

**TOOELE CITY  
WATER RECLAMATION FACILITY  
TOOELE WRF 2026 UPGRADES PROJECT - SOLAR DRYER PROCUREMENT**

**ADDENDUM NO. 2  
February 2, 2026**

**To All Plan Holders:**

You are hereby notified that the following changes, clarifications, and/or corrections have been made to the Drawings, Specifications, or Contract Documents for the above referenced project.

The bid opening date IS changed by the addendum. The bid opening location and time are NOT changed by this addendum.

ADDENDUM NO. 2 consists of the following:

**1. Questions and Clarifications**

- a. Bids cannot be emailed and must be mailed. **Emailed bids are not permitted.** Please disregard the clarification in Addendum 1 that permitted emailed bids.
- b. Question from bidder: The provided specification plans appear to be missing electrical drawings and detailed instrumentation drawings. Bidder is not able to provide a firm proposal until such drawings are made available, and therefore requests an extension to the bid deadline.
  - i. Answer: Bid date has been extended, see section 3.
- c. Question from bidder: Section 46 76 70-1.4.M lists the required service of the service engineer. Bidder requests that an additional line be added to this section to include an additional 2-day trip for training to be completed up to 3 months after start-up, and another 2-day trip for training to be completed up to 12 months after start-up.
  - i. Answer: The additional trips for training and start-up have been added to the specification language. See attached revised specification 46 76 70.
- d. Question for bidder: Section 46 76 70-1.4.M.1 references a 3.01.C. description, which does not appear to be included with these specifications. Please either confirm the requirements of this line and add description 3.01.C, or remove this line from the specifications.
  - i. Answer: Section 1.4.M.1 should refer to 3.2 Installation. The specification language has been revised accordingly. See attached revised specification 46 76 70.
- e. Question from bidder: Section 46 76 70-2.2.A.2.c. lists the minimum annual water evaporation of 4277 tons/year of water. It must be included in this statement that this is based on both the average climate conditions of the site, as procured from the NASA POWER data access website, as well as the transmitted heat through the heated lanes of 1.45 MMBTU/hour.
  - i. Answer: The assumptions for the water evaporation have been added to the specification language. See attached revised specification 46 76 70.
- f. Answers to electrical questions will be answered in a future addendum.

**2. Changes to the Contract Documents**

- a. The question period has been extended from Thursday, January 29 to Thursday, February 5.

## ADDENDUM #2

- b. The Bid Date has been extended from Thursday, February 5 to Thursday, February 12, 2026. The location and time remain the same as in the contract documents: Tooele City Hall at 2:00pm MST. Bids shall be mailed to the Tooele City Recorder.

### 3. Changes to the Drawings

- a. See attached for the updated drawings set.
  - i. Electrical drawings will be forthcoming in a future addendum.

### 4. Changes to the Technical Specifications:

- a. See attached for the revised specifications. Revisions are noted in red text with (Addendum 2) in parentheses.

This ADDENDUM #2 shall become a part of the Contract and all provisions of the Contract shall apply thereto. BIDDERS shall acknowledge receipt of this ADDENDUM in the space provided in the BID FORM.

Sincerely,

J-U-B ENGINEERS, INC.



Andrew Hobson, P.E.  
Project Engineer

**SECTION 46 76 70**  
**SOLAR DRYER EQUIPMENT**  
**(ADDENDUM 2)**

**PART 1. GENERAL**

**1.1 SYSTEM DESCRIPTION**

A. General

1. Dewatering of the sludge is achieved through evaporation using solar dryer equipment mentioned herein, which is furnished by the manufacturer, and the new heated floor furnished by others.
2. Manufacturer shall furnish three (3) sludge solar dryer turners as indicated on the drawings. The turners shall be manufactured from AISI 304L stainless steel shapes. Fabrication and assembly shall be in conformance with these specifications and drawings.
3. Manufacturer shall furnish a complete system, including solar dryer turner, drive motors, gear reducers, supports, and controls, and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.
4. Manufacturer shall coordinate all details of the equipment with other related parts of the work and shall verify that all structures, piping, wiring, and equipment components are compatible.
5. Power supply for main control panel is 460 Volts, 60 Hz, 3-phase.

**1.2 REFERENCES**

A. American Society for Testing and Materials (ASTM) Publications:

1. Section A322: Carbon and Alloy Steel Bar Specifications.
2. Section A507-10: Standard Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold Rolled

B. Anti-Friction Bearing Manufacturers Association (AFBMA) Publications:

1. Standard 9-90 Load Ratings and Fatigue Life for Ball Bearings.
2. Standard 11-90 Load Ratings and Fatigue Life for Roller Bearings.

C. American Institute of Steel Construction (AISC) Publications

D. American Welding Society (AWS) Publications

1. Section A5.10/A5.10M:2012 (ISO 18273) Welding Consumables–Wire Electrodes, Wires and Rods for Welding of Aluminum and Aluminum-Alloys–Classification

E. American Structures Painting Council (ASPC) Publications

**1.3 SUBMITTALS**

A. Submit in accordance with Section 01 33 00.

B. Manufacturer shall submit one pdf electronic copy of all submittals plus the number of copies the Manufacturer wants returned unless otherwise approved by the Engineer or otherwise specified.

C. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Vendor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Owner shall be the final authority for determining the acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

D. Design Information: Manufacturer shall submit the following minimum information as part of their Design Information Submittal for the Goods :

1. Product Data: Include the following:

- a. Descriptive literature, brochures, catalogs, cut-sheets, and other detailed descriptive material of the equipment.
- b. Motor characteristics and performance information.
- c. Gear reducer data including service factor, efficiency, torque rating, and materials.
- d. Parts list including a list of recommended spare parts.

2. Shop Drawings: Include the following:

- a. Manufacturer's installation drawings.
  - b. Wiring and schematic diagrams.
3. A bill of materials for all equipment, tagged devices, components, special tools, and spare parts supplied with the system, including component original part numbers identifying each furnished component and corresponding to the number provided on the drawings.
4. For instrumentation and controls, submit the following:
- a. Wiring diagrams: Comprehensive point-to-point wiring diagrams showing all interconnections between equipment, field instruments, and control panels.
  - b. Instrument List: A detailed instrument list for all field instruments that includes tag number, service, manufacturer, type, range, NEMA classification, connection type, factory calibration requirement, and UL approval.
  - c. Control Panel Documentation (as applicable):
    - i. Detailed Programmable Logic Controller (PLC) system network communication architecture, control panel layout, input/output lists.
    - ii. Control panel electrical power requirements, wiring diagrams, NEMA enclosure rating, and nameplate layout.
    - iii. Control System Programming Documentation:
      - a) Narrative description for all control systems, list of control and monitoring functions, list of alarms, control and alarm setpoints, graphic interface screen layouts.
      - b) Program documentation printout with tag numbers, ladder logic, program and function listing, descriptive comments, list of tags available to plant supervisory system. This may be submitted as an electronic document due to size.
      - c) Bill of Materials: Detailed bill of materials for all control panel, PLC, operator interface terminal, and panel-mounted hardware and field instruments that includes the item tag number.
      - d) Product Data: Control panel, PLC, operator interface terminal, and panel-mounted hardware and field instrument catalog cut sheets.
      - e) Product Data and Shop Drawings shall be marked with tag numbers on all sheets to relate them to the bill of materials.

- f) Product Data shall be marked with arrows to show exact features to be provided.
  5. Detailed information for all ancillary items such as hardware and mounting frames, etc.
  6. Detailed installation instructions, with clear step-by-step points on the correct mechanical and electrical installation procedures.
  7. A maintenance schedule showing the required maintenance, frequency of maintenance, lubricants, and other items required at each regular preventive maintenance period.
  8. Manufacturer's recommended spare parts.
  9. Equipment weights and lifting points.
  10. Recommendations for short and long term storage.
  11. A copy of the manufacturer's warranty.
  12. List of all variances from Specifications (Note: Failure to specifically list and fully explain all variances will be cause for rejection of submittal.)
- E. Submittals required as Special Services shall include:
1. Operation and Maintenance Manual: The Manufacturer shall furnish a complete instruction manual for installation, operation, maintenance, and lubrication requirements for each component of mechanical and electrical equipment or systems provided by the Manufacturer. If manufacturer's standard instruction and maintenance manuals are used to describe operating and maintenance procedures, such manuals shall be modified to reflect only the model or series of equipment used on this project. Extraneous material shall be crossed out neatly or otherwise annotated or eliminated. The Operation and Maintenance (O&M) Manuals shall contain:
    - a. Summary Sheet: At the front of the first Volume of the O&M Manual, include a page with the following information:
      - i. Name of Manufacturer with contact name, phone number and address;
      - ii. Name of Manufacturer sales representative with contact name, phone number, and address; and
      - iii. Manufacturer System Model Number and Serial Numbers.

- b. Mechanical and Electrical Equipment List: A complete list of mechanical and electrical equipment, including:
  - i. Supplier/sales representative contact name, phone number, and address;
  - ii. Original Equipment Manufacturer (OEM) contact name, phone number, and address;
  - iii. OEM list of routine maintenance requirements and frequency; and
  - iv. List of spare parts list furnished with the contract.
- c. Warranty: Copy of all approved guarantees and warranties applicable.
- d. Approved Submittals: Design Information, Shop Drawings, Product Data, Factory Test, and Field Commissioning Test Report.
  - i. Performance and Nameplate Data: The O&M Manual shall include a list of all the nameplate and performance data required on the equipment and the furnishing of performance curves which were the results of factory tests or technical specification requirements.
  - ii. Process Control Information: Complete process description, operational information, control documents, final HMI (Operator Interface) screens with instructions.
  - iii. Electrical and Control Diagrams: As-built diagrams showing internal and connection wiring of enclosure-contained assemblies and overall system.
  - iv. Lubrication Information: OEM's recommendations regarding the lubricants to be used and lubrication schedule to be followed, including a list of acceptable lubricant from at least (3) manufacturers whose products are locally available.
  - v. Installation and Start-up Procedures: Manufacturer's recommendations for installation, adjustment, calibration, troubleshooting, and operating safety. Installation instructions shall include complete assembly drawings.
  - vi. Operating Procedures: Manufacturer's recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation, including initial startup, automatic and manual operation, and emergency operation.

- vii. Preventive Maintenance Procedures: Equipment manufacturer's recommended steps and schedules for maintaining the equipment. Maintenance procedures shall include preventive, corrective maintenance, troubleshooting and detailed assembly, disassembly and repair procedures. Troubleshooting information shall include a tabular list of typical informational malfunctions and probable remedies.
- viii. Overhaul Instructions: Manufacturer's directions for the disassembly, repair, and re-assembly of the equipment and any safety precautions that must be observed while performing the work.
- ix. Exploded Views: Exploded views of mechanical equipment shall be provided, unless specified in the equipment description as not required; when exploded views are specified as not necessary, cut or section views shall be provided with detailed callouts.
- x. Parts List and Product Data: Generic title and identification number of each component part of the equipment and control devices, complete with exploded views of each assembly and weights of individual components weighing over 100 pounds.
- xi. Spare Parts List: Manufacturer's recommendations for parts and maintenance tools that should be stored by the Owner including:
  - a) Generic title, identification number and quantity of each component part;
  - b) Any special storage precautions that may be required;
  - c) Name, address, and phone number of the nearest parts supplier;
  - d) Identification of those parts with an anticipated delivery time of greater than two months.
- xii. Factory test as specified herein.
- xiii. On-site functional and performance testing plan as specified herein.
- xiv. On-site field commissioning test report as specified herein.
- xv. Specific Information: As necessary where items of information are not included in the above list but are required or as otherwise required in the Specifications.

#### **1.4 QUALITY ASSURANCE**

- A. To ensure quality, conformance, and reliability with regard to the manufacturing and production of the machinery described in this section, the equipment manufacturer shall meet the requirements listed in this section
- B. Manufacturer shall have a minimum of ten (10) years of experience producing equipment substantially similar to that required and shall be able to submit documentation of at least fifteen (15) independent installations. Each installation must have been in satisfactory operation for at least three (3) years.
- C. Manufacturer shall have established an ISO 9001 certified quality management system. Equipment suppliers not utilizing ISO 9001 facilities shall not be considered or approved for this project. Equipment supplier shall provide evidence of certification before being named as an acceptable manufacturer.
- D. The unit shall be manufactured from AISI 304L stainless steel shapes.
- E. Manufacturer shall have established an ISO 14001 certified environmental protection management system and help minimize the harmful effects on the environment caused by its manufacturing processes. Equipment suppliers not utilizing ISO 14001 facilities shall not be considered or approved for this project. Equipment supplier shall provide evidence of certification before being named as an acceptable manufacturer.
- F. All stainless steel components and structures shall be submersed in a chemical bath of nitric acid and hydrofluoric acid (pickling bath) for at least eight (8) hours to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel. No stainless steel components may be fabricated or assembled in a factory where carbon steel products are also fabricated, in order to prevent contamination by rust.
- G. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.
- H. All welding in the factory shall use shielded arc, inert gas, MIG or TIG method. Filler wire shall be added to all welds to provide for a cross section equal to or greater than the parent metal. Butt welds shall fully penetrate to the interior surface and gas shielding to interior and exterior of the joint shall be provided.
- I. Bolts, nuts and washers shall be selected from AISI 304L or 316L stainless steel such that they are anti-seizing

- J. The solar dryer equipment shall be manufacturer's standard product and only be modified as necessary to comply with the drawings, specifications, and specified service conditions.
- K. All welding is performed in accordance with American Welding Society (AWS) D1.6 Structural Welding Code, or equivalent.
- L. Manufacturer shall provide the solar dryer turner, motors, gear reducers, controls, control panels, and lifting attachments as a complete integrated package to ensure proper coordination, compatibility, and operation of the system.
- M. Manufacturer shall provide services by a factory-trained service engineer, specifically trained on the type of equipment specified. Service engineer requirements include, but are not limited to the following:
  - 1. Service engineer shall be present during initial energizing of equipment to determine directional testing as described in Section ~~3.01-C~~ 3.2 (Addendum 2) (Installation).
  - 2. Service engineer shall inspect and verify location of anchor bolts, placement, leveling, alignment and field erection of equipment, as well as control panel operation and electrical connections.
  - 3. Service engineer shall provide classroom and/or field training on the operation and maintenance of the equipment to operator personnel.
  - 4. Service engineer shall optimize the system to ensure proper operation of the equipment.
  - 5. Service engineer shall be present to conduct any required field performance testing.
  - 6. Manufacturer shall state field service rates for a service engineer to owner and contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, additional time shall be purchased by contractor to correct deficiencies in installation, equipment, or material without additional cost to owner.
  - 7. Training day requirements:
    - i. Manufacturer shall include a 2-day trip for training to be completed, up to 3 months after start-up. An additional 2-day trip shall be completed for training and start-up support, up to 12 months after start-up. These trips should be included in the equipment procurement bid. (Addendum 2)

- N. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or installation, defective workmanship or materials, and breakage or other failure. Materials shall be suitable for service conditions.
- O. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service prior to delivery, except as required by testing.
- P. Each major component of equipment shall have the manufacturer's name, address and product identification on a nameplate securely affixed to the equipment.

### **1.5 PRE-QUALIFICATION**

Manufacturer of alternate equipment shall submit a pre-approval package to Engineer at least one (1) week prior to bid date. Alternate manufacturer shall submit the following information and supporting documentation:

- A. A complete set of drawings, specifications, catalog cut sheets, and detailed descriptive material. Drawings shall show all relevant details of the unit. This information shall identify all technical and performance requirements stipulated on the drawings and in the specification. If the proposed equipment does not meet these specifications, any deviation from the specification must be expressly noted. All deviations shall be listed on a single document.
- B. Detailed installation drawings illustrating how the proposed solar dryer fits in the building and where the proposed unit will be installed. The drawings shall include plan, elevation, and sectional views of the installation.
- C. Motor characteristics and performance information. Vendor data shall be furnished to confirm the torque and thrust rating of the drive.
- D. Complete reference list of all installations of same and similar equipment including contact names and phone numbers, showing at least 15 installations of the same type as specified.
- E. Complete bill of materials for all equipment, showing dimensions and materials of construction of all components.
- F. Certification by the manufacturer that all stainless steel equipment will be manufactured in a stainless steel only factory.
- G. Certification that the entire equipment will be passivated by submersion in an acid bath as specified in chapter 2.02.M.

- H. A copy of documents proving certification of the Manufacturer's Quality Management System according to ISO 9001 and Environmental Protection Management System according to ISO 14001.
- I. Details of the control and instrumentation system including wiring diagrams.
- J. Information on equipment field erection requirements including total weight of assembled components and weight of each sub assembly.
- K. List of recommended spare parts.
- L. A maintenance schedule showing the required maintenance, frequency of maintenance, lubricants and other items required at each regular preventative maintenance period, including all buy out items.

## **PART 2. PRODUCT**

### **2.1 MANUFACTURERS**

- A. Basis of Design:
  - 1. Solstice® Sludge Drying System Size 11 from Huber Technology, Inc.
- B. Approved Manufacturers:
  - 1. Huber Technology (Basis of Design)
  - 2. Pre-approved "or-equals" in accordance with **section 1.5 Prequalification**.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. Design Information:
  - 1. Dewatered Sludge Characteristics:
    - a. Treatment Process: Activated Sludge
    - b. Minimum Solids concentration: 15%
    - c. Volatile solids: <70% Expected after treatment process
    - d. Other sludge characteristics:
      - i. pH                    6.5-7.5
      - ii. Temperature    Ambient

- iii. TKN                      Not to exceed 75,000 mg/kg
- e. Percentage of Primary Sludge by solids weight: N/A %
- f. Percentage of Primary Sludge by volume: N/A %
- g. Percent of industrial sludge / high-strength waste: <15%

2. Performance Criteria:

The design criteria mentioned below is for the entire dewatering system, including the three solar dryer turners and two heated floor bays. It is estimated that a total of 425 KW or 1.45 MMBTU/hr of heat is transmitted through the heated lanes.

- a. Minimum Solids Content into the solar dryer: 15%
- b. Minimum Solids Content out of the solar dryer: 90%
- c. Minimum Annual Evaporation Rate: 4277 ton/yr of water
  - i. 4277 ton/yr is based on both the average climate conditions of the site, as procured from the NASA POWER data access website, as well as the transmitted heat through the heated lanes of 1.45 MMBTU/hour (Addendum 2)
- d. Dry Solids Processed Per Year Per Unit:
  - i. Heated floor units: 350 dry metric ton/yr
  - ii. Non-heated floor unit: 130 dry metric ton/yr
- e. Sludge to the solar dryer:
  - i. 2025 condition: 6000 wet ton/yr based on 15% solids
  - ii. 2045 condition: 8700 wet ton/yr based on 15% solids
- f. Sludge out of the solar dryer: 600 dry metric ton/yr based on 90% solids

3. Solar Dryer Equipment Design Criteria:

- a. Number of solar dryer turners: 3
- b. Solar dryer Size:
  - i. Lane Width: Same as existing; See drawings

- ii. Total Lane Length: Same as existing; See drawings.
  - iii. Maximum sludge bed height: 1ft (300mm)
- B. The sludge drying plant consists of the following major components:
  - 1. Sludge Turning Device
  - 2. Energy Chain System
  - 3. Control Panel Including Automation of the manufacturer supplied system
  - 4. Greenhouse (using existing; not supplied by manufacturer)
  - 5. Rail System (using existing; not supplied by manufacturer)
  - 6. Loading and unloading by wheel loaders or conveyors (supplied by others)
  - 7. Concrete work and installation (supplied by others)
- C. All parts of the solar dryer shall be designed and appropriate for the service specified and indicated, and for continuous operation.
- D. Sufficient room for inspection, maintenance, repair, and adjustment shall be provided. Contractor shall provide hoisting equipment to facilitate installation and maintenance work.
- E. The physical layout shown on the drawings is based on the Huber Solstice solar dryer. If equipment by another manufacturer is to be supplied, contractor shall include in the bid all necessary modifications to the piping, electrical, structural, and mechanical layouts to accommodate the equipment proposed. Contractor shall pay engineer for all modifications of drawings.
- F. All parts shall be designed and manufactured to handle the forces that may be exerted on the solar dryer during fabrication, shipping, erection, and proper operation according to the O&M manual.
- G. All components shall be so arranged that they can be serviced from the operating floor.
- H. All components shall be balanced so that jamming at any point will not result in structural failure, but will cause the drive motor to stall. All components, including the gear reducer, shall be designed to withstand, without damage or permanent distortion, the full stalling torque of the drive motor.
- I. Materials

1. The solar dryer shall be manufactured from AISI 304L stainless steel shapes (rods, angles, and channels), pipes, and sheets unless otherwise specified. In particular, the frame and the turning device unit. All other material in contact with the sludge or drying air must be corrosion-resistant.

## **2.3 PRODUCT DESIGN SPECIFICATIONS**

### **A. Solar Dryer System**

1. The turning device of the solar dryer shall be made of 304L stainless steel.
2. The sludge will be fed via an existing conveyor system to the greenhouse where the turning device shall automatically turn and transport the sludge from the feed end of the greenhouse to the discharge end of the greenhouse.
3. The air handling system shall be fully automated by the control system developed by the turner manufacturer, greenhouse manufacturer, and systems integration parties.

### **B. Sludge Turner**

1. The sludge turner consists of a supporting frame that travels on the driveway walls. The sludge is moved by a rotating double shovel, which is installed in the frame. A movable plate, which is mounted in front of the double shovel, breaks up sludge lumps and regulates sludge transport.
2. The sludge turner is propelled by a drive system using a chain and sprocket system. The chain runs the length of the sludge bed and the sprocket pulls the device on the chain as the traction drive motor rotates.
3. The turning drive uses a chain and sprocket system to rotate the shovel.
4. The scraper drive uses and motor and cable linkage to raise and lower the scraper plate. This plate cuts the sludge to form the sludge into small pellets as it moves through the greenhouse.
5. The sludge turner comes prewired with an electronic connection box and is equipped with an energy chain. The energy chain's power supply is located at the center of the greenhouse to limit the distance of travel of the chain. It consists of an open cable guide channel made of galvanized steel and hard plastic elements. The sludge turner pushes and pulls the chain inside the greenhouse.
6. The sludge turner shall be capable of:
  - a. Moving sludge over the entire sludge bed in one pass (see item d below)

- b. Moving each sludge particle a distance of 5ft with each turnover cycle
- c. Aeration and mixing of a maximum of 530 cuft/min of sludge
- d. Back-mixing of up to 55 cuft/hr of dried sludge with new wet sludge.
- e. Variable speed of the drive motor and shovel drive motor to vary the linear and rotational speed of the sludge turner.
- f. Fully automatic operation via the PLC control system.

7. Motor Sizes

- a. Traction Drive – max 5HP (460VAC, 3 Phase, 60Hz, VFD driven)
- b. Shovel Drive – max 7.5HP (460VAC, 3 Phase, 60Hz, VFD driven)
- c. Scraper Drive – max 1HP (460VAC, 3 Phase, 60Hz, FVR Starter driven)

C. Energy Chain System

- 1. The existing energy chain system shall be replaced with new equipment for all three bays.

D. Greenhouse – Retain existing/not applicable

- 1. The solar dryer equipment shall be placed inside the existing greenhouse as shown in the drawings. The design condition of the existing greenhouse is mentioned below for reference only.
  - a. The greenhouse frame is constructed of a galvanized steel frame designed for:
    - i. NGMA (National Greenhouse Manufacturer Association) Standards
    - ii. Snow load: 10PSF/Importance and Exposure factor=1.0
    - iii. Wind load: 120mils/h – Exposure C- Occupancy category I
  - b. Gutters and access doors are made of Aluminum
  - c. Coverings are polycarbonate or glass
  - d. Includes provisions for mounting the energy chain system
  - e. The ventilation system is controlled by the PLC based on data from the climate control system, which measures temperatures, air pressures, radiation, and humidity outside of the greenhouse.

E. Rail System – As Existing/not applicable

1. The existing rail system shall be reused for this project. The design condition of the existing rail system is mentioned below for reference only.
  - a. A rail system is provided for the sludge turner to ride on. The rails are made of 12" x 8" x 3/8" A500 GR B steel tube, with all supports and bracing items required to be welded to the rail, and made of A36 Steel.

## 2.4 CONTROL AND INSTRUMENTATION

- A. A fully tested, pre-configured control system shall be provided by the Manufacturer of the solar dryer. This shall include all items listed in this section. Manufacturers not providing a fully tested, pre-configured control system will not be considered.
- B. The contractor shall provide wiring between all system components and instrumentation, as required.
- C. The contractor shall provide a single 480 V, 60 Hz, 3 phase power supply to each of the Huber Technology supplied control panels. All power required to operate the solar dryer system will be distributed and transformed as necessary.
- D. The drying system shall be fully-automatic and shall include the following, all to be supplied by the solar dryer manufacturer:
  1. Solar Dryer Main Control Panel
  2. Junction Box
- E. Solar Dryer Main Control Panel
  1. A 480VAC main control panel shall be provided for each Sludge Turner Solstice® in a NEMA 12 rated painted steel, continuous hinge enclosure, installed in a climate-controlled electrical room. The enclosure shall be two door, free standing, with pad-lockable 3-point latches, and shall include the following:
    - a. Main 480VAC Main Circuit Breaker
    - b. 480VAC Surge arrester
    - c. Programmable logic controller (PLC) Allen Bradley CompactLogix 5069 with required I/O and on-board Ethernet.

- d. Operator Interface Unit, Winsonic, 15-in. Color Touchscreen
  - i. Stainless steel bezel
  - ii. Resolution 1280x1024
  - iii. LED
  - iv. Industrial, Rugged with High Temperature Rating
  - v. Ethernet connection to Micro iPC
  - vi. OIU Details
  - vii. Graphical representation of complete solar dryer system
  - viii. Running, Fault, Auto, Hand, etc. indication of all motors
  - ix. Motor Pop-Up Displays for individual control and status of each motor
  - x. Process instrumentation values
  - xi. Setpoint Access and Adjustment
  - xii. Instrumentation Scaling
  - xiii. Instrument ENABLE/DISABLE capabilities
  - xiv. Run Times of each Motor
  - xv. All system Alarms
  - xvi. Alarm History
  - xvii. Access Restriction via (3) different levels of security
  - xviii. Ability to SAVE and STORE up to 5 complete system configurations that can be pre-loaded and activated as needed.
- 2. Industrial Micro iPC
  - a. Industrial, Rugged with High Temperature Rating
  - b. Software: Ignition by Inductive Automation
- 3. Intrinsically safe Circuit Isolation, as required, for all devices mounted inside the classified area.

4. Ethernet Switch, 5-Port, Unmanaged
5. UPS, Battery Backup, Phoenix or Equal
6. Enclosure Panel Light, LED
7. Control Power Transformer, 480-120 with Branch Circuit Protection
8. Transient Voltage Surge Suppressors, 480V & 120V
9. Phase Failure Relay, 480V
10. UL Label
  - a. Laminated plastic nametags shall be provided for the name of the control panel and all disconnects, switches, lights, and meters.
  - b. Spare terminals (control- and power voltage) shall be provided to accommodate for remote control operation and to interface with other equipment components such as the polymer dosing system, thin sludge pumps etc.
  - c. The solar dryer Controls shall come equipped with data logging system capable of logging up to 100 operational parameters of the drying system at variable times.

F. Junction Boxes

1. Ethernet Switch Junction Boxes, NEMA 4X, 316SS
2. Energy Chain Junction Boxes, NEMA 4X, 316SS – 30 Terminals

## 2.5 FACTORY TESTING

- A. This section includes the testing requirements for the complete solar dryer Control System. Including the solar dryer Main Control Panel, and solar dryer Local Control Stations. The solar dryer supplier will be required to demonstrate that the complete solar dryer control system, including the solar dryer Main Control Panel, and all LCS's, were factory wired and tested in all modes of operation and shall be tested while connected to a motor, and all field instruments shall be simulated at the field terminal blocks. This test may be witnessed by owner/engineer, at their expense. If witnessed testing of solar dryer Control System is desired, solar dryer Manufacturer shall be notified at time of equipment release.

## PART 3. EXECUTION

### **3.1 DELIVERY, STORAGE, AND HANDLING OF EQUIPMENT**

- A. Equipment shall be shipped and delivered in subsections to be assembled by contractor to conform to transportation regulations and for the protection of components. Manufacturer will provide details to assemble the unit together.
- B. Contractor shall be responsible for unloading and shall have equipment on-site at the time of delivery permitting proper hoisting of the equipment.

### **3.2 INSTALLATION, START-UP, AND OPERATOR TRAINING**

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Installation of the equipment shall be in strict accordance with the contract documents and the manufacturer's instructions and shop drawings. Manufacturer shall supply anchor bolts for the equipment. Contractors shall install the anchor bolts in accordance with the manufacturer's recommendations.
- C. After Installation touch-up paint shall be applied to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting. Contractor shall passivate all field welds.
- D. Supplier shall furnish the services of a factory-trained service engineer to inspect the installation, observe start up, and provide operator training.
  - 1. Equipment shall not be energized, or "bumped" to check the electrical connection for motor rotation without the service engineer present.
  - 2. The service engineer shall make all necessary adjustments and settings to the controls.
  - 3. The service engineer shall demonstrate proper and sequential operation of the drying system. The drying system shall be able to operate fully automatically.

### **3.3 WARRANTY**

- A. The manufacturer will warrant against any defects in material or workmanship to the solar dryer and framework. This warranty will commence upon delivery of the products and will expire on the earlier to occur of one (1) year from initial operation of the product or 18 months from delivery thereof (the "Warranty Period").

**END OF SECTION**