4.14 – Filter Media

Addendum #1

4.14.0 Scope of Work

This section requires the furnishing of filter media for installation into fifteen (15) filter cells totaling 7713 square feet. The filters shall consist of 12 inches of silica sand media, and 30 inches of anthracite media. **Filter basin and media shall be cleaned and disinfected following the guidelines of AWWA C653-13**.

4.14.1 Quality Assurance

The filter equipment manufacturer shall furnish a Quality Control Manual demonstrating that the filter media to be furnished will comply with the requirements of the contract specifications.

The Quality Control Manual will define the following:

1. Qualification of the raw feedstock
2. Control procedures at the screening mill
3. Independent testing laboratories
4. Packaging definition
5. Purchase orders
6. Storage procedures

4.14.2 Submittal Information

The technical information will be provided and approved by a licensed engineer regularly employed by the filter manufacturer. The engineer shall have at least 15 years of experience in water treatment.

All submittal shall include the following information as a minimum:

1. Supplier's Name
2. Resume of Engineer Providing Submittal
3. Quality Control Manual
4. Gradation of Each Media Type
5. Date of Sampling/Lot Number
6. Samples of Each Media Type (If Required)
7. Representative Sample Analysis, (i.e. effective size, uniformity coefficient, specific gravity, acid solubility and MOH hardness for Anthracite only.)
8. Material Quantities
9. Diagram with Type of Material and Depth of Each
10. Estimated Shipping Schedule
11. Media Loading Procedure
12. All testing shall conform to the requirements of the latest edition of AWWA B100.

4.14.3 Shipment and Storage

Media materials will not be shipped until the submittal is approved by the OWNER. Approval of the submittal, including the Quality Control Manual, samples and independent testing, shall constitute acceptance of the media.

The schedule of work shall be submitted to the OWNER for approval prior to commencement of work. The contractor shall be responsible for coordinating the shipment of supplies of materials and equipment specified herein. The OWNER shall designate a storage space for the filter media and the CONTRACTOR shall maintain material and space in a neat and tidy condition.

All filter media will be shipped in "semi-bulk" bags having lifting loops and bottom discharge spout, weighing approximately 2,000-4,000 pounds each. Delivery of "bulk" shipments will not be permitted unless the contractor can demonstrate that the materials can be handled and stored without contamination

If material cannot be placed immediately into the filter cell, the material shall be stored on a clean, hard, dry surface and covered to prevent contamination. Bags and semi-bulk containers shall be stored on pallets or dunnage.

Any filter material that becomes contaminated by contact with dirt or any other foreign substance shall be removed from the project site and replaced or, if approved by the OWNER, completely cleaned of the contaminant prior to placement.

4.14.4 Filter Media

4.14.4.1 Sand

Filter sand shall be composed of hard, durable clean siliceous particles, free of all mica with an average specific gravity of 2.6 (±.05) and shall be in strict accordance with AWWA B100, and have an effective size of 0.45-0.55 mm, and a uniformity coefficient of ~~1.40~~ **1.45** or less, for a finished depth after backwashing and scraping and removal of fines and debris of 12 inches. A minimum skimming allowance of 1/2-inch shall be provided.

4.14.4.2 Anthracite

Filter anthracite shall be composed of specially selected and graded hard, durable anthracite coal particles. The anthracite shall be composed entirely of deep mined material. A quality control manual shall be included to show the source of the material and the quality of the material produced. The anthracite shall have an average specific gravity of 1.65 (±.05) with a hardness (MOH scale) of 2.7 or more and shall be essentially free of iron, clay, shale, extraneous dirt, and excessive dust with moisture less than 4.0 percent as shipped. The anthracite shall be in accordance with AWWA B100, and have an effective size of 0.95- ~~1.~~0 **1.05** mm, and a uniformity coefficient of 1.40 or less for a finished depth after backwashing and scraping and removal of fines and debris of 30 inches. A minimum skimming allowance of 1-inch shall be provided.

4.14.5 Installation

4.14.5.1 Cleaning

Following removal of old media and replacement of underdrain caps and components, the CONTRACTOR shall clean the filter tanks and keep them clean throughout placing the

new media. Thoroughly clean filter basins, manifolds and associated piping using high-pressure water jet and remove any accumulated debris by sweeping and vacuuming.

4.14.5.2 Marking and Measuring

Marks shall be placed on the side of the filter designating the top elevation of each layer. Measure depth of each layer of media after it has been backwashed and skimmed as recommended by the filter equipment manufacturer.

4.14.5.3 Placing

Place the filter sand and filter anthracite in the bed in the order of their respective specific gravities **in accordance with AWWA B100**. Place and level the filter sand first. Then backwash the filter bed, and remove the surface fines by scraping as required to the correct elevation. Place the filter anthracite and backwash the filter bed, and remove the surface fines by scraping as required to the correct elevation.

4.14.5.4 Disinfection

Disinfect by inserting sufficient chlorine into the backwash water to produce a free chlorine residual of at least 25 mg/L throughout the filter. Allow chlorinated water to stand for 12 hours, at the end of which the chlorinated water will be tested in multiple locations and depths to determine that at least 15 mg/L free chlorine residual remains. If less than 15 mg/L is found, the process shall start over. If satisfactory chlorine residuals are obtained after the chlorine contact period, the filter shall be run to waste or backwashed thoroughly to remove highly chlorinated water.

4.14.5.5 Bacteriological Sampling

After completion of disinfection, two or more samples shall be taken from the filters and tested for total coliform in accordance with TCEQ requirements. If any of the samples show the presence of total coliform bacteria, the filter disinfection process shall be repeated. If no total coliform bacteria is found the filter may be placed into service.