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**ENGINEER'S SUPPLEMENTAL INSTRUCTIONS NO. TWENTY-SIX (26)**  
**(Via Posting to FTP Site and Electronic Mail)**

TO: Wes Weaver  
John Jacob  
Jeff Burst  
**Weaver Construction Management, Inc. (WCMI)**

DATE: April 10, 2013

FROM: Mark A. Morton, P.E.  
Roger J. Sams, P.E.  
**GMS, Inc.**

RE: Harold D. Thompson Regional Water Reclamation Facility (HDTRWRF)-Phase 1  
**ENGINEER'S SUPPLEMENTAL INSTRUCTIONS NO. TWENTY-SIX (ESI-026)**

This ESI-026 provides additional information for the chlorination system housed in the Pumping and Disinfection Building. Specification 11345-Chemical Feed Systems is attached to this ESI-026 and is issued for immediate use. This specification section provides detailed information on the chlorine solution metering pumps and the appurtenances of the feed system. Please note this specification section requires the provision of two chlorine solution metering pumps in order to provide equipment redundancy for this system. However, the two pumps will both be Owner-furnished equipment. To accommodate this requirement, a note must be revised on the Chlorination System Schematic, Detail 6 on Project Drawing DL-5. The note referencing Chlorine Solution Metering Pump CLP-1 as being furnished as part of this Phase 1 project shall be revised so the pump is furnished by Owner.

If you should have any questions or desire additional information, please contact our office at your earliest convenience.

Attachment: Technical Specifications Table of Contents, page iii only  
Specification Section 11345, 6 pages

ec: Lower Fountain Metropolitan Sewage Disposal District  
Fountain Sanitation District  
Colorado Centre Metropolitan District

cc: Jerry Miller, GMS, Inc.  
David R. Frisch, P.L.S., GMS, Inc.

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SECTION 11345  
CHEMICAL FEED SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install all equipment, accessories and appurtenances as indicated on the Drawings or specified herein to provide a complete and functional chemical feed system
  - a. Feed chemical: Sodium hypochlorite

B. Additional Requirements Specified Elsewhere

1. Section 01010: Summary of Work
2. Section 01340: Shop Drawings, Product Data and Samples
3. Section 01400: Quality Control
4. Section 01600: Materials and Equipment
5. Section 01730: Operating and Maintenance Manuals

C. Related Requirements Specified Elsewhere

1. Section 02622: Plastic Pipe
2. Section 02641: Valves and Accessories
3. Section 02708: Pressure Pipelines and Appurtenances
4. Section 13300: Utility Control System
5. Section 13421: Polyethylene Chemical Storage Tank
6. Division 16: Electrical

1.2 QUALITY ASSURANCE

A. Supplier's Qualifications

1. All equipment and accessories to be furnished by a manufacturer or supplier experienced in manufacture of each type of equipment

B. Responsibilities of Supplier

1. Design verification, coordination, and functioning of entire system

C. Conformance

1. All equipment, devices, valves, gauges, materials and accessories suitable for handling of the individual feed system chemical

D. Warranty

1. Provide a two (2) year warranty on all chemical feed system equipment from the date of acceptance by the Owner
2. Warranty shall cover all materials, components, installation and workmanship associated with the chemical feed system equipment and their appurtenances

E. Reference Standards

1. Hydraulic Institute Standards (HIS)
2. American Gear Manufacturers Association (AGMA)
3. Antifriction Bearing Manufacturers Association (AFBMA)
4. American Iron and Steel Institute (AISI)
5. American Society for Testing and Materials (ASTM)
6. American National Standards Institute (ANSI)
7. National Electric Code (NEC)
8. National Electrical Manufacturers Association (NEMA)
9. Chlorine Institute standards and recommendations

1.3 SUBMITTALS

A. In Accordance with Section 01340

B. Manufacturer's Literature

1. Submit complete fabrication, assembly, foundation, and installation drawings
2. Submit detailed specifications and data describing material, parts, devices, and accessories

C. Manufacturer's Specifications and Illustrations

1. Sufficient data to verify compliance with specifications and to illustrate construction or assembly of the products
2. Materials
3. Parts
4. Devices
5. Accessories
6. Dimensions
7. Data on shop painting

D. Shop Drawings

1. Fabrication
2. Assembly
3. Installation
4. Device templates
5. Schematics
6. Wiring diagrams
7. Interconnecting diagrams

E. Pump Data

1. Name of manufacturer
2. Type and model
3. Rotative speed
4. Size of suction nozzle
5. Size of discharge nozzle
6. Pump performance data
7. Net weight of pump
8. Type of couplings
9. Data on shop painting

F. Certification of Compliance

1. Manufacturer's affidavit of compliance certifying
  - a. All tests have been performed
  - b. All equipment, materials and devices comply with these specifications with any exceptions noted
  - c. Equipment has been properly installed and is operating within specification tolerances

G. Operating and Maintenance Data

1. Refer to Section 01730 - Operating and Maintenance Data for requirements

1.4 JOB CONDITIONS

- A. Equipment to be located in Hypochlorite Room of Pumping and Disinfection Building
  1. Elevation: 5405 feet above mean sea level
- B. System to be capable of handling the design liquid of sodium hypochlorite in liquid form with solution concentrations up to 15%

1.5 DELIVERY, STORAGE AND HANDLING

- A. Use extreme care to protect equipment from damage during shipment, storage, installation and subsequent construction activities
- B. Protect all equipment from damage
- C. Plug all temporary openings in equipment to prevent entrance of dirt or foreign material
- D. Store equipment under cover in a building and a minimum of 2 feet above ground
- E. Equipment which rusts or is damaged by the elements to be restored to new condition or replaced prior to installation
- F. Cover equipment containing motors or bearings with watertight, dustproof covers

## PART 2 - PRODUCTS

### 2.1 GENERAL

#### A. Design

1. Chemical feed equipment shall be shop assembled
2. Chemical feed system components and appurtenances may be shop or field assembled

#### B. All wearing parts and items requiring maintenance and adjustment shall be readily accessible

#### C. All parts which are exposed to corrosive conditions shall be made from corrosive resistant materials or covered with suitable protective coatings

#### D. Each item shall be furnished with all mechanical and electrical equipment required for proper operation, all components shown on the Drawings or specified and any materials required by manufacturer's design

#### E. Refer to Drawings for equipment power and operational requirements

#### F. Nameplates

1. On or adjacent to each piece of chemical feed equipment
2. Identify function
3. 1" x 3"
4. Phenolic material, black exterior, white interior
5. Minimum of  $\frac{3}{16}$ " high
6. Tag numbers and descriptions on nameplates shall correspond to those shown on the Drawings

### 2.2 CHEMICAL FEED SYSTEMS

#### A. Hypochlorite Feed System

1. Chemical
  - a. Sodium hypochlorite
    - 1) Design liquid properties as given in paragraph 1.4.B.
  - b. Application point: Discharge pipe of each RAS and WAS pump as indicated on the Drawings
2. Feed pumps
  - a. Peristaltic type
  - b. Number required: 2 (furnished by Owner)
  - c. Drive: Manual speed controller
    - 1) Total manually adjustable range of 1:20, minimum
  - d. Tubing connections:  $\frac{5}{16}$ " minimum
  - e. Suction lift rating: 25 feet
  - f. Discharge pressure rating: 0-40 psi

- g. Accessories
  - 1) Minimum 20 feet of suction and discharge tubing matching pump connection sizes
    - a) Manufacturer's standard material: polyethylene, EPDM or other material suitable for solution characteristics and system design pressures previously reported
  - 2) Weighted suction strainer
  - 3) Mounting bracket to secure pump to mounting stand
- h. Design feed rate: 10 to 170 gpd
- i. Mounting: Shelf or cart mounted as shown on the Drawings
- j. Design basis
  - 1) Stenner Pump Company
  - 2) Watson-Marlow Pump Group
  - 3) Or equivalent
  - 4) Equivalent products of other manufacturers may be accepted subject Owner and Engineer review and product compliance with design, function, materials, performance, longevity and reliability of the specified items
- k. Spare parts as recommended by manufacturer, with the following items being the minimum required
  - 1) One (1) spare pump tube
  - 2) Complete set of connecting nuts and ferrules
  - 3) 20 feet of suction tubing
  - 4) 20 feet of discharge tubing

## B. Piping, Valves and Appurtenances

1. Basic layout of required chemical feed piping systems are schematically shown on the Drawings
2. Contractor shall determine exact dimensions, pipe routing and fittings required for proper installation of the system, subject to Engineer's approval
3. Contractor shall provide suitable and adequate pipe support system
4. Required pipe sizes are indicated on the Drawings, where not indicated, manufacturer or supplier shall be responsible for determining required pipe sizes
5. Isolation valves in chemical feed system piping
  - a. Materials of construction suitable for solution characteristics previously described
  - b. Provide unions for ease of valve removal and replacement
  - c. Refer to Section 02641
6. Calibration column
  - a. Material: Clear, Schedule 40 PVC with Schedule 80 fittings
  - b. Size: 1.0 liter with calibration lines in tenths and hundredths
  - c. Provide fittings and valves as shown on the Drawings
7. Pulsation dampeners
  - a. Sentury pulsation dampener by Blacoh Fluid Control, or equivalent
  - b. Size for application
  - c. Construction materials suitable for design liquid characteristics and operating conditions

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. In conformity with the contract Drawings and Specifications, unless exceptions are noted by Engineer
- B. Per manufacturer's instructions and recommendations, unless exceptions are noted by Engineer
- C. Make all piping and electrical connections necessary for intended operation
- D. Install all interconnecting wiring in conduit
- E. Provide unions at locations adjacent to equipment, devices, valves and at locations indicated on the Drawings
- F. Install system components and connect to adjacent piping so that no strain is transmitted to the pipe or component

### 3.2 FIELD QUALITY CONTROL

- A. Provide Manufacturer's Field Service
  - 1. Qualifications of manufacturer's representative
    - a. Authorized representative of the manufacturer
    - b. Experienced in the application and installation of the subject work, materials and equipment
  - 2. Services provided by representative
    - a. Inspect, check, adjust and test equipment installed, as required, and approve final installation
    - b. Be present when equipment is placed in operation by General Contractor and Owner's personnel
    - c. Revisit site as often as required to correct all problems and until equipment installation and operation are acceptable to Engineer and Owner
  - 3. Manufacturer's representative to instruct Owner's personnel in the operation and maintenance of the equipment furnished
- B. Furnish written report to Engineer certifying that
  - 1. Equipment is properly installed, supported and lubricated
  - 2. Equipment is in accurate alignment and balance
  - 3. Equipment is free from any undue stress imposed by connecting piping, anchor bolts, etc.
  - 4. Equipment has operated satisfactorily under full load conditions and as specified through full operating range

END OF SECTION