

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE	PAGE OF PAGES
				J	1   3
2. AMENDMENT/MODIFICATION NO. 0001	3. EFFECTIVE DATE 02-Jun-2004	4. REQUISITION/PURCHASE REQ. NO. W68SBV-4092-4098		5. PROJECT NO.(If applicable)	
6. ISSUED BY WALLA WALLA DISTRICT,COE-G4P CONTRACTING DIVISION 201 N THIRD AVENUE WALLA WALLA WA 99362-1876	CODE W912EF	7. ADMINISTERED BY (If other than item 6) WALLA WALLA DISTRICT, COE-G4P JENNIFER CHRISTENSEN 509/527-7206 JENNIFER.R.CHRISTENSEN@USACE.ARMY.MIL WALLA WALLA WA		CODE W912EF	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X	9A. AMENDMENT OF SOLICITATION NO. W912EF-04-B-0013
				X	9B. DATED (SEE ITEM 11) 11-May-2004
					10A. MOD. OF CONTRACT/ORDER NO.
					10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE				
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS					
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer 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 _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram 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 telegram or letter, provided each telegram or letter 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)					
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.					
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, 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 <input type="checkbox"/> is not, <input type="checkbox"/> 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.) It has been determined to be necessary and in the best interest of the Government to modify this solicitation by answering questions submitted in writing and modifying Technical Specification Section 05000 Paragraph 2.3.4 and 1.2 References. An updated Technical Specification Section 05000 is attached to this amendment. Bid opening date remains unchanged at Thursday, June 10, 2004. Clause 52.000-3010 is modified to reflect change in bid opening location.  All other terms and conditions remain unchanged.					
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)		
			TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)		02-Jun-2004	

## SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

The following have been added by full text:

QUESTIONS & ANSWERS

- Q.1.** Please advise details on 55-gallon HDPE tank and 350-gallon storage tank. Are the tanks to be installed above or below ground? What manufacturer or material is specified?
- A.1.** The tanks will be installed in the Lower Granite Dam. Please refer to Section 05000, paragraphs 2.3.12 and 2.3.13 for 350-gallon oil tank and 55-gallon HDPE tank standards and specifications.
- Q.2.** Sheet 8, Photo D, Oil room north wall, you show government furnished Milltronics Multiranger Level Control mounted on north wall with ¾" conduit with 3#10's connecting to existing imbedded conduit. Where is the existing embedded conduit located? Also on sheet 9 Sump Oil Pumping system one-line diagram you show this being feed from control transformer in MCC-CQ01, Cubicle Ac with ¾" conduit with 3:12's. Do you want #12 or #10s?
- A.2.** The spare conduit indicated by Lower Granite as available to be used daylights on the west wall in the Oil Storage Room 57 feet south of the corner shown in photo D at 12 feet above the floor. Conduit routing will have to avoid the doorway. Conductors are to be #12.
- Q. 3.** Sheet 9, Sump Oil Pumping system one-line diagram show feeder to Combination Motor starter (Oil Skimmer Collection Tank Pump Motor) being feed out of MCC-CQ01, Cubicle A2 from existing MCP breaker, and 120V off control transformer for level controller. This is an existing combination starter now; do you want us to unhook starter and just use MCP breaker and control transformer?
- A.3.** The intent is to reuse the circuit breaker and control transformer. Disconnect the motor starter, remove and deliver to the Contacting Officer.
- Q.4.** On sheet 9, Proposed Equipment Layout. What location do you want this mounted?
- A.4.** The intent is to mount the new control equipment on the wall shown in the photo on sheet #9 after the existing CC1 is removed.

## SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been modified:

## 52.000-3010 BID OPENING

The bid opening will be held in the Harvest Room at the Walla Walla District Headquarters Building located at 201 North Third Avenue, Walla Walla, Washington.

## ATTACHMENT 1: TECHNICAL SPECIFICATIONS

The following has been added to Section 1.2 References:

ASTM B 32 (1996) Solder Metal

The following has been modified to read in Section 2.3.4 Copper Pipe and Fittings:

Copper pipe used for oil piping shall conform to the requirements of ASTM B 88, Type L. Copper pipe fittings shall

be solder joint fittings conforming to ASME B16.22. Connections in copper pipelines and fittings shall be made by soldering. Solder shall conform to the requirements of ASTM B 32, 95-5 tin-antimony or Grade Sn96 tin-silver with flux containing not more than 0.2 percent lead.

(End of Summary of Changes)

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## SECTION 05000

## METALWORK, MISCELLANEOUS PROVISIONS, AND EQUIPMENT

## PART 1 GENERAL

## 1.1 SCOPE

This section specifies the materials, equipment, and workmanship standards applicable to the fabrication, assembly, installation, and testing of the various items of metal and machine 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 within the text by the basic designation only.

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B4.1 (1967 R1999) Preferred Limits and Fits for Cylindrical Parts

## AMERICAN PETROLEUM INSTITUTE (API)

API RP 1110 (1997) Pressure Testing of Liquid Petroleum Pipelines

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M (2001) Carbon Structural Steel

ASTM A 53/A 53M (1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A 123/A 123M (2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 307 (2002) Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM A 780 (2001) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM B 88 (1999e1) Seamless Copper Water Tube

ASTM B 32 (1996) Solder Metal

ASTM D 1785 (1999) Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

ASTM F 1508 (1996) Angle Style, Pressure Relief Valves for Steam, Gas, and Liquid Services

## ASME INTERNATIONAL (ASME)

ASME B16.22	(1995) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.39	(1998) Malleable Iron Threaded Pipe Unions
ASME B31.3	(2002) Process Piping
ASME BPV IX	(2001) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

## AMERICAN WELDING SOCIETY (AWS)

AWS A5.1	(1991) Carbon Steel Electrodes for Shielded Metal Arc Welding
AWS D1.1/D1.1M	(2002) Structural Welding Code - Steel

## AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 316	(1989) ASD Manual of Steel Construction
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## MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-58	(1993) Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	(1996) Pipe Hangers and Supports - Selection and Application
MSS SP-80	(1997) Bronze Gate, Globe, Angle and Check Valves
MSS SP-89	(1998) Pipe Hangers and Supports - Fabrication and Installation Practices
MSS SP-110	(1996) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
MSS SP-123	Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30	(1996) Flammable and Combustible Liquids Code
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## UNDERWRITERS LABORATORIES (UL)

UL 142	(1993; Rev thru Jul 1998) Steel Aboveground Tanks for Flammable and Combustible Liquids
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### 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" designation identifies the office that will review the submittal for the Government. The contractor shall not begin procurement, fabrication, or installation before approval of related submittals. The following shall be submitted in accordance with Section: 01330 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

##### Steel Fabrication

Submit shop drawings that include all shop and erection details, templates, fabrication and installation details, type, grade and class of materials, as appropriate. Members and connections for any portion of the structures or elements of fabricated items omitted from the contract drawings shall be detailed by the fabricator and indicated on the shop drawings. All welds shall be indicated by standard welding symbols of the AWS.

Oil System Layout Drawings; G EM

#### SD-03 Product Data

Data shall be highlighted to show model number, size, options, performance charts and curves, etc. in adequate detail to demonstrate compliance with the contract requirements. Data shall include catalog cuts and a list of qualified permanent service organizations for support of all the equipment, which includes their addresses and qualifications. Data shall also include equipment installation instructions and procedures.

Adhesive Anchors

Oil Sensor

Float Gauge

Oil Pressure Relief Valve

Positive Displacement Flow Meter

Oil Pump

Oil System Hangers and Supports

350 Gallon Oil Tank

Pump Discharge Hose

Pump Suction Hose

Pump Support Structure

#### SD-07 Certificates

#### Verification of Dimensions

A letter shall state the date the site was visited and a listing of all discrepancies found or indicating that no discrepancies were found. The letter shall include all discrepancies noted with proposed solutions or shall include a request for information (RFI) necessary to remedy the discrepancies.

#### Welder Qualifications

##### 1.3.1 Welder Qualifications.

Submit information at least 30 days prior to performing the work specified for welders and welding operators. Welding operators, welders, and tack welders, shall be qualified and, as necessary, re qualified for the particular type of work to be done. Qualification shall be in accordance with AWS D1.1/D1.1M or ASME BPV IX. The Contractor shall certify by name to the Contracting Officer's Representative, the welders and welding operators so qualified including the date of qualification, code, and procedures under which qualified. The qualification tests shall be performed within 12 months prior to performing work on this contract. The Contractor shall require the welder or welding operator to repeat the qualifying tests when, in the opinion of the Contracting Officer's Representative, a reasonable doubt about proficiency exists. In such cases, the welder or welding operator shall be considered recertified, as above, if the retest is successfully passed; otherwise, the welder or welding operator shall be disqualified until successfully passing a retest. All expenses in connection with qualification and requalification shall be borne by the Contractor. Certificates for welder and welding operator qualifications shall include qualified procedures, and a list of names and identification symbols of welders and welding operators.

#### SD-10 Operation and Maintenance Data

##### Operation and Maintenance Data; G EM

##### 1.3.2 Operation and Maintenance Data.

Furnish operation and maintenance manuals for the oil sensor system, the oil pump, and the positive displacement flow meter. Draft copies of the operation and maintenance manuals shall be submitted at least 15 days prior to delivery or at least 60 days prior to scheduled installation as required in Section: 01330 SUBMITTAL PROCEDURES.

##### 1.4 Oil System Layout Drawings

The Contractor shall provide oil system layout drawings. Drawings shall consist of plans drawn to scale, with elevations and sections to show clearly the location (by dimension to pertinent building features) and routing of all piping for the entire oil system, including but not limited to; details of connections and size and type of piping, all support types and locations, pipe thrust restraints, sway braces, and appurtenances.

## PART 2 PRODUCTS

### 2.1 MATERIALS, STANDARD ARTICLES, AND PRODUCTS

Materials and standard articles shall be as specified herein unless otherwise indicated on the drawings. Where requirements are not specified, materials and standard articles shall be suitable for the intended use and follow standard industry practice. Equipment shall be the standard products of a manufacturer regularly engaged in the manufacturing of such products, which are of a similar material, design and workmanship. The standard products shall have been in satisfactory commercial or industrial use for at least two years prior to bid opening. The two-year use shall include applications of equipment and materials under similar circumstances and of similar size. The two years experience shall be satisfactorily completed by a product that has been sold or is offered for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures. Products having less than a two-year field service record may be acceptable if a certified record of satisfactory field operation, for not less than 6000 hours exclusive of the manufacturer's factory tests, can be shown. All products shall be supported by a service organization that is able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

### 2.2 NAMEPLATES

Each major component of equipment shall have the manufacturer's name, address, type or style, and catalog or serial number on a plate securely attached to the item of equipment. In lieu of a nameplate, the manufacturer's name or trademark may be cast integrally or stamped, or otherwise permanently marked.

### 2.3 MATERIALS AND EQUIPMENT

#### 2.3.1 Structural Steel

Structural steel plates and shapes shall conform to ASTM A 36/A 36M.

#### 2.3.2 Steel Pipe

Steel pipe shall conform to ASTM A 53/A 53M, Schedule 40, Galvanized.

#### 2.3.3 PVC Pipe

PVC pipe shall conform to ASTM D 1785, Schedule 40, Type 1, Grade 1. Perforated PVC pipe for the oil sensor stilling well shall have perforations as recommended by the oil sensor manufacturer. Perforation edges shall be smooth and free of burrs. Perforations shall cover 25% to 30% of the surface area. Adhesives shall be compatible with the pipe material.

#### 2.3.4 Copper Pipe and Fittings

Copper pipe used for oil piping shall conform to the requirements of ASTM B 88, Type L. Copper pipe fittings shall be solder joint fittings conforming to ASME B16.22. Connections in copper pipelines and fittings shall be made by soldering. Solder shall conform to the requirements of ASTM B 32, 95-5 tin-antimony or Grade Sn96 tin-silver with flux containing not more than 0.2 percent lead.

### 2.3.5 Clear PVC Pipe and Fittings

Clear, rigid PVC pipe and fittings shall meet schedule 40 criteria. Fittings shall be socket type except where threads are required. Cement and primer shall be suitable for use with the pipe and fittings. Pipe and fittings shall be clear or transparent to allow visual observation of flow through the pipe and fittings.

### 2.3.6 Clear Hose

Clear hose shall be utility grade vinyl tubing designed for use as a general-purpose air and liquid, low pressure transfer hose. Fittings for clear hose shall be PVC or Polypropylene insert type as indicated.

### 2.3.7 Flexible Pipe Couplings

Flexible pipe couplings shall be made of tough, resilient, elastomeric PVC. They shall be resistant to chemicals, ultraviolet rays, fungus growth, and normal sewer gases. Each coupling shall be secured in place with a minimum of one hose clamp at each end of the coupling. The hose clamps, including the band screw and housing, shall be made of 300 series stainless steel.

### 2.3.8 Pipe Sleeves

Pipe sleeves shall be provided where piping passes through floors. Pipe sleeves shall be schedule 40 steel pipe as specified herein. Sleeves shall be secured in proper position with non-shrink grout. Sleeves in floor slabs shall extend 3 inches above the finished floor. An annular space of at least 1/4 inch shall be provided between exterior of piping and the interior wall of the sleeve.

### 2.3.9 Bolts, Nuts and Washers

Bolts, nuts and washers shall be of the material, grade, type, class, style, and finish indicated or best suited for intended use.

### 2.3.10 Adhesive Anchors

Anchors shall consist of threaded steel rods grouted into holes drilled in concrete. Grout shall be a two component material consisting of a polyester or vinylester resin and a hardener contained in a capsule. Threaded rod shall conform to ASTM A 307. The grout shall be non soluble in water. Installation of the anchors shall be in accordance with the manufacturer's instructions. Anchor diameters shall be as indicated. Anchor lengths shall be the larger of the indicated lengths or the manufacturer's standard lengths. Total lengths of anchors shall be as necessary so that at least 1/8" (but not more than 1/4") of threaded rod extends past the nut when final installation is complete. Reinforcing steel or other embedded metals may be encountered when drilling for installation of the anchors.

### 2.3.11 Offset Pipe Clamps

Offset pipe clamps shall be galvanized carbon steel 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.

### 2.3.12 350 Gallon Oil Tank

The oil tank shall have a minimum capacity of 350 gallons and be constructed to UL 142 standards. It shall be of double wall construction. The maximum height to the inlet port on the tank shall be 38 inches. The tank shall have integral support feet which can be anchored to the floor and provide for at least 1 inch clearance between the floor and the bottom of the tank. The tank shall have openings for tank filling, pump suction, pressure relief valve return, mechanical oil level indicator, Ultrasonic fluid level transducer, 2 inch vent, and 4 inch emergency vent fittings. Four inch emergency vent fittings shall be provided for both primary and secondary containment tanks. The emergency vent fitting shall conform to the requirements of NFPA 30 and be vaportight when not in use.

### 2.3.13 55-Gallon HDPE Tank

55-Gallon tank shall be cylindrical, rotationally molded high-density polyethylene with seamless walls. Tank shall be made from resin complying with FDA regulation 177.1520, suitable for operating temperatures up to 150 °F. Approximate tank dimensions shall be 22" OD by 36" deep, approximate wall thickness shall be 1/4". Provide cover with notched area to clear the inlet pipe.

### 2.3.14 Tank Support Stand

Tank support stand for the 55-gallon tank shall be hot dip galvanized after fabrication. Welds shall be fillet or groove type as appropriate. Support stand top plate shall be 1/8" thick steel plate with 1" raised lip around the edge. Size top plate to fit 55-gallon HDPE tank bottom. Cut hole in top plate to clear tank drain connection. Legs shall be 3" steel pipe, equally spaced a short distance in from the perimeter of the top plate, of length as required to provide the tank elevation indicated. Leg base plates shall be 6" square, 1/4" thick, welded to legs. Anchor tank support stand to floor as indicated.

### 2.3.15 Float Gauge

The float gauge shall be a spiral actuated, mechanical, direct reading gauge. It shall be designed for use with hydraulic oil, lubricating oil, gasoline, and diesel fuel. It shall be suitable for use in the 350 gallon tank installed. It shall be of the vertical rise type and occupy only the area below the mounting opening. The gauge shall be readable from a top view and show proportional tank capacity. The gauge shall be suitable for a tank pressure up to 25 psi.

### 2.3.16 Ultrasonic Fluid Level Transducer

The ultrasonic fluid level transducer shall meet the requirements of section 16050, ELECTRICAL WORK.

### 2.3.17 Oil Pressure Relief valve

The oil pressure relief valve shall be an angle style relief valve conforming to the specifications of ASTM F 1508 and these specifications. Both the inlet and outlet to the safety relief valve shall be at least 1 inch FNPT. The valve seat orifice diameter shall be a minimum of 3/8 inch. The valve body shall be constructed of brass with a Buna-N seat. The valve

shall shall have a set point of 60 psi. The valve shall be bubble tight to 95% of the set pressure and the set pressure shall be 93% of the gush point. The valve shall be designed to avoid chatter. It shall be designed for a temperature range of between -65 and 500 degrees F, and a pressure range of between 30 to 300 psig. The pressure relief valve shall be securely anchored to the wall.

#### 2.3.18 Positive Displacement Flow Meter

The oil pump discharge piping shall be installed with a positive displacement flow meter, as indicated. The flow meter shall be of the oval gear type. The flow meter shall be able to accurately measure fluid flows between 6 and 60 gallons per minute. The meter shall be suitable for fluids viscosities of between 100 and 300 centipoise and fluid pressures up to 75 psi. The flow meter shall have an aluminum body and Rytan gears with Buna-N seals. The meter shall produce a maximum head loss of no more than 14.5 psi in the pipeline at the full rated flow. The meter shall be equipped with a mechanical numerical display with two readouts. One six digit non-resettable readout and one four digit resettable batch totalizer.

#### 2.3.19 Brass Unions

Brass unions shall conform to the requirements of MSS SP-123.

#### 2.3.20 Dielectric Unions

Insulated unions shall be provided with a galvanized steel female pipe-threaded end and a copper solder joint end conforming with ASME B16.39, Class 1, dimensional, strength and pressure requirements. Union shall have a water-impervious insulation barrier capable of limiting galvanic current to one percent of the short-circuit current in a corresponding bimetallic joint. When dry, the insulation barrier shall be able to withstand a 600-volt breakdown test.

#### 2.3.21 Ball Valve

Ball valves shall conform to the requirements of MSS SP-110 full port design, copper alloy. Valves shall have two-position lever handles. Ball Valves indicated as normally open shall have green handles and ball valves indicated as normally closed shall have red handles.

#### 2.3.22 Check Valve

Check valves in the oil pipeline shall be constructed of bronze and conform to the requirements of MSS SP-80.

#### 2.3.23 Oil Pump

The oil pump shall be of the positive displacement internal gear type. The pump shall be designed for use with fluid viscosities up to 250 centipoise and a specific gravity of 0.9. The pump shall be constructed with a steel or cast iron exterior with bronze bushings, steel shaft, and Viton mechanical seals. It shall be capable of running dry. The inlet and outlets of the pump shall be 1 inch FNPT. The pump capacity shall be 9 GPM at a motor speed of 1750 RPM. The pump shall be able to prime itself through the suction piping without damage and deliver a discharge pressure of 50 PSI at the pump outlet. The pump shall have a small footprint and be directly coupled to the motor.

#### 2.3.24 Pump Discharge Hose

A plyable hose shall form a flexible connection between the pump and the discharge pipeline. The hose shall have a nominal internal diameter of 1 inch. The working pressure of the hose shall be not less than 250 psi and the burst pressure shall be not less than 1000 psi. The hose shall have a minimum bend radius of not greater than 6 inches. The hose shall maintain its working properties through a temperature range of -40 to 257 degrees F. The hose shall be compatible with typical ISO 100 turbine oil and it shall be equipped with permanently attached end fittings which do not detract from the performance of the hose. The fittings shall shall have male NPT threaded ends.

#### 2.3.25 Pump Suction Hose

A plyable hose shall form a flexible connection between the pump and the suction pipeline. The hose shall have a nominal interal diameter of 1 inch. The hose shall be able to operate under a vacuum of 28 inHg without deformation. The hose shall have a minimum bend radius of not greater than 6 inches. The hose shall maintain its working properties through a temperature range of -40 to 257 degrees F. The hose shall be compatible with typical ISO 100 turbine oil and it shall be equipped with permanently attached end fittings which do not detract from the performance of the hose. The fittings shall shall have male NPT threaded ends.

#### 2.3.26 Pump Support Structure

The pump shall be supported above the oil tank and against the wall. The support structure shall safely support the pump without deformation. The structure shall be secured to the concrete wall through adhesive anchors. After fabrication the support structure shall be hot dip galvanized.

#### 2.3.27 Oil Sensor

Oil sensor shall consist of a floating detector, signal processor, and interconnecting instrumentation cable. Floating detector shall operate using electromagnetic energy absorption technology. Detector shall be capable of monitoring hydrocarbons and other organic solvents on water. Detection range shall be 1/64" to 1" thick layer of hydrocarbon on water. Detector operating temperature range shall be from 32 °F to 150 °F. Signal processor operating temperature range shall be from minus 40 °F to 180 °F. Detector housing construction materials shall be 316 stainless steel and hydrocarbon-resistant polymers. Detector dimensions shall be approximately 3.5" diameter by 5" tall. Signal processor enclosure shall be NEMA 4. Signal processor shall operate on standard 120 VAC power. Signal processor shall have 2 adjustable relays and 3 indicating lights. The oil sensor shall have 2 field adjustable alarm points. The oil sensor shall include a test feature to continuously monitor for system failure. Interconnecting instrumentation cable length shall be suitable for the operating water level fluctuation range indicated. The oil sensor shall be suitable for installation in wet sumps, tanks, and groundwater monitoring wells. Floating detector shall be Leakwise model ID-221, product number AGA 00002 or approved equal. Signal processor shall be Leakwise model PS-220/N4/RL/LI, product number AGA 00016 or approved equal.

#### 2.4 Oil System Hangers and Supports

Design, selection, fabrication, installation, and spacing shall conform to MSS SP-58, MSS SP-69, and MSS SP-89. Hangers, supports, rods, anchors,

nuts, bolts, and washers shall be hot-dip galvanized. Hangers and supports shall be of the adjustable type.

## 2.5 ZINC COATINGS

### 2.5.1 Application

Application of zinc coatings shall conform to the requirements of ASTM A 123/A 123M. Thickness of the zinc shall conform to standard industry practice for the given application.

### 2.5.2 Repair of Zinc Coatings

In all cases where zinc coating is damaged, 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.

## PART 3 EXECUTION

### 3.1 STEEL FABRICATION

#### 3.1.1 General Steel Fabrication

AISC 316 shall govern the work. Welding shall be in accordance with AWS D1.1/D1.1M. Workmanship shall be of the highest grade in accordance with the best modern practices to conform to the specifications for the item of work being furnished. Submit shop drawings of steel fabrications.

#### 3.1.2 Verification of Dimensions

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall carefully investigate the piping, electrical, structural, and finish conditions that would affect the work to be performed and shall arrange such work accordingly, furnishing required offsets, fittings, and accessories to meet such conditions. The Contractor shall field verify all dimensions for metalwork which must fit existing features at the site. Shop drawings shall note dimensions that are field measured and are different than those given on the contract drawings.

#### 3.1.3 Fabrication

Material shall be straight before being laid off or worked. If straightening is necessary, it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection for the material. Material with welds will not be accepted, except where welding is definitely specified, indicated on the drawings, or otherwise approved. Bends, except for minor details, shall be made by approved dies, press brakes, or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in such a manner as not to destroy the original properties of the metal. Corners shall be square and true unless otherwise indicated on the drawings. Re-entrant cuts shall be filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free from twists, bends and open joints. All bolts, nuts and screws shall be tight.

### 3.1.4 Cutting

Flame cutting of material other than structural steel shall be subject to approval and where proposed, shall be indicated on the shop drawings. Shearing shall be accurately done and all portions of the work shall be neatly finished. Structural steel may be cut by mechanically-guided or hand-guided torches provided an accurate profile with a smooth surface free from cracks and notches is formed. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1/D1.1M. 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 cuts or hand-guided cuts not exposed to view. Hand-guided cuts exposed or visible shall be chipped, ground or machined to sound metal.

### 3.1.5 Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape of approximately the same temperature as the material at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the section pertaining to the specific item of work. Except as required to meet the requirements above an allowable variation of 1/32" is permissible in the overall length of the individual members with both ends milled, except stiffeners. The ends of stiffeners on flexural members at points of bearing shall be milled or ground to bear against the flange, or shall be welded to the flange if authorized. The fit of intermediate stiffener ends against the flange shall be such as to exclude water after being painted unless welding is authorized. Individual component members without milled ends shall not deviate from the dimensions shown on the drawings by more than 1/16" for members 30 feet or less in length, and by not more than 1/8" for members over 30 feet in length. When a member with a specified overall dimension is made up of two or more pieces, the permissible variations shall also apply to the assembled members.

## 3.2 WELDING

### 3.2.1 General

Unless otherwise authorized or specified, welding of structural steel shall be by an electric-arc welding process, using a method that excludes the atmosphere from the molten metal. Welding, unless specified otherwise, shall conform to the applicable provisions of AWS D1.1/D1.1M.

### 3.2.2 Welding Equipment

All items of welding equipment shall conform to the requirements of AWS D1.1/D1.1M.

### 3.2.3 Filler Metal

The electrode, electrode-flux combination and grade or weld metal shall conform to AWS A5.1 or to the appropriate AWS Specification for the base metal and welding process being used. Only low-hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedure to be furnished by the Contractor. To maintain low moisture of low-hydrogen electrodes, a controlled temperature storage oven shall be used at the welding work area.

### 3.2.4 Workmanship Requirements

#### 3.2.4.1 Preheat and Interpass Temperature

Preheating shall be performed as required by AWS D1.1/D1.1M, except that all steel under 3/4" thickness shall be preheated to at least 70 °F. The weldments to be preheated shall be slowly and uniformly heated 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.

#### 3.2.4.2 Temporary Welds

Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed herein for permanent work. All temporary welds shall be made using low-hydrogen welding electrodes by welders qualified for permanent work as specified elsewhere in these specifications. Preheat furnished for temporary welds shall be as required by AWS D1.1/D1.1M for permanent welds except that the minimum temperature shall be 120 °F. in any case. In making temporary welds, arcs shall not be struck in other than weld locations. Each temporary weld shall be removed after serving its purpose and ground flush with adjacent surfaces.

#### 3.2.4.3 Tack Welds

Tack welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds. Preheating shall be performed as specified for temporary welds above. Such tack welds shall be cleaned and fused thoroughly with the permanent welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

### 3.2.5 Inspection

#### 3.2.5.1 General

Welding shall be subject to inspection by Government inspectors to determine conformance with the requirements of AWS D1.1/D1.1M, the approved welding procedures, and provisions stated elsewhere in these specifications. The Contractor shall maintain an adequate inspection system and perform the necessary inspections.

#### 3.2.5.2 Visual Examination

Prior to any welding, the Contractor shall visually inspect the preparation of material for welding to assure compliance with AWS D1.1/D1.1M. All completed welds shall be cleaned and examined carefully by the Contractor for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement, and other surface defects to insure compliance with the requirements of AWS D1.1/D1.1M. Defects shall be corrected as provided in paragraph: Repairs, below.

#### 3.2.5.3 Supplemental Examination

The Government reserves the right to perform supplemental nondestructive examinations as deemed necessary when the soundness of any weld is in doubt and to detect cracking or similar defects that might occur during shipment or erection and before final acceptance by the Government. The cost of such inspection will be borne by the Government. The repairs and the

re-examination of repairs will be performed by the Contractor at no additional cost to the Government.

### 3.2.6 Repairs

Defective welds shall be repaired in compliance with AWS D1.1/D1.1M. When deemed necessary by the Contracting Officer, the Contractor shall submit a welding repair plan for approval before repairs are made. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and were found to have acceptable welds, costs of repairs and retesting shall be borne by the Contractor.

## 3.3 BOLTED CONNECTIONS

### 3.3.1 General

Bolts, nuts, and washers shall be of the type specified or indicated on the drawings. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

### 3.3.2 Bolt holes

All bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical, unless indicated on the drawings to be slotted.

#### 3.3.2.1 Regular Bolts

Holes for regular bolts shall be drilled or subdrilled and reamed in the shop, and not more than 1/16" larger than the diameter of the bolt, unless otherwise indicated.

## 3.4 MACHINE WORK

### 3.4.1 General

Tolerances, allowances, and gages for metal fits between plain, non-threaded cylindrical parts shall conform to ANSI B4.1 for the class of fit shown or required unless otherwise shown on approved shop drawings. Where fits are not shown, they shall be suitable as approved by the Contracting Officer's Representative. Tolerances for machine-finished surfaces designated by non-decimal dimensions shall be within 1/64". All drilled holes for bolts shall be accurately located.

### 3.4.2 Unfinished Surfaces

All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces, they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown on the drawings and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in a manner approved by the Contracting Officer's Representative.

### 3.5 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity, and temperature variations, dirt and dust, and other contaminants.

### 3.6 INSTALLATION

#### 3.6.1 General

All work shall be performed in accordance with the manufacturer's published diagrams, recommendations, instructions, and equipment warranty requirements. All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Enclosed chambers or passages shall be examined to make sure that they are free from damaging materials. Bolts and screws shall be tightened firmly and uniformly, but care shall be taken not to overstress the threads. Lubricate threads of all bolts, nuts and screws by graphite and oil before assembly. Driving and drifting bolts or keys will not be permitted. Electrical work shall be in accordance with the National Electrical Code.

#### 3.6.2 Copper Tubing

Pipe shall be cut with square ends and remove burrs and fins. Tubing cut, dented, or otherwise damaged shall be replaced with new tubing. Outside surface of tubing ends and inside recess of fittings shall be cleaned to bright metal with wire brush or abrasive, then applied with flux to outside surface of tubing ends and on the recess inside of fittings. Insert tubing to the full depth of fitting, then braze. Remove stems and washers of solder-joint type valves before brazing. Brazing procedure qualification and preparation and procedures for joints shall be in accordance with ASME B31.3. The copper tubing shall be installed in a manner that allows the end of the pipe to move and expand while anchoring the centers of the spans.

### 3.7 FIELD TESTING AND ADJUSTING EQUIPMENT

#### 3.7.1 General

Prior to acceptance, an operational test of all equipment and control systems shall be performed to determine if the installed equipment operates properly. Tests shall demonstrate that the equipment is not electrically, mechanically, structurally, or otherwise defective; is in safe and satisfactory operating condition; and conforms to the specified operating characteristics. If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be reconducted at no additional cost. Tests shall be conducted in the presence of a Contracting Officer's Representative.

#### 3.7.2 Pneumatic Pipe Test

The oil piping system shall be pneumatically tested to 25 psig, and the joints examined with soap solution. Gradually increase to 50 psig and hold for 1 hour. The pneumatic test is more hazardous than a hydrostatic test, therefore, special safety measures, including the wearing of face masks, shall be taken during testing under pressure. Only authorized personnel shall be permitted in the area during pneumatic and hydrostatic testing.

### 3.7.3 Hydrostatic Pipe Test

Upon completion of pneumatic testing, the oil piping shall be hydrostatically tested at 1.5 times maximum system operating pressure but in no case more than 275 psig in accordance with ASME B31.3 and API RP 1110, with no leakage or reduction in gage pressure for 4 hours.

### 3.8 CONTRACTOR QUALITY CONTROL

The Contractor shall establish and maintain quality control to insure compliance with contract requirements and maintain records of his quality control as required in Section: 01451 CONTRACTOR QUALITY CONTROL for all operations including, but not limited to, the following:

- a. Inspection of material delivered to the project site against approved material data.
- b. Storage and handling of materials.
- c. Removal of existing materials and equipment.
- d. Installation of all new equipment.
- e. Proper welder, and welding operator qualifications.
- f. Proper welding procedures.

Copies in duplicate of these records and tests as well as the records of corrective action taken when results are unsatisfactory shall be furnished to the Contracting Officer's Representative within 24 hours following the inspection or test.

### 3.9 MAINTAIN WORKING "AS-BUILT" CONTRACT DRAWINGS

The Contractor shall maintain working "as-built" contract drawings as specified in Section: 01010 SUPPLEMENTARY REQUIREMENTS.

-- End of Section --