot be shop prepared. The Government understands that field surface preparation will be limited to solution and mechanical cleaning. Perform all painting in accordance with Specification 09 97 02.00 25 PAINTING.

3.5.6 Clean and Prepare Mounting Surfaces for Upper and Lower Bearings

The Contractor must clean up to sound metal the mounting surfaces of the upper and lower fish pump guide bearings, the cover plate, and the diffuser as necessary, including the horizontal bearing surface and centering spigot surface. Surface clean up must be sufficient to mount the bearing housings in a manner that ensures the bearing housings will be rigidly mounted and plumb with the pump shaft. Coordinate a minimum shaft sleeve journal to bearing diametrical clearance with the bearing liner manufacturer. Submit a detailed work plan for the cleanup of the cover plate and the diffuser.

3.5.6.1 Surface Preparation

Clean the surface to a degree sufficient for visual inspection. Provide finish preparation of the surfaces that assures a smooth and clean metal surface. Measure and record the shaft spigot diameters.

3.5.7 Reassemble Pump Components and Measure Shaft

Perform a complete vertical shaft alignment at assembly. Alignment of the pump shaft must be performed using dial indicators mounted in at least two vertical locations along the shaft. Each location must have two dial indicators mounted 90 degrees from each other. Check shaft plumbness and adjust using a precision level. The initial assessments may be made with the pump shafting in one position or static. After the assembled shaft has been attached to the gearbox and is able to be rotated, check and adjust plumbness and alignment of the shafts by a full rotation of the assembled free hanging pump. Mount and center the upper and lower bearing housings on the sleeve and dowel in place while maintain clearance coordinated with the bearing liner manufacturer. A minimum of three dowels must be used for each housing.

3.5.7.1 Site Work

Provide a detailed procedure for installation of the pump components. Alignment and final installation of the pump components may be found in the following paragraphs. In general, the Contractor will be responsible

for the following:

a. Re-installation of the propeller, pump shaft, diffuser, and cover plate. Accurately measure the propeller liner in two directions prior to installation of any pump components. Take accurate upstream/downstream measurements and north shore/south shore measurements of the propeller blade tip to blade tip. Submit these measurements to the Government.

b. Set up and level propeller on cribbing of sufficient height to allow installation of propeller end hub cover.

c. Assemble the lower bearing and install into diffuser.

d. Crib up the diffuser to sufficient height to allow for setting pump shaft through and supported on support ring.

e. Install rotor support ring onto pump shaft.

f. Lift and set pump shaft through lower bearing/diffuser until supported by support ring.

g. Lift pump shaft/diffuser and lower down through propeller.

h. Install propeller nut, tighten one flat, and secure.

i. Install propeller hub end cover.

j. Lift diffuser and shaft/propeller together and lower onto upper casing flange.

k. Re-install maintenance decking atop diffuser.

l. Set diffuser to casing with original dowels. Install fasteners.

3.5.7.2 Preliminary Alignment

The pump shaft and propeller must be made plumb and level and centered in the pump liner and the lower bearing. The propeller and shaft must be fixed in place. Install cover plate with hold down fasteners loose. Install extension shaft onto the pump shaft with temporary fasteners and plumb and level. Install bearing housing with bearing liner and check for clearance and alignment. Center cover plate to the extension shaft.

3.5.7.3 Gearbox Installation

Set the gearbox in place and align with the extension shaft.

3.5.7.4 Final Alignment

Check and adjust alignment between the vertical shaft and the gearbox as necessary.

3.5.7.5 Final Alignment Check

Perform final combined shaft alignment/plumb checks to include two dial indicators 90 degrees apart at two elevations and use the precision level as a minimum. Record the bearing and blade tip clearances. Blade tip measurements must be taken by first finding the longer of the two blades

and then using this blade to take further clearance measurements at the following four locations: upstream, downstream, north bank, and south bank. Record and submit these measurements in a report for Government approval.

3.5.7.6 Final Assembly

Perform final assembly of parts after the Final Alignment Check is accepted by the Government.

a. Apply final paint coating to rotating parts.

b. The gearbox must be final doweled.

c. The upper and lower bearing housing must be doweled in place including the water cooling piping to the connection provided by the Government.

d. Install the rotor support ring on the pump shaft.

e. Complete the packing box, including packing, lantern ring, and gland in upper bearing housing.

f. Install the diffuser extension cone.

g. Install access covers and grating.

h. Install any remaining items to make a final and complete installation.

i. Install new lip seals in the bearing housing. Two must be installed on the lower side of the lower bearing housing and one must be installed in the bottom of the upper bearing housing.

j. Install two new lip seals at the top of the diffuser extension cone.

3.5.8 Final Gearbox Mounting

Permanently mount the gearbox to its sole plate with proper shimming and doweling in place after all measurements have been taken, submitted, and accepted. Permanent mounting of the gearbox must not take place until the Government provides the Contractor with a notice to proceed. Submit detailed information on this procedure, to include location and thickness of necessary shim and size and location of dowels in a written document and shown in detail on a sketch.

3.6 FIELD QUALITY ASSURANCE

Perform all specified quality control inspections and tests. Implement and maintain an inspection log to include copies of all descriptive data for all specified inspections and tests. Make the inspection log available immediately to the Government's inspector upon request. Submit a complete copy of the inspection log to the Government at the end of specified inspections and tests. The Government reserves the right to witness any and all specified quality control (QC) procedures. Provide the Government with one-week advance notice of QC procedure scheduling to allow time for witness coordination. Fully test replacements for all rejected parts as specified herein for the original lots.

3.6.1 Shop Inspection

The Government will send an inspector to visit the Contractor's shop or the shop where the work is being performed to evaluate all inspection data and witness final measurements taken by the Contractor and recorded on the dimension sheet, unless otherwise waived by the CO. Provide the Government with a minimum of 14 days notice and arrange an appropriate time for a Government inspector shop visit. Make all previous Submittals available to the Government for use during the shop visit.

3.7 NONDESTRUCTIVE EXAMINATION

3.7.1 NDT Agency Requirements

Conduct NDT examinations using suitable equipment and qualified personnel. Provide written approval of the examination procedures and perform the examination tests in the presence of the CO. Persons performing the NDT examination are to be qualified for the specific procedure used in accordance with ASNT SNT-TC-1A. Submit nondestructive examination certification of qualified persons, procedures and equipment performing or used for nondestructive testing.

3.8 WELDING

Perform welding in compliance with the requirements of Section 05 50 14.00 25 METAL FABRICATIONS unless otherwise specified herein. Where specification requirements are similarly covered in both Sections the specification Section, apply the more stringent requirements. Unless otherwise specified, conform welding to the provisions of AWS D1.1/D1.1M, Sections 1 through 8 and Section 10. Welders and welding operators are to pass the qualification tests as prescribed by AWS D1.1/D1.1M, Section 5 before being assigned to production work.

3.9 FIELD ERECTION AND TESTS

3.9.1 General

Perform field erection and field tests. Install the equipment furnished under 15 00 00.02 25 FISHWATER PUMP GEARBOX and under this specification under supervision of the erecting engineer under the provisions of paragraph ERECTING ENGINEER. Submit the installation and alignment procedure and install with the approved procedure. In the submittal provide detailed instructions concerning the installation and alignment procedures for the equipment to be furnished. Reference the existing Operations and Maintenance manual for installation and alignment procedures and provide updated procedures as necessary. The procedure has to include consideration of all the other work that is obligated to be performed at the site. Base the procedure on a proper sequence of construction that will complete the work with safety, efficiency, and in full accordance with these specifications. Submit for approval any Support Method to be used. Include detailed information on the method proposed to support the equipment during the work delineated in this section. The support method, engineering computations, and support drawings have to be designed and certified by a licensed professional engineer.

3.9.2 General Test Procedure

Submit the commissioning, pre-functional and functional checklist test

procedures, with a blank test results data sheet for each, prior to the commencement of any tests. Complete all Pre-Functional checklists prior to performing Functional operational tests. The testing is to comply with the requirements herein and as specified below. The test procedure will consist of operating the units for 15 minutes. Inspect each piece of equipment for smooth operation and proper alignment and check all necessary clearances to ensure vibration, binding, or excessive heat does not occur in any moving part. During the test, provide readings of motor currents, RPM, voltage, and bearing temperature. Stop the test immediately if there is any undue noise, vibration, or heat developed in any of the equipment. After correction of alignment and/or all other causes for the interruption of the test, reinspect the unit and resume testing when permitted by the CO. Submit final operating test results for each unit.

3.9.3 Crane Availability

The Government's existing cranes will be available for use in installation of the machinery. Schedule and coordinate operations with the CO. Include such schedule in the installation and alignment procedure.

3.9.4 Schedule

Schedule and coordinate operations with the CO for the Government's installation and removal of the bulkheads for the fish pump unit. Provide a minimum of 14 days advance notice prior to requested date.

3.10 ERECTING ENGINEER

Furnish the services of one or more competent erecting engineers from the equipment manufacturer/fabricator to supervise and direct the erection and installation of this equipment.

a. The erecting engineer(s) are required to be present for all shop erection, inspections, tests, installation and operation of all equipment at the project site.

b. The erecting engineer has responsibility for the equipment meeting all the requirements of these specifications and fulfilling all the Contractor's guarantees.

c. The erecting engineer will verify the fit and alignment of mating components prior to erecting in the field and be present during final connection and all commissioning and field testing for contract compliance. The erecting engineer will keep records of all measurements taken during installation and testing.

d. Upon completion of the installation, commissioning and startup for each specified major equipment or subassemblies, each erecting engineer will submit an erecting engineer installation and operation certification approving the installation and operation of the equipment.

3.11 STARTUP AND ACCEPTANCE TEST

Submit the pre-functional checklist for approval that includes checks, recordings, measurements and verifications to be performed prior to start up. Signature by all parties is required for acceptance. Following the completion of installation, checkout, adjustment, and setting the limit

switches, controls, interlocks, and other control system components as applicable, perform a startup and acceptance test on each machinery unit. Perform the startup and acceptance test in accordance with the approved commissioning functional checklist, record and submit the results on test result forms of the procedure. Signature by all parties is required for acceptance. Include a demonstration of proper functioning of the refurbished unit in the acceptance test. For acceptance, the machinery unit(s) are to be successfully operated a minimum of five days to satisfy the CO that the requirements of the contract have been met and that the performance of the equipment is satisfactory for the purpose intended.

Upon successful completion of the field tests, the rehabilitated fish pump, machinery, accessory items and equipment will be examined by the CO, Erecting Engineer, Contractor, Project Personnel, and if found to comply with the Contract it will be accepted by signature of all parties in a prepared commissioning document. Signatures and Acceptance will not occur until all found deficiencies have been corrected. submit copies of the signed commissioning document document to the CO.

3.12 EQUIPMENT WARRANTY

Submit manufacturer's standard warranty or guarantee for equipment, e.g., speed reducers, or any other equipment. Identify any warranties that extend beyond a 1-year period.

3.13 OPERATIONS AND MAINTENANCE DATA

a. For specifications on the furnishing, installation, operations and maintenance instructions, refer to Section 01 78 23.00 25 OPERATION AND MAINTENANCE DATA. Unless otherwise specified, all operation and maintenance manuals need to be comprehensive to the electro-mechanical operating system with independent sections for each unique piece of equipment. Operation and Maintenance manuals are to comply with the requirements of Data Package 3 in accordance with Section 01 78 23.00 25 OPERATION AND MAINTENANCE DATA.

b. Unless otherwise specified, all operation and maintenance manuals are to be comprehensive to the electro-mechanical operating system with independent sections for each unique piece of equipment. Include six copies of the following bound information.

(1) Safety precautions

(2) Operator prestart

(3) Normal operations

(4) Emergency operations

(5) Environmental conditions

(6) Lubrication data

(7) Preventive maintenance plan and schedule

(8) Cleaning recommendations

(9) Troubleshooting guides and diagnostic techniques

(10) Wiring diagrams and control diagrams

(11) Maintenance and repair procedures

(12) Removal and replacement instructions

(13) Spare parts and supply list

(14) Product submittal data

(15) O&M submittal data

(16) Parts identification

(17) Warranty information

(18) Testing equipment and special tool information

(19) Testing and performance data

(20) Contractor information

c. Submit six copies of the OPERATIONS AND MAINTENANCE (O&M) MANUAL in accordance with paragraph OPERATIONS AND MAINTENANCE MANUALS and in compliance with Data Package 3 in Section 01 78 23.00 25 OPERATION AND MAINTENANCE DATA.

<CTR> -- End of Section --</CTR>