

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT ID CODE		PAGE OF PAGES 1   5	
2. AMENDMENT/MODIFICATION NO. 0001		3. EFFECTIVE DATE 14-Sep-2022		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)	
6. ISSUED BY CODE USAED, WALLA WALLA - CONTRACTING DIV. HILLARY A. MORGAN 201 N. THIRD AVENUE WALLA WALLA WA 99362		W912EF		7. ADMINISTERED BY (If other than item 6) CODE		See Item 6	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X		9A. AMENDMENT OF SOLICITATION NO. W912EF22R0001	
				X		9B. DATED (SEE ITEM 11) 22-Aug-2022	
						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 checked="" type="checkbox"/> is extended, <input 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 <u>1</u> 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.)  The purpose of this amendment is to incorporate the changes outlined below .							
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  _____ (Signature of person authorized to sign)		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA  BY _____ (Signature of Contracting Officer)		16C. DATE SIGNED  14-Sep-2022	

## SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

Summary of changes for Amendment-0001  
LGA DC System and LV Switchgear Upgrades  
Solicitation Number: W912EF22R0001

1. Revised solicitation:
  - a. SECTION 00 10 00 - SOLICITATION
    - The required response date/time has changed from 21-Sep-2022 03:00 PM to 12-Oct-2022 03:00 PM.
  - b. SECTION 00 21 00 - INSTRUCTIONS
    - The bid schedule was revised as follows:
    - Revised CLIN 0032 – Changed 0031 to 0032
    - Added CLIN 0033 – New CLIN
2. Revised the following Specifications:
  - c. SECTION 01 22 00.00 28 "MEASUREMENT AND PAYMENT"
    - Revised paragraph 1.35 "GOVERNOR AIR SUPPLY CROSSOVER MODIFICATION"
    - Added paragraph 1.36 "CLIN 0033 - FURNISH AND INSTALL NEW CABLE TRAYS"
  - d. SECTION 01 35 29.10 28 "GOVERNMENTAL SAFETY REQUIREMENTS"
    - Revised paragraph 1.6.1.1 "Site Safety and Health Officer (SSHO)"
  - e. SECTION 26 05 36.00 28 "CABLE TRAYS FOR ELECTRICAL SYSTEMS"
    - Revised paragraph 3.5 "CABLE CLEATS"
    - Revised paragraph 3.6 "CABLE TRAY FILL"
  - f. SECTION 26 32 36.00 26 "BATTERY CHARGERS AND INVERTERS"
    - Revised paragraph 1.3 "SUBMITTALS"
    - Deleted paragraph 2.5 "INVERTER ISOLATION TRANSFORMERS"

See revised specifications for details.

SECTION 00 10 00 - SOLICITATION

The required response date/time has changed from 21-Sep-2022 03:00 PM to 12-Oct-2022 03:00 PM.

The Issued By organization has changed from

USAED, WALLA WALLA - CONTRACTING DIV.

DAVID C BOONE 201 N. THIRD AVENUE

WALLA WALLA WA 99362-1876

to

USAED, WALLA WALLA - CONTRACTING DIV.

HILLARY A. MORGAN

201 N. THIRD AVENUE

WALLA WALLA WA 99362

## SECTION 00 21 00 - INSTRUCTIONS

Walla Walla District Corps of Engineers  
Little Goose DC System and Low Voltage Switch Gear Upgrades

The magnitude of construction is estimated to be between \$10,000,000 and \$25,000,000

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>U/M</u>	<u>U/P</u>	<u>AMOUNT</u>
	<b>Base Items</b>				
0001	MOBILIZATION AND DEMOBILIZATION	1	JOB	XXXXX	\$ _____
0002	REMOVE AND DISPOSE OF EXISTING TRANSFORMERS AND 480V AC SWITCHGEAR SQO, SQ1, and SQ2	1	JOB	XXXXX	\$ _____
0003	REMOVE AND DISPOSE OF EXISTING UNIT MOTOR CONTROL CENTERS SU1-SU6 AND CP1-CP6	1	JOB	XXXXX	\$ _____
0004	REMOVE AND DISPOSE OF EXISTING MOTOR CONTROL CENTERS CQO1, CQO2, CQO4, CQO5, SH AND THE SH TRANSFORMER	1	JOB	XXXXX	\$ _____
0005	REMOVE AND DISPOSE OF EXISTING PANELBOARDS CQO3, FCQ1, and FCQ2	1	JOB	XXXXX	\$ _____
0006AA	REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 1 - 3	1	JOB	XXXXX	\$ _____
0006AB	REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 4 - 6	1	JOB	XXXXX	\$ _____
0007	REMOVE AND DISPOSE OF EXISTING 125V AND 48V BATTERIES	1	JOB	XXXXX	\$ _____
0008	REMOVE AND DISPOSE OF EXISTING BATTERY CHARGERS BC1, BC2, AND BC3	1	JOB	XXXXX	\$ _____
0009	REMOVE AND DISPOSE OF EXISTING DC SWITCHBOARDS AND PANELBOARDS AND PREFERRED AC PANELS	1	JOB	XXXXX	\$ _____
0010	REMOVE AND DISPOSE OF EXISTING CONDUCTORS, CONDUIT RISERS, AND EXPOSED CONDUIT	1	JOB	XXXXX	\$ _____
0011	REMOVE AND DISPOSE OF EXISTING TURBINE SUPPORT EQUIPMENT STARTERS AND CONTROLS	1	JOB	XXXXX	\$ _____
0012	FURNISH AND INSTALL NEW 480V AC SWITCHGEAR AND TRANSFORMER LINEUPS SQO, SQ1 AND SQ2, INCLUDING NEW FEEDER CABLES	1	JOB	XXXXX	\$ _____
0013	FURNISH AND INSTALL NEW UNIT MOTOR CONTROL CENTERS SU1 - SU6, INCLUDING ASSOCIATED CONTROLS AND NEW FEEDER CABLES	1	JOB	XXXXX	\$ _____

0014	FURNISH AND INSTALL NEW STATION SERVICE MOTOR CONTROL CENTERS CQ01, CQ02, CQ04, CQ05 AND SH, INCLUDING ASSOCIATED CONTROLS, NEW SH TRANSFORMER, AND FEEDER CABLES	1	JOB	XXXXXX	\$ _____
0015	FURNISH AND INSTALL NEW PANELBOARDS CQ03, FCQ1, AND FCQ2, INCLUDING NEW FEEDER CABLES	1	JOB	XXXXXX	\$ _____
0016AA	FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 1 - 3	1	JOB	XXXXXX	\$ _____
0016AB	FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 4 - 6	1	JOB	XXXXXX	\$ _____
0017	FURNISH AND INSTALL NEW 125V BATTERY CHARGERS IN BC1 AND BC2	1	JOB	XXXXXX	\$ _____
0018	FURNISH AND INSTALL NEW BATTERIES, BATTERY MONITORING COMPUTER, CART, DIAGNOSTIC EQUIPMENT, WIRING, BATTERY MONITORING HARDWARE & SOFTWARE PACKAGE	1	JOB	XXXXXX	\$ _____
0019	FURNISH AND INSTALL NEW BATTERY SWITCHBOARDS, DC DISTRIBUTION PANELBOARDS, 120V AC DISTRIBUTION PANELBOARDS, AND MANUAL BREAKER TRANSFER PANELS INCLUDING NEW FEEDER CABLES	1	JOB	XXXXXX	\$ _____
0020	FURNISH AND INSTALL BATTERY ROOM UPGRADES	1	JOB	XXXXXX	\$ _____
0021	PROVIDE NEW LOAD BANK	1	JOB	XXXXXX	\$ _____
0022	FURNISH AND INSTALL SQ REMOTE CONTROL PANELS	1	JOB	XXXXXX	\$ _____
0023	FURNISH THEN INSTALL SBC AND SG PANELS	1	JOB	XXXXXX	\$ _____
0024	RELOCATE EXISTING INVERTERS	1	JOB	XXXXXX	\$ _____
0025	FURNISH SPARE PARTS AND ACCESSORIES	1	JOB	XXXXXX	\$ _____
0026	CORE DRILLING AND CONCRETE WORK	1	JOB	XXXXXX	\$ _____
0027	FURNISH O&M MANUALS	1	JOB	XXXXXX	\$ _____
0028	FURNISH FINAL RECORD DRAWINGS	1	JOB	XXXXXX	\$ _____
0029	PROVIDE COMMISSIONING SERVICES AND TRAINING	1	JOB	XXXXXX	\$ _____
0030	FIRESTOPPING	1	JOB	XXXXXX	\$ _____

0031	FURNISH AND INSTALL NEW PLC GOVERNOR OIL PUMP CONTROLS	1	JOB	XXXXXX	\$_____
	<b>Optional Items</b>				
0032	GOVERNOR AIR SUPPLY CROSSOVER MODIFICATION	1	JOB	XXXXXX	\$_____
0033	FURNISH AND INSTALL NEW CABLE TRAYS	800 EST	LF	\$_____	\$_____
<b>SCHEDULE TOTAL \$_____</b>					

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

U/M\* = Unit of Measure    U/P\* = Unit Price    NTE\* = Not to Exceed    EST\* = Estimated

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

#### SECTION 00 70 00 - CONDITIONS OF THE CONTRACT

The following have been added by reference:

52.211-18                      Variation in Estimated Quantity

APR 1984

(End of Summary of Changes)

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- 1.15 CLIN 0013 - FURNISH AND INSTALL NEW UNIT MOTOR CONTROL CENTERS SU1 - SU6, INCLUDING NEW FEEDER CABLES
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- 1.17 CLIN 0015 - FURNISH AND INSTALL NEW PANELBOARDS CQO3, FCQ1, AND FCQ2, INCLUDING NEW FEEDER CABLES
- 1.18 CLIN 0016AA - FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 1 - 3
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## SECTION 01 22 00.00 28

## MEASUREMENT AND PAYMENT

## PART 1 GENERAL

In each instance, the contract price for an item shall constitute full compensation for furnishing all plant, labor, equipment, and materials, and for performing all operations required to complete the work included in the item as herein specified, or as otherwise approved.

## 1.1 RETAINAGE OF PAYMENT

Retainage in the amount of 10 percent of original contract award amount will be withheld until the final submittals listed below have been approved by the Government. The 10 percent final submittals retainage will be held until the Contractor has earned 90 percent of the original contract value. See SECTION 01 78 00.00 28 "CLOSEOUT SUBMITTALS" and SECTION 01 78 23.00 28 "OPERATION AND MAINTENANCE DATA" for additional information.

- a. Final Shop Drawings.
- b. Final As-built Drawings.
- c. Final Record Drawings.
- d. Return of Government Issued Items.
- e. Final Operation and Maintenance Manuals and Parts Catalogs.
- f. Final Spare Parts submission.
- g. Complete all required training.

## 1.2 CLIN 0001 - MOBILIZATION AND DEMOBILIZATION

Measurement and payment for mobilization and demobilization will be in accordance with Contract CLAUSE: PAYMENT FOR MOBILIZATION AND DEMOBILIZATION. This item will be measured for payment as a complete pay item (JOB) under Item No. 0001, "Mobilization and Demobilization", which price and payment shall be full compensation for mobilizing and demobilizing all plant and equipment required for performance of the work, as specified and approved.

## 1.3 CLIN 0002 - REMOVE AND DISPOSE OF EXISTING TRANSFORMERS AND 480V AC SWITCHGEAR SQ0, SQ1, and SQ2

Removal and disposal of existing transformers and 480V AC switchgear SQ0, SQ1, and SQ2 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0002, "REMOVE AND DISPOSE OF EXISTING TRANSFORMERS AND 480V AC SWITCHGEAR SQ0, SQ1, and SQ2", which price and payment shall be full compensation for all work required to remove and dispose of existing transformers and 480V AC switchgear SQ0, SQ1, and SQ2, complete, as specified and approved.

## 1.4 CLIN 0003 - REMOVE AND DISPOSE OF EXISTING MAIN UNIT AUXILIARY BOARDS SU1-SU6 AND CP1-CP6

Remove and dispose of existing main unit auxiliary boards SU1 - SU6 and CP1-CP6 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0003, "REMOVE AND DISPOSE

OF EXISTING MAIN UNIT AUXILIARY BOARDS SU1 - SU6 AND CP1-CP6", which price and payment shall be full compensation for all work required to remove and dispose of existing main unit auxiliary boards SU1 - SU6 and CP1-CP6, complete, as specified and approved.

1.5 CLIN 0004 - REMOVE AND DISPOSE OF EXISTING MOTOR CONTROL CENTERS CQ01, CQ02, CQ04, CQ05, SH AND THE SH TRANSFORMER

Remove and dispose of existing motor control centers CQ01, CQ02, CQ04, CQ05, SH and the SH transformer will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0004, "REMOVE AND DISPOSE OF EXISTING MOTOR CONTROL CENTERS CQ01, CQ02, CQ04, CQ05, SH AND THE SH TRANSFORMER", which price and payment shall be full compensation for all work required to remove and dispose of existing motor control centers CQ01, CQ02, CQ04, CQ05, SH and the SH transformer, complete, as specified and approved.

1.6 CLIN 0005 - REMOVE AND DISPOSE OF EXISTING PANELBOARDS CQ03, CQ07, FCQ1, and FCQ2

Remove and dispose of existing panelboards CQ03, CQ07, FCQ1, and FCQ2 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0005, "REMOVE AND DISPOSE OF EXISTING PANELBOARDS CQ03, CQ07, FCQ1, and FCQ2", which price and payment shall be full compensation for all work required to remove and dispose of existing panelboards CQ03, CQ07, FCQ1, and FCQ2 as specified and approved.

1.7 CLIN 0006AA - REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 1 - 3

Remove and dispose of existing 4160 volt governor oil pump motors from units 1 - 3 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0006AA, "REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 1 - 3", which price and payment shall be full compensation for all work required to remove and dispose of existing 4160 volt governor oil pump motors from units 1 - 3 complete, as specified and approved.

1.8 CLIN 0006AB - REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 4 - 6

Remove and dispose of existing 4160 volt governor oil pump motors from units 4 - 6 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0006AB, "REMOVE AND DISPOSE OF EXISTING 4160 VOLT GOVERNOR OIL PUMP MOTORS FROM UNITS 4 - 6", which price and payment shall be full compensation for all work required to remove and dispose of existing 4160 volt governor oil pump motors from units 4 - 6 complete, as specified and approved.

1.9 CLIN 0007 - REMOVE AND DISPOSE OF EXISTING 125V AND 48V BATTERIES

Removal and disposal of existing 125V and 48V batteries will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0007, "REMOVE AND DISPOSE OF EXISTING 125V AND 48V BATTERIES" which price and payment shall be full compensation for all work required to remove and dispose of existing 125V and 48V batteries complete, as specified and approved.

1.10 CLIN 0008 - REMOVE AND DISPOSE OF EXISTING BATTERY CHARGERS BC1, BC2, AND BC3

Remove and dispose of existing battery chargers BC1, BC2, AND BC3 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0008, "REMOVE AND DISPOSE OF EXISTING BATTERY CHARGERS BC1, BC2, AND BC3", which price and payment shall be full compensation for all work required to remove and dispose of existing battery chargers BC1, BC2, AND BC3, complete, as specified and approved.

1.11 CLIN 0009 - REMOVE AND DISPOSE OF EXISTING DC SWITCHBOARDS AND PANELBOARDS AND PREFERRED AC PANELS

Remove and dispose of existing DC switchboards and panelboards and preferred AC panels will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0009, "REMOVE AND DISPOSE OF EXISTING DC SWITCHBOARDS AND PANELBOARDS AND PREFERRED AC PANELS", which price and payment shall be full compensation for all work required to remove and dispose of existing DC switchboards and panelboards and preferred AC panels complete, as specified and approved.

1.12 CLIN 0010 - REMOVE AND DISPOSE OF EXISTING CONDUCTORS, CONDUIT RISERS, AND EXPOSED CONDUIT

Remove and dispose of existing conductors, conduit risers, and exposed conduit will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0010, "REMOVE AND DISPOSE OF EXISTING CONDUCTORS, CONDUIT RISERS, AND EXPOSED CONDUIT", which price and payment shall be full compensation for all work required to remove and dispose of existing conductors, conduit risers, and exposed conduit complete, as specified and approved.

1.13 CLIN 0011 - REMOVE AND DISPOSE OF EXISTING HEADCOVER, TURBINE BEARING OIL PUMP STARTERS AND CONTROLS

Remove and dispose of existing headcover, turbine bearing oil pump starters and controls will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0011, "REMOVE AND DISPOSE OF EXISTING HEADCOVER, TURBINE BEARING OIL PUMP STARTERS AND CONTROLS", which price and payment shall be full compensation for all work required to Remove and dispose of existing headcover and turbine bearing oil pump starters and controls, complete, as specified and approved.

1.14 CLIN 0012 - FURNISH AND INSTALL NEW 480V AC SWITCHGEAR AND TRANSFORMER LINEUPS SQ0, SQ1 AND SQ2, INCLUDING NEW FEEDER CABLES

Furnish and install new 480V AC switchgear and transformer lineups SQ0, SQ1 and SQ2, including new feeder cables will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0012, "FURNISH AND INSTALL NEW 480V AC SWITCHGEAR AND TRANSFORMER LINEUPS SQ0, SQ1 AND SQ2, INCLUDING NEW FEEDER CABLES," which price and payment shall be full compensation for all work required to furnish and install new 480V AC switchgear and transformer lineups SQ0, SQ1 and SQ2, including new feeder cables, complete, as specified and approved.

1.15 CLIN 0013 - FURNISH AND INSTALL NEW UNIT MOTOR CONTROL CENTERS SU1 - SU6, INCLUDING NEW FEEDER CABLES

Furnish and install new unit motor control centers SU1 - SU6, including new feeder cables will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0013, "FURNISH AND INSTALL NEW UNIT MOTOR CONTROL CENTERS SU1 - SU6, INCLUDING NEW FEEDER CABLES", which price and payment shall be full compensation for all work required to furnish and install new unit motor control centers SU1 - SU6, including new feeder cables complete, as specified and approved.

1.16 CLIN 0014 - FURNISH AND INSTALL NEW STATION SERVICE MOTOR CONTROL CENTERS CQ01, CQ02, CQ04, CQ05 AND SH, INCLUDING NEW SH TRANSFORMER AND FEEDER CABLES

Furnish and install new station service motor control centers CQ01, CQ02, CQ04, CQ05 AND SH, including new SH transformer and feeder cables will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0014, "PROVIDE NEW STATION SERVICE MOTOR CONTROL CENTERS CQ01, CQ02, CQ04, CQ05 AND SH, INCLUDING NEW SH TRANSFORMER AND FEEDER CABLES", which price and payment shall be full compensation for all work required to furnish and install new station service motor control centers CQ01, CQ02, CQ04, CQ05 AND SH, including new SH transformer and feeder cables complete as specified and approved.

1.17 CLIN 0015 - FURNISH AND INSTALL NEW PANELBOARDS CQ03, FCQ1, AND FCQ2, INCLUDING NEW FEEDER CABLES

Furnish and install new panelboards CQ03, FCQ1, and FCQ2, including new feeder cables will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0015, "FURNISH AND INSTALL NEW PANELBOARDS CQ03, FCQ1, and FCQ2", INCLUDING NEW FEEDER CABLES which price and payment shall be full compensation for all work required to furnish and install new panelboards CQ03, FCQ1, and FCQ2, including new feeder cables complete, as specified and approved.

1.18 CLIN 0016AA - FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 1 - 3

Furnish and install new 480 volt governor oil pump motors in units 1 - 3 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0016AA, "PROVIDE NEW 480 VOLT GOVERNOR OIL PUMP MOTORS. UNITS 1 - 3", which price and payment shall be full compensation for all work required to provide new 480 volt governor oil pump motors for units 1 - 3 complete, as specified and approved.

1.19 CLIN 0016AB - FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 4 - 6

Furnish and install new 480 volt governor oil pump motors in units 4 - 6 will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0016AB, "FURNISH AND INSTALL NEW 480 VOLT GOVERNOR OIL PUMP MOTORS IN UNITS 4 - 6", which price and payment shall be full compensation for all work required to Furnish and install new 480 volt governor oil pump motors in units 4 - 6 complete, as specified and approved.

## 1.20 CLIN 0017 - FURNISH AND INSTALL NEW 125V BATTERY CHARGERS IN BC1 AND BC2

Furnish and install new 125v battery chargers in BC1 and BC2, which will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0017, "FURNISH AND INSTALL NEW 125V BATTERY CHARGERS IN BC1 AND BC2", which price and payment shall be full compensation for all work required to Furnish and install new 125v battery chargers in BC1 and BC2, complete, as specified and approved.

## 1.21 CLIN 0018 - FURNISH AND INSTALL NEW BATTERY, BATTERY MONITORING COMPUTER, CART, DIAGNOSTIC EQUIPMENT, WIRING, BATTERY MONITORING HARDWARE AND SOFTWARE PACKAGE

Furnish and install new battery, battery monitoring computer, cart, diagnostic equipment, wiring, battery monitoring hardware and software package will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0018, "FURNISH AND INSTALL NEW BATTERY, BATTERY MONITORING COMPUTER, CART, DIAGNOSTIC EQUIPMENT, WIRING, BATTERY MONITORING HARDWARE AND SOFTWARE PACKAGE", which price and payment shall be full compensation for all work required to furnish and install new battery, battery monitoring computer, cart, diagnostic equipment, wiring, battery monitoring hardware and software package, as specified and approved.

## 1.22 CLIN 0019 - FURNISH AND INSTALL NEW BATTERY SWITCHBOARDS, DC DISTRIBUTION PANELBOARDS, 120V AC DISTRIBUTION PANELBOARDS, AND MANUAL BREAKER TRANSFER PANELS INCLUDING NEW FEEDER CABLES

Furnish and install new battery switchboards, DC distribution panelboards, 120V AC distribution panelboards, and manual breaker transfer panels including new feeder cables will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0019, "FURNISH AND INSTALL NEW BATTERY SWITCHBOARDS, DC DISTRIBUTION PANELBOARDS, 120V AC DISTRIBUTION PANELBOARDS, AND MANUAL BREAKER TRANSFER PANELS INCLUDING NEW FEEDER CABLES", which price and payment shall be full compensation for all work required to Furnish and install new battery switchboards, DC distribution panelboards, 120V AC distribution panelboards, and manual breaker transfer panels including new feeder cables complete, as specified and approved.

## 1.23 CLIN 0020 - FURNISH AND INSTALL BATTERY ROOM UPGRADES

Furnish and install battery room upgrades will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0020, "FURNISH AND INSTALL BATTERY ROOM UPGRADES", which price and payment shall be full compensation for all upgrades made to the battery room according to contract plans and specifications, as specified and approved.

Battery Room Upgrades consist, but not limited to the following work items:

- a. Remove existing belt driven exhaust fan EF-6 and provide direct drive exhaust fan (retain mark EF-6) and associated fire damper and duct work items.
- b. Piping serving existing emergency shower and eyewash station.
- c. Hydrogen Detector, Smoke Detector, Room Differential Pressure Switch, and Emergency Shower and Eyewash Station Water flow detector; with the output from each of these devices annunciated in the Control Room.
- d. Combination fire smoke damper in the supply air duct serving the

battery room with power to the damper and activation annunciated in the Control Room.

- e. Fire damper at the exhaust air opening in the Battery Room.
- f. Battery Monitoring System
- g. Fire rated battery room door and fire barrier signs
- h. Epoxy flooring and containment curb
- i. Battery racks

1.24 CLIN 0021 - PROVIDE NEW LOAD BANK

The new load bank will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0021, "PROVIDE NEW LOAD BANK", which price and payment shall be full compensation for all work required to provide provide new load bank complete, as specified and approved.

1.25 CLIN 0022 - FURNISH AND INSTALL SQ REMOTE CONTROL PANELS

Furnish and install SQ remote control panels will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0022, "FURNISH AND INSTALL SQ REMOTE CONTROL PANELS", which price and payment shall be full compensation for all work required to furnish and install SQ remote control panels complete, as specified and approved.

1.26 CLIN 0023 - FURNISH THEN INSTALL SBC AND SG PANELS

Furnishing, then installing the SBC and SG panels will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0023, "FURNISH THEN INSTALL SBC AND SG PANELS", which price and payment shall be full compensation for all work required to furnish, then install the SBC and SG panels complete, as specified and approved.

1.27 CLIN 0024 - RELOCATE EXISTING INVERTERS THEN FURNISH AND INSTALL 125V/48V DC/DC CONVERTERS

Relocate existing inverters will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0024, "RELOCATE EXISTING INVERTERS", which price and payment shall be full compensation for all work required to relocate existing inverters complete, as specified and approved.

1.28 CLIN 0025 - FURNISH SPARE PARTS AND ACCESSORIES

Furnish spare parts and accessories will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0025, "FURNISH SPARE PARTS AND ACCESSORIES", which price and payment shall be full compensation for all work required to furnish spare parts and accessories complete, as specified and approved.

1.29 CLIN 0026 - CORE DRILLING AND CONCRETE WORK

Core drilling and concrete work will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0026, "CORE DRILLING AND CONCRETE WORK", which price and payment shall be full compensation for all work required for core drilling and concrete work complete, as specified and approved.



## 1.30 CLIN 0027 - FURNISH O&amp;M MANUALS

Furnish O&M manuals will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0027, "FURNISH O&M MANUALS", which price and payment shall be full compensation for all work required to furnish O&M manuals complete, as specified and approved.

## 1.31 CLIN 0028 - FURNISH FINAL RECORD DRAWINGS

Furnish final record drawings will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0028, "FURNISH FINAL RECORD DRAWINGS", which price and payment shall be full compensation for all work required to furnish final record drawings complete, as specified and approved.

## 1.32 CLIN 0029 - PROVIDE COMMISSIONING SERVICES AND TRAINING

Provide commissioning services and training will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0029, "PROVIDE COMMISSIONING SERVICES AND TRAINING", which price and payment shall be full compensation for all work required to Provide commissioning services complete, as specified and approved.

## 1.33 CLIN 0030 - FIRESTOPPING

Firestopping will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0030, "FIRESTOPPING", which price and payment shall be full compensation for all work required to Provide commissioning services complete, as specified and approved.

## 1.34 CLIN 0031 - LEAD BASED PAINT REMEDIATION AND DISPOSAL

CLIN 0003 - "LEAD BASED PAINT REMEDIATION AND DISPOSAL" will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0031, "Lead Based Paint Remediation And Disposal", which price and payment shall be full compensation for all work required for the Lead Based Paint Remediation And Disposal on existing Battery Room Floor LBP, complete, as specified and approved.

## 1.35 OPTIONAL ITEMS

1.35.1 CLIN ~~0031~~0032 - GOVERNOR AIR SUPPLY CROSSOVER MODIFICATION

Governor air supply crossover modification will be measured for payment as a complete pay item (JOB). Payment will be made at the lump sum price for CLIN No. 0031, "GOVERNOR AIR SUPPLY CROSSOVER MODIFICATION" which price and payment shall be full compensation for all parts and labor required to modify the governor air supply crossover, as specified and approved.

## 1.35.2 CLIN 0033 - FURNISH AND INSTALL NEW CABLE TRAYS

Furnish and install up to an estimated 800 lineal feet (LF) of 24 inch new cable trays for existing trays not meeting NEC fill requirements. Payment is measured and made at the price per lineal foot for CLIN No. 0032, "FURNISH AND INSTALL NEW CABLE TRAYS", which price and payment is full compensation for all work required to furnish and install new cable trays, complete, as specified and approved.

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PART 3 EXECUTION (NOT APPLICABLE)

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## SECTION 01 35 29.10 28

## GOVERNMENTAL SAFETY REQUIREMENTS

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE A10.44	(2016) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSE/SAFE Z244.1	(2003; R 2014) Control of Hazardous Energy Lockout/Tagout and Alternative Methods
ASSE/SAFE Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ASSE/SAFE Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSE/SAFE Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSE/SAFE Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSE/SAFE Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSE/SAFE Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSE/SAFE Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSE/SAFE Z359.3	(2019) Safety Requirements for Positioning and Travel Restraint Systems
ASSE/SAFE Z359.4	(2013) Safety Requirements for

Assisted-Rescue and Self-Rescue Systems,  
Subsystems and Components

ASSE/SAFE Z359.6

(2009) Specifications and Design  
Requirements for Active Fall Protection  
Systems

ASSE/SAFE Z359.7

(2011) Qualification and Verification  
Testing of Fall Protection Products

## ASME INTERNATIONAL (ASME)

ASME B30.20

(2013; INT Oct 2010 - May 2012)  
Below-the-Hook Lifting Devices

ASME B30.22

(2016) Articulating Boom Cranes

ASME B30.26

(2015; INT Jun 2010 - Jun 2014) Rigging  
Hardware

ASME B30.3

(2016) Tower Cranes

ASME B30.5

(2014) Mobile and Locomotive Cranes

ASME B30.8

(2015) Floating Cranes and Floating  
Derricks

ASME B30.9

(2014; INT Feb 2011 - Nov 2013) Slings

## ASTM INTERNATIONAL (ASTM)

ASTM F855

(2015) Standard Specifications for  
Temporary Protective Grounds to Be Used on  
De-energized Electric Power Lines and  
Equipment

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048

(2003) Guide for Protective Grounding of  
Power Lines

IEEE C2

(2017) National Electrical Safety Code

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10

(2018; TIA 18-1) Standard for Portable  
Fire Extinguishers

NFPA 241

(2013; Errata 2015) Standard for  
Safeguarding Construction, Alteration, and  
Demolition Operations

NFPA 51B

(2014) Standard for Fire Prevention During  
Welding, Cutting, and Other Hot Work

NFPA 70

(2017) National Electrical Code

NFPA 70E

(2018; TIA 18-1; TIA 81-2) Standard for  
Electrical Safety in the Workplace



## U.S. ARMY CORPS OF ENGINEERS (USACE)

## EM 385-1-1

## Safety and Health Requirements Manual

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

## U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1910.1025	Lead
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes and Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.62	Lead
29 CFR 1926.500	Fall Protection
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

## 1.2 DEFINITIONS

## 1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

## 1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person

requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

#### 1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

#### 1.2.4 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems/equipment, is capable of identifying, evaluating, and addressing existing or potential fall hazards, and has the authority to take prompt corrective measures with regard to such hazards.

#### 1.2.5 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

#### 1.2.6 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

#### 1.2.7 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

#### 1.2.8 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

#### 1.2.9 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

#### 1.2.10 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

#### 1.2.11 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

#### 1.2.12 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

#### 1.2.13 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

#### 1.2.14 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of [EM 385-1-1](#) Appendix Q, and [ASSE/SAFE Z359.0](#), with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

### 1.2.15 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

- a. Death, regardless of the time between the injury and death, or the length of the illness;
- b. Days away from work (any time lost after day of injury/illness onset);
- c. Restricted work;
- d. Transfer to another job;
- e. Medical treatment beyond first aid;
- f. Loss of consciousness; or
- g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above.

### 1.2.16 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

### 1.2.17 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document any mishap that meets the criteria described in the Crane/Rigging Mishap Investigation Form, see attached.

## 1.3 SUBMITTALS

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

#### SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G C

Activity Hazard Analysis (AHA); G C

Safe Clearance; I C

Authorized Individuals; I C

Standard Lift Plan; G C

Critical Lift Plan; G C

Lead Compliance Plan; G ECC

State licensed Journeyman Electrician; I C

Asbestos Hazard Abatement Plan; G ECC

Crane Wheel And Outrigger Loading Diagram And Deck Protection For  
Outriggers; G ST

SSHO And Alternate SSHO; G C

Competent Person Qualifications; G, C

Bridge/Intake Crane Qualifications; G, C

Naval Architecture Analysis; I, C

#### SD-06 Test Reports

Monthly Exposure Reports; I C

Notifications and Reports; I C

Accident Reports; I C

LHE Inspection Reports; I C

#### SD-07 Certificates

Crane Operators/Riggers; I C

Confined Space Entry Permit; I C

Hot Work Permit; I C

Certificate of Compliance; I C

Competent Person Trainer; G C

### 1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

### 1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria,

rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

## 1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

### 1.6.1 Personnel Qualifications

#### 1.6.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the SSHO. The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times, with the exception of temporary absences less than 24 hours discussed below, to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs including the following.

The SSHO ~~shall~~must either be employed by the Prime Contractor, or be employed by the Prime Contractor as a subcontractor. If the SSHO is employed by a subcontractor, they must obtain a letter of authority from the Prime Contractor. The SSHO can be assigned no other duties. on this project. The SSHO shall also meet the following requirements:

- a. A minimum of 5 years safety work on similar projects.
- b. 30-hour OSHA construction safety class or equivalent within the last 5 years.
- c. Provide documentation that shows the completion of a minimum of 8 hours of formal, on-line, or self-study safety and health related coursework each year during the last five (5) years.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

#### 1.6.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all

times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

#### 1.6.1.2.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space.

#### 1.6.1.2.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

#### 1.6.1.2.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04 and herein.

#### 1.6.1.3 Qualified Trainer Requirements

Individuals who are qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards and Lockout/Tagout in accordance with 29 CFR 1926.450, Subpart L. Submit Certification of Competent Person training.

Instructors are required to:

- a. Prepare class presentations that cover construction-related safety requirements.
- b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.
- c. Update training course materials whenever an update of the EM 385-1-1 becomes available.
- d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.
- e. Request, review and incorporate student feedback into a continuous course improvement program.

#### 1.6.1.4 Crane Operators/Riggers

Provide Operators meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of

current qualifications.

- a. Before any operator is approved, they shall spend at least one (1) hour demonstrating their capabilities to operate the Government Crane, under the direct surveillance of a Government operator. The operators may be retested at any time.

#### 1.6.2 Personnel Duties

##### 1.6.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.
- b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.
- c. Use OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors. Post and maintain the Form 300 on the site Safety Bulletin Board.
- d. Maintain applicable safety reference material on the job site.
- e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.
- f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.
- g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.
- h. Ensure subcontractor compliance with safety and health requirements.
- i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).
- j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.
- k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.



### 1.6.3 Meetings

#### 1.6.3.1 Preconstruction Meeting

Refer to SECTION 01 11 01.00 28 SUPPLEMENTARY REQUIREMENT for additional requirements on the Preconstruction Meeting.

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction meeting. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.
- c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin work until an APP is established that is acceptable to the Contracting Officer.

#### 1.6.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings Seven (7) calendar days in advance.

### 1.7 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written, site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. See attached Accident Prevention Plan Requirements Form for guidance when preparing the APP. The following conditions apply:

1. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A.
2. Must be job-specific and address any unusual or unique aspects of the project or activity for which it is written.

3. Must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific.
4. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process.
5. Describe innovative methods used to ensure and monitor safe work practices of subcontractors.
6. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.
7. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.
8. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH).
9. The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer.
10. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the contracting Officer Fifteen (15) calendar days prior to the date of the preconstruction conference for acceptance. Work cannot precede without an accepted APP. Once reviewed and accepted by the contracting Officer, the APP and attachments will be enforced as part of the contract.

1. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.
2. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager.
3. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure ( i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard.
4. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel,

visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

#### 1.7.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in EM 385-1-1; Appendix A, including the following:

- a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated SSHO and other competent and qualified personnel to be used. Specify the duties of each position.
- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

#### 1.7.2 Plans

Provide plans in the APP in accordance with the requirements outlined in EM 385-1-1, Appendix A including the following:

##### 1.7.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan that is compatible with NWWP 385-1-20 in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

##### 1.7.2.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

##### 1.7.2.3 Critical Lift Plan- Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer Thirty (30) calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

In addition to the requirements of [EM 385-1-1](#), Section 16.H.02, the critical lift plan must include the following:

- a. For lifts of personnel, demonstrate compliance with the requirements of [29 CFR 1926.1400](#) and [EM 385-1-1](#), Section 16.T.
- b. For barge mounted mobile cranes, provide a [Naval Architecture Analysis](#) and include an LHE Manufacturer's Floating Service Load Chart in accordance with the criteria from the selected standard in [EM 385-1-1](#), Section 16.L.02. The Floating Service Load Chart must provide a table of rated load versus boom angle and radius. The Floating Service Load Chart must also provide the maximum allowable machine list and trim associated with the tabular loads and radii provided. If the Manufacturer's Floating Service Load Chart is not available, a floating service load chart may be developed and provided by a qualified Registered Professional Engineer (RPE), competent in the field of floating cranes. The Load Chart must be in accordance with the criteria from the selected standard in [EM 385-1-1](#), Section 16.L; provide . Provide a table of rated load versus boom angle and radius; provide the maximum allowable machine list and machine trim associated with the tabular loads and radii provided; and be stamped by a RPE qualified and competent in the field of floating cranes. The RPE, competent in the field of floating cranes must stamp and certify (sign) that the Naval Architectural Analysis (NAA) meets the requirements of [EM 385-1-1](#), Section 16.L.03.
- c. Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

#### 1.7.2.4 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of [EM 385-1-1](#), Section 21.D and [ASSE/SAFE Z359.2](#). Be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above [6 feet](#). A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

#### 1.7.2.5 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with [EM 385-1-1](#) Section 21.N and [ASSE/SAFE Z359.2](#), and include in the FP&P Plan and as part of the

APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

#### 1.7.2.6 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSE/SAFE Z244.1, and ASSE/SAFE A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

#### 1.7.2.7 Lead Compliance Plan

Develop a site specific lead compliance plan in accordance with EM 385-1-1, 29 CFR 1910.1025 and 29 CFR 1926.62.

##### 1.7.2.7.1 RCRA Metal Based Paint Removal And Disposal

All existing painted surfaces in this work are considered to be RCRA metal based paint. RCRA METAL BASED PAINT is defined as paint containing Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver as defined in the Resource Conservation and Recovery Act (RCRA). RCRA Metal dust is also present on the surfaces of the existing equipment identified for removal and modification.

To the maximum extent possible no cutting, grinding, sanding, heat application, or any other operation that would create a hazardous waste shall be performed on any surfaces coated with RCRA metal based paint.

a. To the maximum extent possible parts shall be mechanically disassembled by unbolting, unscrewing, uncoupling connections, etc. in a manner to prevent creation of a hazardous waste.

b. If any RCRA metal based paint is removed at the project site in a manner that creates a hazardous waste, then all operations for removal, handling, and storage of RCRA metal based paint shall be in compliance with Federal, state, and local laws, as outlined below. If there is any conflict between law and the outlined procedure, the law shall govern. See SECTION 01 57 20.00 28 ENVIRONMENTAL PROTECTION, paragraph METAL BASED PAINT ABATEMENT for additional information.

c. Paint shall be removed prior to any welding or cutting. The paint shall be removed at least four (4) inches away from the point of heat application when welding, grinding, cutting such as torch or air arc, and similar operations.

##### 1.7.2.7.2 Electrical Safety Precautions

For abatement areas where there are energized electrical items a journey man electrician shall be provided by the Contractor, see "a" below for details.

a. A State licensed Journeyman Electrician shall oversee and be in the abatement area while abatement work is performed to ensure the safety of abatement workers and to prevent damage to existing electrical

equipment and systems.

#### 1.7.2.8 Asbestos Hazard Abatement Plan

The safety and health aspects of asbestos work, prepared in accordance with SECTIONS 01 57 20.00 28 ENVIRONMENTAL PROTECTION.

#### 1.7.2.9 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with this Section 01 35 29.10 28 GOVERNMENTAL SAFETY REQUIREMENTS.

### 1.8 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Submit the AHA for review at least 15 working days prior to the start of each activity task. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

The activity hazard analyses shall be developed using the Project Schedule as the basis for the activities performed. Any activities listed on the Project Schedule will require an AHA. The AHAs will be developed by the Contractor, supplier or subcontractor and provided to the Prime Contractor for submittal to the Contracting Officer. **The Activity Hazard Analysis Template is attached to the end of this SECTION.** Electronic copy of the AHA may be downloaded from the following site.

<http://www.usace.army.mil/Portals/2/docs/AHA2.pdf>

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

#### 1.8.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

#### 1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

### 1.9 LOCKOUT/TAGOUT (LOTO)-SAFE CLEARANCE OR HAZARDOUS ENERGY CONTROL PROGRAM (HECP) PROCEDURES

All Contractor work on site shall meet the requirements of "Safety and Occupational Health Office; Safe Clearance Program for the Control of Hazardous Energy, NWWP 385-1-20". A digital copy may be obtained at the web address shown below in paragraph, Safe Clearance Training. Safe Clearance procedures are used by Project and Contractor personnel to protect personnel, equipment and the environment as well as ensuring continuity of service. Any work performed by the Contractor that requires taking project operated equipment out of service shall be done only after a formal clearance is obtained through the Government. Violations will be reported to the Issuing Individual and violations may result in disciplinary action ranging from retraining to removal of safe clearance authorization.

For jobs with multiple tasks that require AHA's, prepare and submit an Activity Hazard Analysis (AHA) on the first feature of work that requires a clearance request. A comprehensive AHA is required for smaller jobs. AHA requirements will be verified at the Pre-Construction Meeting.

The following applies to LOTO and HECP procedures:

- a. The Government will provide Safe Clearance Tags and will issue Isolation Locks to Contractor for clearances using the Government Safe Clearance Procedures. Provide personal safety locks, meeting OSHA standards, for use with the Government's safe clearance procedures. See NWWP 385-1-20, Chapter 6 - Locks and Tags, and Chapter 10 - Contractor Personnel for further guidance.
- b. Government HECP procedures shall be used on equipment/systems owned by the Government. It shall also be used on all points interfacing with Government owned equipment/systems. In instances where equipment is owned by the Contractor, not yet turned over to the Government, or equipment which is not tied into Government energy sources, the Contractor may use their own Lockout/Tagout Program. Contractor Programs shall be pre-approved by the Responsible Official.
- c. Submit the names of **Authorized Individuals** to the Contracting Officer prior to the Pre-Construction Meeting. Project-specific training will be given by the Operations Chief or designee and will be approximately 30 minutes in length. Project-specific training will be provided for every contract and only to the Contractor's Authorized Individuals. The Authorized Individuals shall be required to brief their work crews and subcontractors of any project-specific clearance information. Training is only required once per year and is, with the exception of project-specific training, valid for every facility within the Walla Walla District. If the Responsible Official or Government designee determines that the Authorized Individual's knowledge of the HECP procedures are inadequate the Responsible Official may administer a retest. See NWWP 385-1-20 Chapter 5 - Training for further guidance.

#### 1.9.1 Safe Clearance Training

Contractor, subcontractor, vendors and visitors shall take the appropriate level of HECP Procedure training commensurate with their job duties. Only HECP certificates generated from Walla Walla District or the project are

acceptable.

Based on the scope of work and size of crew, have the appropriate number of Authorized Individuals trained to ensure that there are no delays. All Contractor personnel working in areas under a Safe Clearance shall be trained as Affected Persons. Any non-working personnel, vendors and visitors, that will be entering an area under Safe Clearance shall take Awareness Level training. Training and written tests for the modules below shall be completed on-line prior to commencing on-site work. Time estimates for training follow:

- a. Awareness Level Training: Approximately 1 hour (non-working personnel, vendors and visitors).
- b. Affected Persons: Approximately 2 hours in addition to Awareness Level training.
- c. Authorized Individuals: Approximately 3 hours in addition to Awareness Level training and Affected Personnel Training.

A copy of the Safe Clearance Program for the Control of Hazardous Energy (NWWP 385-1-20) can be found on the Walla Walla District Internet site at: <http://www.nww.usace.army.mil/Portals/28/docs/contracting/OP385120.pdf>.

All costs for this training shall be considered incidental to the work, and therefore, no additional payment will be made. Training is an annual requirement and will expire one year from completion date. Training is provided by Vivid Learning Systems and is available on line at <http://Hecp.vividlms.com>. Cost for the training is displayed on the home page. Submit the training completion certification a minimum of Seven (7) calendar days prior to the individual's arrival at site. Maintain training documentation on site, including the individual's name and date of training completion, in accordance with NWWP 385-1-20.

#### 1.10 DISPLAY OF SAFETY INFORMATION

##### 1.10.1 Safety Bulletin Board

Within **one (1)** calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by **EM 385-1-1**, Section 01.A.07. Additional items required to be posted include:

- a. **Confined space entry permit.**
- b. **Hot work permit.**

##### 1.10.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

- a. Date deficiency identified;



- b. Description of deficiency;
- c. Name of person responsible for correcting deficiency;
- d. Projected resolution date;
- e. Date actually resolved.

#### 1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

#### 1.12 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

#### 1.13 NOTIFICATIONS and REPORTS

##### 1.13.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, load handling equipment (LHE) or rigging mishaps, or any property damage. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

##### 1.13.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the USACE Accident Report Form 3394, and provide the report to the KO within Five (5) calendar day(s) of the accident. The KO will provide copies of any required or special forms.

b. Near Misses: Report all "Near Misses" to the KO, using local mishap reporting procedures, within 24 hrs. The KO will provide the Contractor the required forms. Near miss reports are considered

positive and proactive Contractor safety management actions.

c. Conduct an accident investigation for any load handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident. Complete the attached LHE Accident Report (CRANE/RIGGING MISHAP INVESTIGATION) form and provide the report to the KO within Thirty (30) calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the KO. The KO will provide a blank copy of the accident report form.

#### 1.13.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

#### 1.13.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within Fifteen (15) calendar days in advance of planned lift.

#### 1.13.5 Contractor's Cranes

a. Contractor's cranes and equipment furnished for this work shall conform to all applicable OSHA Requirements and EM 385-1-1. Submit Crane Wheel and Outrigger Loading Diagram and Deck Protection for Outriggers submittal for approval at least Thirty (30) calendar days prior to using any crane rated 50 tons or more on any of the Project decks. The submittal shall provide the following information on a plan view sketch or drawing. A marked up Government-provided resource (R) contract drawing can also be used, if available.

1. Crane outrigger locations with dimensions from the center of each outrigger to identifiable project feature(s).
2. Dimensions of each outrigger.
3. Maximum load on each outrigger.
4. Outrigger pad deck protection dimensions and location. All outrigger pad deck protection shall be provided by the Contractor.
5. If cribbing material is used, show the cribbing material dimensions and location.

b. Include, in the submittal, the cribbing material properties, and calculations to verify the cribbing material's adequacy to carry the intended loads. To the greatest extent possible, place the outriggers over existing supports such as walls. Avoid placing the outriggers next to a wall or support. Under no circumstance shall an outrigger or cribbing be placed on metal grating. See Section 01 55 10.00 28 CONTRACTOR WORK, ACCESS AND STORAGE AREAS, paragraph GOVERNMENT

ROADWAYS AND DECK ACCESS RESTRICTIONS for information on deck loading capacities.

#### 1.14 USE OF POWERHOUSE BRIDGE AND INTAKE CRANES

##### 1.14.1 General

The Government's bridge crane within the powerhouse, and intake crane will be available for the work within the working load and movement limits of the crane. Both cranes will be available for use by the Contractor at such times as not required for other maintenance and repair work performed by Government personnel. The Government will furnish electric power, lubrication, and normal maintenance including adjustments without cost to the Contractor. The Contractor shall give the Government at least 24 hours notice in advance each time he desires use of the cranes on weekdays and 48 hours notice for use on weekends and Federal holidays.

##### 1.14.2 Crane Operators

The Contractor shall furnish qualified bridge and intake crane operators for their operations. Each operator in addition to meeting the requirements of [EM 385-1-1](#) shall have had at least 1-year experience on a bridge crane of equivalent capacity and characteristics. [Bridge/Intake Crane Qualifications](#) for each operator in the form of an affidavit signed by the operator and the Contractor shall be submitted. The affidavit shall include a complete record of all related work with particular emphasis on experience directly related to operation of a bridge crane, or intake crane handling comparable loads. Before any operator is approved they shall spend at least 1 hour in being checked out on the cranes under the direct surveillance of a Government operator. The operators may be retested at any time. The Contractor shall ensure that the crane operators have current (within the previous 12 months) physical or medical examinations with emphasis on hearing, eyesight, and cardiovascular conditions. Dates of physical exams shall be submitted to the Contracting Officer.

##### 1.14.3 Use of the Cranes

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

##### 1.14.4 Riggers

Only qualified riggers shall be used in preparing loads for lifting and in attaching such loads to the cranes. See SECTION [01 35 29.10 28](#) SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS paragraph "Riggers" for additional information.

##### 1.14.5 Lifting Devices

The Contractor is responsible for furnishing all rigging, lifting devices, and containers for use with Government cranes. Any special lifting devices required for handling new equipment furnished by the Contractor shall be turned over to the Government upon completion of the contract. Standard slings and shackles are not considered "special" lifting devices.

#### 1.15 HOT WORK

Activities involving burning, brazing, cutting, grinding, powder-actuated

tools, soldering, sparks, thawing activities, welding, working with open flames, or any similar operation that is capable of initiating fires or explosions is considered HOT WORK.

Provide at least two (2), twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work." All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 60 minutes after completion of the task or as specified on the Hot Work Permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE AUTHORITY IMMEDIATELY.

Obtain services from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems, welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, vaults, etc.) that have the potential for flammable or explosive atmospheres.

#### 1.16 CONFINED SPACE ENTRY REQUIREMENTS.

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

##### 1.16.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

##### 1.16.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

##### 1.16.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

##### 1.16.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

## PART 2 PRODUCTS (NOT APPLICABLE)

## PART 3 EXECUTION

## 3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

- a. Hard Hat
- b. Long Pants
- c. Appropriate Safety Shoes
- d. Appropriate Class Reflective Vests

## 3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

## 3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

## 3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that

portion of work and notify the Contracting Officer immediately. Within **Fourteen (14)** calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4, "Changes" and FAR 52.236-2, "Differing Site Conditions."

### 3.2 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with **ASSE/SAFE Z359.2** and **EM 385-1-1**, Sections 21.A and 21.D.

#### 3.2.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with **EM 385-1-1**, Section 21.C. Document training and practical application of the competent person in accordance with **EM 385-1-1**, Section 21.C.04 and **ASSE/SAFE Z359.2** in the AHA.

#### 3.2.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in **EM 385-1-1**, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with **EM 385-1-1** Section 21.I, **29 CFR 1926.500** Subpart M, **ASSE/SAFE Z359.0**, **ASSE/SAFE Z359.1**, **ASSE/SAFE Z359.2**, **ASSE/SAFE Z359.3**, **ASSE/SAFE Z359.4**, **ASSE/SAFE Z359.6**, **ASSE/SAFE Z359.7**, **ASSE/SAFE Z359.11**, **ASSE/SAFE Z359.12**, **ASSE/SAFE Z359.13**, **ASSE/SAFE Z359.14**, and **ASSE/SAFE Z359.15**.

##### 3.2.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with **EM 385-1-1**, Section 21.0. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

##### 3.2.2.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The

use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Prevention such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

### 3.2.3 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

### 3.2.4 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

### 3.2.5 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE Z359.4.

## 3.3 WORK PLATFORMS

### 3.3.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

- a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

- b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.
- c. An adequate gate is required.
- d. Employees performing scaffold erection and dismantling must be qualified.
- e. Scaffold must be capable of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.
- f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
- g. Special care must be given to ensure scaffold systems are not overloaded.
- h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.
- i. Scaffolding other than suspended types must bear on base plates upon wood mud sills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.
- j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet.
- k. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

### 3.3.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

## 3.4 EQUIPMENT

### 3.4.1 Material Handling Equipment (MHE)

- a. Material handling equipment such as forklifts must not be modified



with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

### 3.4.2 Load Handling Equipment (LHE)

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer fifteen (15) working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. Under no circumstance must a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

g. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees must keep clear of loads about to be lifted and of suspended loads.

- j. Use cribbing when performing lifts on outriggers.
- k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- l. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.
- m. Maintain inspection records in accordance with EM 385-1-1, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.
- n. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.
- o. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).
- p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

#### 3.4.3 Machinery and Mechanized Equipment

- a. Proof of qualifications for operator must be kept on the project site for review.
- b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

#### 3.5 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

##### 3.5.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048.

Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

### 3.5.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State and Local requirements applicable to where work is being performed.

### 3.5.3 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

### 3.5.4 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

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## DIVISION 26 - ELECTRICAL

### SECTION 26 05 36.00 28

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## SECTION 26 05 36.00 28

## CABLE TRAYS FOR ELECTRICAL SYSTEMS

## PART 1 GENERAL

## 1.1 DESCRIPTION OF WORK

This specification includes the design, fabrication, assembly, installation and grounding of cable tray systems for Little Goose Powerhouse.

The cable tray system shall be designed by the Contractor. Contractor-design of the cable tray system shall comply with IEEE 422 paragraph 9.3 and with NEMA VE 1. Design load shall include a safety factor of 1.5 per NEMA VE 1.

## 1.2 REFERENCES

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

## ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A1008/A1008M	(2016) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM A1011/A1011M	(2018a) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 422	(2012) Guide for the Design of Cable Raceway Systems for Electric Generating Facilities
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## NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA VE 1	(2017) Metal Cable Tray Systems
NEMA VE 2	(2013; ERTA 2016) Cable Tray Installation Guidelines

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

## NFPA 70

(2017) National Electrical Code

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "I" designation are for information only. When used, a designation following the "G" or "I" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Submit within 90 days after Notice To Proceed:

Cable Tray Installation Plan; G HDC, EL

## SD-02 Shop Drawings

Submit within 90 days after Notice To Proceed:

Fabrication And Assembly Drawings; G, HDC, EL

Installation Drawings; G, HDC, EL

## SD-03 Product Data

Submit within 90 days after Notice To Proceed:

Cable Tray Components; G, HDC, EL

Hangers and Supports; G, HDC, EL

Cable Tray Accessories; G HDC, EL

## SD-05 Design Data

Submit within 90 days after Notice To Proceed:

Cable Tray Fill Calculations; G HDC, EL

Cleat Manufacturer's Spacing Calculations; G HDC, EL

## SD-08 Manufacturer's Instructions

Submit within 90 days after Notice To Proceed:

Manufacturer's Instructions; G HDC, EL

## 1.4 DRAWINGS

Installation drawings and Fabrication And Assembly Drawings shall be submitted for approval. Drawings shall be coordinated with all other work in the immediate area that could come in conflict with the installation. Drawings shall include layout of cable tray work, including details of both horizontal and vertical supports. Both horizontal and vertical supports shall be as specified in paragraph SUPPORTS.



## 1.5 QUALIFICATIONS

Manufacturer shall have a minimum of 5 years documented experience specializing in the manufacturing of products specified in this section.

## 1.6 DELIVERY, STORAGE AND HANDLING

### 1.6.1 Delivery

Cable trays shall be bundled for shipment to prevent movement or damage during shipment. Accessories and small components shall be boxed and placed on a pallet. Fork extensions shall be used to off load skidded cable trays bundles from trailers. Cable trays shall not be off loaded by attaching a chain or rope to the bottom rung and dragging out of the trailer. Upon receipt, inspect the cable trays for shipping damage. Damaged cable trays shall not be repaired. Return all damaged cable trays to the manufacturer.

### 1.6.2 Storage

Cable trays stored outside shall be loosely stacked, elevated of the ground and covered to prevent staining or damaging the cable trays. Cable trays shall be stored away from high traffic areas.

### 1.6.3 Handling

Cable trays shall be handled to prevent damage. If lifting cable trays with a crane, ensure that the sling is properly located to prevent damage.

## PART 2 PRODUCTS

### 2.1 CABLE TRAY COMPONENTS

All cable tray segments and components used in the cable tray system shall conform to the applicable requirements of **NEMA VE 1**.

#### 2.1.1 Material

Side rails, covers, splice plates, and rungs shall be made from structural quality steel meeting the minimum mechanical properties of **ASTM A1011/A1011M** Grade 33 for 14 gauge and heavier, or **ASTM A1008/A1008M**, Grade 33 Type 2 for 16 gauge and lighter.

#### 2.1.2 Finish

Steel cable tray components and fittings shall be hot-dip galvanized after fabrication in accordance with **ASTM A123/A123M**.

#### 2.1.3 Cable Tray Sections and Fittings

Cable trays must meet the following requirements:

- a. Provide Ladder type, unless wire mesh type cable tray is indicated in contract drawings.
- b. Tray Width shall be 36 inches wide.
- c. Minimum Fill Depth shall be 3 inches.

d. Outside depth shall not exceed the inside depths by more than 1-1/4 inch.

e. Cable tray rated load for straight spans and fittings shall be suitable for at least 100 lb./ft. as described in NEMA VE 1 Annex B. Rated span/load shall be marked on each straight span and fitting.

e. Ladder type tray shall have maximum 9-inch rung spacing.

## 2.2 CABLE TRAY ACCESSORIES

### 2.2.1 Splice Plates and Expansion Joints

Splice plates and expansion joints shall be pre-drilled and compatible with the cable tray system. Splice plates and expansion joints shall have the same finish as the cable trays. Expansion plates shall allow for a minimum of 1 inch of expansion or contraction of the cable tray.

### 2.2.2 Cable Tray Grounding Conductor Clamp

Cable tray grounding conductor clamps be of malleable iron and shall be specifically designed for use with cable trays. Clamps shall be sized for the grounding conductor used. Clamps shall have separate fasteners/set screws for securing the clamp to the tray and for securing the grounding conductor to the clamp.

### 2.2.3 Cable Tray Conduit Clamp

Cable tray conduit clamps shall have a cast iron body with a steel hook. They shall be sized to match the conduit size. Clamps shall have independent means for securing the clamp to the cable tray and for securing the conduit to the clamp. Clamps shall be designed to bond the conduit to the cable tray. Metal conduit straps shall not be used for this purpose.

### 2.2.4 Cable Cleats

Cleat spacing shall be determined by the cleat manufacturer. Cable cleats shall be sized for the cable size and configuration. The mounting bracket shall be compatible with the cable tray.

### 2.2.5 Cable Tray Dropouts

Cable tray dropouts shall span the entire width of the cable tray run and provide a smooth surface for dropping cables out of the cable tray. The dropout shall have a minimum radius of 4 inches.

## 2.3 HANGERS AND SUPPORTS

a. The structural design calculations for seismic restraints and detail drawings for cable tray systems shall be developed by the Contractor in accordance with the requirements of Section 13 48 00.00 26, SEISMIC RESTRAINT FOR MECHANICAL AND ELECTRICAL EQUIPMENT. The cable tray support configuration shall be designed by the Contractor per NEMA VE 1 and shall be reflected in the fabrication drawings and the installation drawings.

b. Supports shall be fabricated from minimum 12 gauge steel channel, 1-5/8 by 1-5/8 inches, with a continuous 7/8-inch wide slot, hot-dip

galvanized after fabrication. Supports shall provide at least 1-1/8 inch bearing length for each rail and shall have provision for tray hold-down clamps and fasteners. Neither cable tray nor supports shall be attached to the new or existing equipment. Supports must provide at least 1-1/8 inch bearing length for each rail and have provision for tray hold-down clamps and fasteners.

### PART 3 EXECUTION

#### 3.1 GENERAL

- a. Cable tray installation shall comply with NEMA VE 2 guidelines.
- b. All equipment surrounding the cable tray installation shall be protected from damage. Existing equipment, pipes, cable trays, etc., shall not be used to support the cable trays during installation.
- c. Circuits that must remain energized during the cable tray installation are indicated on the drawings. These circuits shall be provided with an alternate source of power during the outage or the cables must remain intact and energized during the cable tray replacement. These provisions must be included in the Contractor's Cable Tray Installation Plan.

#### 3.2 INSTALLATION

##### 3.2.1 General

A Cable Tray Installation Plan shall be submitted prior to commencing any work. The plan should detail the sequencing, scheduling, outages, needed to install the cable trays. The plan should also address how the trays will interface with the existing equipment and the handling of critical loads that must remain energized during outages. Required outages must conform with the outage windows specified elsewhere, if any. The cable trays and supports shall be installed per the approved installation drawings.

##### 3.2.2 Manufacturer's instructions

Cable tray Manufacturer's instructions shall be submitted for review. The instructions shall include any special tools, installation, inspection and cable installation requirements needed to install the cable tray system.

##### 3.2.3 Cable Tray System Layout

Unless otherwise indicated on the drawings. The required vertical spacing for cable trays is a minimum of 6 inches, measured from the bottom of the upper tray to the top of the lower tray. A minimum clearance of 6 inches shall be maintained where possible between the top of a tray and beams, piping, etc., to facilitate installation of cables in the tray. Cables installed in stacked cable trays shall be arranged by descending voltage levels, with the higher voltage at the top.

##### 3.2.4 Interference with Existing Equipment

Cable trays shall not be installed within 12 inches of existing equipment. This allows for access for maintenance or modification work. This minimum distance also allows for some air flow around the tray. Personnel shall not stand on existing equipment, pipes, conduits or cable

trays during the installation of the new cable trays.

### 3.2.5 Hangers and Supports

Hangers and supports and their associated anchors shall be installed per the manufacturer's instructions and as indicated on the approved installation drawings and structural calculations per Section

13 48 00.00 26, SEISMIC RESTRAINT FOR MECHANICAL AND ELECTRICAL EQUIPMENT.

### 3.2.6 Tolerances

Installation shall be level, straight, and true to line or grade within + 1/8-inch in 10 feet and within an accumulative maximum of 1/2-inch. Vertical structures shall be plumb within a tolerance of 1/8-inch per 10 feet of length. Install hold-down clamps or fasteners at all support points.

### 3.2.7 Field Modifications

When a required cable tray length is less than standard lengths the cable tray field modifications shall be made by qualified personnel. After cutting, all edges shall be smooth and all burrs shall be removed. Holes for splice plates shall be located in the field modified cable tray using an existing splice plate as a template. After drilling the holes, remove all burrs.

### 3.2.8 Coating Repairs

Cable trays that are Hot-Dip Galvanizing after fabrication shall be touched up after cutting, drilling or deburring, or if the coating becomes damaged. Touch-up of the galvanized finish shall be done according to ASTM A780/A780M.

## 3.3 CONDUIT TERMINATION

Conduits terminating at new and existing cable trays shall be secured to the cable trays with cable tray conduit clamps specifically designed for this purpose.

## 3.4 GROUNDING

Cable trays shall be grounded and electrically continuous. A continuous bare ground conductor (minimum #4 AWG copper) shall be routed along the entire length of each new cable tray run and secured with cable tray grounding conductor clamps. Bonding jumper should be used to ensure electrical continuity between cable trays connected with expansion splice plates, adjustable splice plates and discontinuous cable trays. The cable tray shall only be connected to the station ground at one end. Cable trays shall not be used as the Equipment Ground Conductor. The individual circuits will be required to have their own Equipment Ground Conductor.

## 3.5 ~~Cable Cleats~~ CABLE CLEATS

The Contractor must coordinate between the cable manufacturer and the cleat manufacturer for cleat spacing suitable for the specified fault current while still allowing enough length of the cables between cleats to flex by thermal expansion under full load. Cleat spacing for short circuit restraint in horizontal runs shall be supported by the cleat manufacturer's spacing calculations. Approval of these calculations shall

not relieve the Contractor from remedying the cleat spacing and repairing the existing cable tray at no additional cost to the Government if the cleated cables damage the existing tray due to thermal expansion under a 24-hour load test. This load test shall be performed after cables have been cleated but prior to acceptance of the cable tray system. Cable cleats shall be installed per the manufacturer's instructions and the required spacing. Cable cleats shall not be over tightened to ensure the cables are not damaged. The cable shall not bulge at either side of the cable cleat strap under no load conditions.

### 3.6 ~~Cable Tray Fill~~ CABLE TRAY FILL

Cable tray fill shall be in accordance with Article 392 of NFPA 70. The cable tray fill and cable orientation shall minimize the need to derate the cable ampacity of the circuits. Provide Cable Tray Fill Calculations for new cable trays and any cable tray that the contractor intends to re-use which include the following:

- a. Cable tray fill calculation
- b. Cable ampacity adjustments

If existing cable trays that contractor intends to re-use, do not meet NEC fill requirements, the contractor must furnish and install additional cable trays. Optional CLIN 0032 "FURNISH AND INSTALL NEW CABLE TRAY" will be implemented depending on the results of the Cable Tray Fill Calculations submittal.

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## DIVISION 26 - ELECTRICAL

### SECTION 26 32 36.00 26

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## SECTION 26 32 36.00 26

## BATTERY CHARGERS AND INVERTERS

## PART 1 GENERAL

## 1.1 DESCRIPTION OF WORK

This Section covers the removal of two 125VDC battery chargers, one 48VDC battery charger, one manual bypass switch and one bypass transformer. The two existing inverters will remain for reconnection. This Section also covers the supply, installation and testing of the battery electrical system and equipment required for the new 125VDC battery chargers, two new remote manual bypass switches and one inverter bypass transformers.

## 1.2 REFERENCED PUBLICATIONS

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

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C39.1 (1981; R 1992) Requirements for Electrical Analog Indicating Instruments

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C37.90.1 (2012) Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus

## NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2018) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA ICS 1 (2000; R 2015) Standard for Industrial Control and Systems: General Requirements

NEMA PE 5 (1997; R 2003) Utility Type Battery Chargers

## UNDERWRITERS LABORATORIES (UL)

UL 1564 (2006) UL Standard for Safety Industrial Battery Chargers

UL 1778 (2005; Reprint Oct 2011) Uninterruptible Power Systems

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as

otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00, SUBMITTAL PROCEDURES unless otherwise indicated below:

#### SD-03 Product Data

Submit within 60 days after receipt of Notice to Proceed

Battery Chargers; G, HDC

Inverter Bypass Transformers; G, HDC, EL

Manual Bypass Switch; G, HDC, EL

~~Inverter Isolation Transformers; G, HDC, EL~~

#### SD-05 Design Data

Submit within 60 days after receipt of Notice to Proceed

Plan for Field Tests; G, HDC

Plan for Operational Tests; G, HDC

Foundations; G, HDC

#### SD-06 Test Reports

Submit within 10 days after completion of tests

Field Test Report; G, HDC

Operational Test Report; G, HDC

Insulation Resistance Test; G, HDC

#### SD-10 Operation and Maintenance Data

Submit a minimum of 30 days prior to field test

Operation and Maintenance (O&M) Manual; G, HDC

## PART 2 PRODUCTS

### 2.1 BATTERY CHARGERS

#### 2.1.1 General

Battery chargers shall conform to NEMA PE 5 and UL 1564. Chargers shall be 400 ampere 125 volt DC static battery chargers with 480 volt AC input, designated BC1 and BC2. The chargers shall be identical make and model to each other. The chargers shall have, at minimum, the following:

- a. Means for adjusting the floating voltage.
- b. Means for adjusting the equalizing voltage.
- c. An equalizing charge timer as specified in paragraph EQUALIZING

## CHARGE TIMER.

- d. Circuit breakers with bell alarm and auxiliary contacts, AC and DC, as specified in paragraph Protection.
- e. An AC voltmeter as specified in paragraph Indicating Meters.
- f. An AC ammeter as specified in paragraph Indicating Meters.
- g. A DC voltmeter as specified in paragraph Indicating Meters.
- h. A DC ammeter as specified in paragraph Indicating Meters.
- i. A switch, mounted on the front panel, to disable the onboard ground detection device unless ground detection can be disabled using the front panel control.

## 2.1.2 Input

The input to battery chargers BC1 and BC2 will be 480 volt, three-phase, 60 Hz, with a voltage range of 424-508 volts and a normal frequency variation of plus or minus five percent.

## 2.1.3 Output

Each charger shall have the following output provisions:

- a. Zero to 100 percent rated amperes continuous.
- b. A minimum adjustable float range of 130 volts plus or minus five percent.
- c. A minimum adjustable equalizing range of 135-145 volts, with the initial setting at 140 volts.

## 2.1.4 Voltage Regulation

Output regulation shall be +/- 0.5 percent of the float voltage at zero to 100 percent of rated charger capacity with the AC input variations stated previously and with the battery connected. Regulation shall be +/- 1.0 percent of the equalize voltage.

## 2.1.5 Filtering

On all chargers, the maximum allowable ripple voltage at any output from zero to full load shall be 100 millivolts rms with batteries connected.

## 2.1.6 Reverse Current

Reverse current shall be limited to 0.1 percent of rating into the chargers during an AC supply voltage outage, during charger failure, or during equalizing. Failure and restoration of an AC supply voltage shall not require manual reset operations. The charger shall resume operation in the mode it was in prior to the failure.

## 2.1.7 Output Current Limit

Output current limit shall be factory set at 100 percent of rating and be adjustable from 50-100 percent. Adjustment provisions shall be accessible

from the front of the charger.

#### 2.1.1.8 Battery Eliminator Option

Each charger shall be capable of carrying the load with the battery disconnected (battery eliminator operation) with a maximum 100 mV change in ripple voltage in accordance with NEMA PE 5, with and without the batteries on line.

#### 2.1.1.9 Cooling

Each charger shall be convection cooled for a temperature of 40 degrees C maximum rise in a 25 degree C ambient temperature room.

#### 2.1.1.10 Load Sharing

The chargers shall be capable of sharing the load with each other during parallel operation, without damage occurring to either charger.

#### 2.1.1.11 Protection

Each charger shall be provided with input and output magnetic circuit breakers, with voltage and current ratings suitable for the specified input and output. The solid state electronic circuits shall have AC and DC transient voltage protection adequate to withstand the IEEE C37.90.1 SWC tests applied to both input and output terminals. Two normally open and two normally closed auxiliary contacts shall be provided on all breakers so that external control circuits can ascertain the closed status or the opened/tripped status of the breaker or contactor. These contacts shall be in addition to any contacts that may be required on the breakers for the alarms specified in paragraph ALARM RELAYS. The interrupting rating of both AC and DC breakers shall not be less than 42,000 amperes.

#### 2.1.1.12 Equalizing Charge Timer

An adjustable 0 to 72-hour timer shall be provided for automatically resetting each battery charger from an equalizing charge setting to a normal float charge setting after a preset period of time.

#### 2.1.1.13 Audible Noise

The audible noise at 1 meter shall be less than 70 decibels (dB) above ambient at 100 percent load.

#### 2.1.1.14 Terminals

The input and output terminals in each charger shall be suitable for wire sizes shown on the Contract drawings. Output circuit breakers shall have lugs, or shall use lug adaptors, to allow connection of two separate load feeders of equal size.

#### 2.1.1.15 Local Indicating Meters

All indicating meters shall be of the 1 percent accuracy class, and shall conform to ANSI C39.1. The meters shall be in the battery charger cabinet. Each battery charger voltmeter shall be connected to the load side of the DC breaker. The following meters shall be provided on each battery charger:

- a. AC input voltmeter.
- b. AC input ammeter.
- c. DC output voltmeter.
- d. DC output ammeter.

#### 2.1.16 Alarm Relays

Relays shall meet the applicable requirements of **NEMA ICS 1**. Alarm relays shall provide contacts suitable for 125 volts DC. Where indicated as local, the alarm shall be in the battery charger cabinet. Master trouble contacts shall operate for all listed local relay actions. An indicator light and a contact shall be provided to indicate the following conditions (as a minimum):

- a. AC input failure, local.
- b. High DC output voltage, local.
- c. Low DC output voltage, local.
- d. Battery charger failure, local.
- e. Output circuit breaker trip, remote.
- f. Master trouble contact, remote.

#### 2.1.17 SCADA Alarm Input

The "battery charger trouble" alarm for each charger shall be capable of being hard wired to the Powerhouse SCADA system.

#### 2.1.18 Accessories and Spare Parts

Furnish the following parts as spares if applicable:

- a. One - Main control PC board with firmware pre-loaded.
- b. Five - Fuses of each type used.
- c. One - SCR rectifier module.
- d. One - Filter Capacitor for battery eliminator.
- e. One - Lot spare lamps of each type used in indicating lights, if replaceable.

### 2.2 **MANUAL BYPASS SWITCH**

#### 2.2.1 General

Provide (2) 15kVA manual bypass switches for the Preferred AC inverters. The manual bypass switches must be identical make and model to each other and shall be set on a platform such that the height of the manual bypass switch is between 60" to 66".. The switch must be connected as shown on the Contract drawings, and shall conform to NEMA 250. The switch must be a 3-position switch, must offer complete isolation of the inverter, and must

be wall mountable external to the inverter. The manual bypass switch must be make-before-break transfer between the two in-sync sources to enable a zero-break transfer and no disruption of power to the connected loads, in both directions. Transfer of criteria must not allow manual transfer unless the bypass source and inverter output source are in synchronism.

#### 2.2.2 Indicating Lights

Indicator lights must be provided at the equipment to indicate the following condition (as a minimum):

- a. Source 1 - Load fed from the normal inverter
- b. Source 2 - Load fed from the second inverter
- c. Bypass - Load fed from bypass source, completely isolating the manual bypass switch and the inverter

#### 2.2.3 Switch Positions

Each manual bypass switch must have three (3) positions as follows:

- a. Source 1 - Load fed from the normal inverter
- b. Source 2 - Load fed from the second inverter
- c. Bypass - Load fed from bypass source, completely isolating the manual bypass switch and the inverter

### 2.3 FOUNDATIONS

New foundations and equipment pads are required to provide level mounting channels wherever existing pads are not available or must be replaced. Whether new equipment pads are poured, or existing equipment pads are re-used, the equipment shall be installed in accordance with the requirements of Section 13 48 00.00 26, SEISMIC RESTRAINT FOR MECHANICAL AND ELECTRICAL EQUIPMENT.

### 2.4 INVERTER BYPASS TRANSFORMERS

External bypass transformer shall be 37.5kVA, 480 volts AC - 120 volts AC single-phase, electrostatically shielded, with 115 degrees C temperature rise. The inverter bypass transformer will provide a source of power to the Preferred 120 volt AC Loads either through the inverter static transfer switch upon inverter failure or through the inverter manual bypass switch.

### ~~2.5 INVERTER ISOLATION TRANSFORMERS~~

~~External isolation transformer shall be 37.5kVA, 120 volts AC - 120 volts AC single-phase, electrostatically shielded, with 115 degrees C temperature rise. The isolation transformer will provide a separately derived system to provide a grounded neutral for the Preferred AC system.~~

## PART 3 EXECUTION

### 3.1 EQUIPMENT TO BE REMOVED

Equipment to be removed includes the three existing battery chargers, BC1,

BC2 and BC3, and the manual bypass switch.

### 3.2 EQUIPMENT TO BE INSTALLED

a. Install, connect with all control and power wiring, and make ready for field testing the battery chargers and bypass transformers based on the approved equipment removal, installation, and testing plans.

b. Install, inspect and make ready for field testing the following electrical systems:

(1) Conduit and cable systems from 480 volt sources to the battery chargers and inverter bypass transformer.

(2) Conduit and cable systems from the DC switchboard to the battery chargers

(3) Conduit and cable system from the existing inverters to the new manual bypass switches, new DC switchboards, new Preferred AC switchboards, and new inverter bypass transformer.

### 3.3 INSPECTION AND TESTS

#### 3.3.1 Inspection

All apparatus furnished and all work performed is subject to inspection, and no apparatus will be installed until all required tests or inspections have been made or certified copies of reports of tests have been accepted. Acceptance of apparatus or waiving of the inspection thereof will in no way relieve the Contractor of the responsibility for furnishing apparatus meeting the requirements of these specifications.

#### 3.3.2 Tests

Furnish all labor, materials, and equipment required for the tests. Test each item of equipment furnished as required below to demonstrate the item is free from electrical and mechanical defects and conforms to the requirements of the specifications. All tests required herein shall be witnessed by the Government Quality Assurance Representative (GQAR), unless waived in writing, and ship no equipment until it has been approved for shipment. Notify the Government a minimum of 15 days in advance of the date of the tests, so that arrangements can be made for the GQAR to be present at and witness the tests. The test equipment and the test methods used will conform to the applicable requirements of ANSI, IEEE, and NEMA standards and are subject to approval. Furnish certified copies of the reports of all tests recording all data obtained during any given test. Make operational tests on the equipment in conjunction with the tests specified elsewhere.

#### 3.3.3 Safety

Provide and use safety devices such as rubber gloves, protective barriers, and danger signs to protect and warn personnel in the test vicinity. Replace any devices or equipment that are damaged due to improper test procedures or handling.

#### 3.3.4 Field Testing

a. Perform field testing in the presence of the Contracting Officer

Representative (COR). Notify the COR 14 calendar days prior to conducting tests. Furnish all materials, labor, and equipment necessary to conduct field tests. Submit a [plan for field tests](#) for approval per paragraph SUBMITTALS. Perform all tests and inspections recommended by the manufacturer unless specifically waived by the COR. Maintain a written record of all tests which includes date, test performed, personnel involved, devices tested, serial number and name of test equipment, and test results. Sign and date all field test reports.

b. Include, but be not limited to, the following in the field tests:

- (1) Continuity and insulation resistance tests of wiring installed post factory installation. Reference Section [26 05 19.00 28](#), INSULATED WIRE AND CABLE.
- (2) Manual circuit breaker operation.
- (3) Meter polarity.
- (4) Current transformer polarity.
- (5) Ground relay operation.

c. Submit a [field test report](#) in accordance with paragraph SUBMITTALS.

### 3.3.5 Conductor And Cable Test

Reference Section [26 05 19.00 28](#), INSULATED WIRE AND CABLE.

Perform an [Insulation Resistance Test](#) on each field-installed conductor with respect to ground and adjacent conductors. Applied potential must be 1000 volts DC. Take readings after 1 minute and until the reading is constant for 15 seconds. Minimum insulation-resistance values must not be less than 100 Megohms.

### 3.3.6 Operational Tests

After the installation is completed, and at such time as the COR may direct, conduct operating tests for approval, including measuring the ripple voltage, automatic transfer, output voltages for each functional mode, and all alarms. Submit the [plan for operational tests](#) for approval per paragraph SUBMITTALS. Demonstrate that the equipment operates in accordance with the specified requirements. Submit an [operational test report](#) in accordance with paragraph SUBMITTALS.

### 3.3.7 Acceptance

Final acceptance of the equipment will not be given until the Contractor has successfully completed all tests and after all defects in installation, material or operation have been corrected.

## 3.4 OPERATION AND MAINTENANCE MANUAL

Supply an [Operation and Maintenance \(O&M\) Manual](#) for the battery chargers and inverters. Separate manuals for each may be submitted. The manual shall include, but not be limited to the following:

- a. Detailed instructions on the operation and maintenance of the battery chargers and inverters with and without a battery bank in



service.

b. Electrical control drawings and internal layout drawings of the battery chargers and inverters.

c. Wiring diagrams of the battery chargers and inverters and external connections to the Powerhouse annunciation system.

### 3.5 TRAINING

Provide two alternate training sessions to accommodate different shifts of operating personnel. Each session shall provide three hours of battery charger training and three hours of inverter training. Training shall cover the equipment user interfaces, including the software, user input and output, settings, alarms, and operating parameters. All training manuals, slides, and other materials be submitted 30 days prior to the date training is scheduled to occurs.

-- End of Section --

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