GEOTHERMAL WATER STORAGE TANK SPECIFICATION WELDED STEEL CONSTRUCTION

PART 1. GENERAL

1.01 SECTION INCLUDES:

This section includes furnishing and erecting a 20,000-gallon welded steel tank and necessary piping and appurtenances, per AWWA D100 specifications, latest revision. This tank will store Geothermal water at 195 degrees Fahrenheit.

1.02 QUALIFICATIONS OF TANK SUPPLIER:

A. The Engineer's selection of a welded steel tank is predicated on a thorough examination of design criteria, construction methods, and optimum coating for resistance to internal and external tank corrosion. Deviations from the specified design, construction or coating details will not be permitted.

B. The bidder shall offer a new tank reservoir as supplied from a manufacturer specializing in the design, fabrication and erection of welded water storage tanks.

C. The tank shown on the contract drawings and specified herein shall be fabricated by Tank Manufacturer.

D. Erection and /or fabrication of the tank is to be by the tank manufacturer or approved contractor. The installer shall be fully responsible for the entire installation including tank erection, and the ultimate water tightness of the complete installation.

E. Strict adherence to the standards of design, fabrication, erection, product, quality, and long-term performance, established in this Specification will be required by the Owner and Engineer.

F. Tank suppliers wishing to pre-qualify shall submit the following to the Engineer/Owner for consideration:

1. List of tank materials, appurtenances and tank coating technical specifications.

2. Resume of job installation superintendent.

3. The contractor shall have the experience and knowledge necessary to furnish and erect/fabricate the highest quality tank possible. The contractor shall be fully responsible for the entire installation including appurtenances and the final product.

1.03 SUBMITTAL DRAWINGS AND SPECIFICATIONS:

A. Construction shall be governed by the Owner's drawings and specifications showing general dimensions and construction details. There shall be no deviation from the drawings and specifications, except upon written order from the Engineer.

B. The bidder is required to furnish, for the approval of the Engineer and at no increase in contract price, 5 sets of complete specifications and construction drawings, stamped by an Oregon Licensed Engineer, for all work for construction of the tank. A complete set of structural calculations shall be provided for the tank structure and foundation.

C. When approved, and permitted, two sets of such prints and submittal information will be returned to the bidder marked "APPROVED FOR CONSTRUCTION" and these drawings will then govern the work detailed thereon. The approval by the Engineer of the tank supplier's drawings shall be an approval relating only to their general conformity with the bidding drawings and specifications and shall not guarantee detail dimensions and quantities, which remains the bidder's responsibility.

PART 2. DESIGN CRITERIA

2.01 TANK SIZE:

A. The horizontal tank shall be as shown on the drawings. Dimensions may vary if proposed by the supplier/contractor.

B. Soil bearing capacity is 1,500 pounds per square foot.

C. Seismic coefficients – Ss= 1.054, S1 = 0.415, Site Class D, Response Coefficient C= 0.3513

2.02 TANK CAPACITY AND ELEVATION:

A. Tank working capacity shall be 20,000 gallons (nominal).

B. Freeboard space in top of tank shall be a minimum of 0.5 ft.

C. Tank base (bottom) elevation shall be at 4,428.0 ft.

2.03 TANK DESIGN REQUIREMENTS:

A. The materials, design, fabrication and erection of the welded tank shall conform to AWWA Standard D100, latest edition.

B. The welded steel tank will rest on footings designed similar to, as shown on the drawings.

C. The reservoir shall be furnished with piping and appurtenances as shown on the plans and as follows:

1. Inlet pipe
2. Overflow pipe
3. Outlet pipe
4. Drain pipe
5. Insulation as shown on the drawings
6. Outside weather tight steel cladding over insulation
7. Screened roof vent
8. Identification name plate
9. Access hatches/covers insulated

PART 3. MATERIALS

3.01 MANUFACTURERS:

A. Five years' experience in welded steel tank construction.

3.02 TANK MATERIALS:

A. Furnish steel plate and structural shapes per AWWA D100, Section 2.

B. Steel pipe and pipe fittings shall conform to ASTM A-120.

C. Structural bolts shall conform to ASTM A-307.

D. Welding electrodes shall conform to ASTM 233 E60 or E70.

F. Asphalt board or asphalt expansion joint material shall be furnished which complies with ASTM D-994.

G. Caulking mastic shall be 100% solids epoxy or approved equal.

PART 4. COATINGS

4.01 COATING SYSTEM:

A. Interior coating system, Blome International, TL-280 High Temperature Sprayable Flake Glass Vinyl Ester Lining, or approved equal.

B. Exterior coating system, coat exterior of tank before applying insulation. Coat with Sherwin Williams, HEAT-FLEX® HI-TEMP 1200 COATING under insulation, or approved equal.

C. Install Johns Mansville, Min-wool 1200 insulation over coated tank exterior. Submit shop drawings with tank design for attaching insulation and metal weather tight jacket over insulation.

D. Metal Jacket ,29 Guage, factory painted sheets, with trim as required. Submit Product data and anchoring system for approval.

PART 5. FABRICATION

5.01 TANK FABRICATION:

A. All reservoir sub-assemblies and accessories, including shell manholes, ladders, and overflow pipes, shall be fabricated in accordance with AWWA D-100, Section 7.

5.02 APPURTENANCES:

A. Pipe Connections

1. Overflow piping shall be 6 inches nominal diameter schedule 40 carbon steel coated externally.

2. Inlet and outlet connections shall conform to the sizes and locations specified on the plan sheets. Standard flange connections to piping outside of tank.

B. Access Doors

1. One manways shall be provided as shown on the contract drawings in accordance with AWWA D100.

2. The Manway opening shall be a minimum of 24 inches in diameter. The access door (shell manhole) and the tank shell reinforcing shall comply with AWWA D100.

C. Roof Vent

1. A properly sized vent assembly in accordance with AWWA D100 shall be furnished and installed above the maximum water level of sufficient capacity so that at maximum design rate of water fill or withdrawal, the resulting interior design pressure / vacuum will not exceed +2.0 / -0.5 ounces per square inch.

2. The overflow pipe shall not be considered to be a tank vent.

3. The vent shall be so designed in construction as to prevent the entrance of birds and/or animals by including a 4 mesh (1/4” opening size) galvanized screen.

D. Identification Plate

1. Manufacturer's nameplate shall list the tank serial number, tank diameter and height, and maximum design capacity. The nameplate shall be affixed to the tank exterior sidewall location approximately five (5) feet from the grade elevation.

PART 6. EXECUTION

6.01 EARTHWORK:

A. All excavation, structural fill, and structural backfill in connection with foundation preparation and construction shall be done according to the requirements of the drawings and of contract documents. All trench excavation, pipe laying, and pipe bedding and backfill shall be done according to the requirements of the drawings and specifications.

6.02 CONCRETE:

A. All concrete work for reservoir foundations and floor slabs shall be done according to contract documents.

6.03 FIELD EXAMINATION:

A. The tank fabricator shall field verify the foundation elevation and the tolerances of the in-place foundation. Any deviations shall be reported to the Engineer for correction before proceeding with any work. All tank piping must be in place prior to the commencement of tank erection.

6.04 TANK ERECTION:

A. The CONTRACTOR shall furnish all labor, tools, scaffolding, and other equipment necessary to properly erect the tank complete and ready for use.

B. Erection shall be completed in compliance with Section 10 of AWWA D100 for welded steel tanks.

6.05 FIELD QUALITY CONTROL TESTING:

A. After the erection of the reservoir is completed and before it is painted, it shall be tested for leaks. Any leaks that are disclosed in the shell bottom, roof, manhole, or piping shall be repaired prior to painting.

B. Inspection and testing shall be in accordance with Section 11 of AWWA D100, latest revision.

C. All defective welds shall be removed and repaired in accordance with Section 11 of AWWA D100, latest revision.

D. Make available all radiographs and other testing information to the Owner's representative during construction.

E. After completion of the work, the Contractor shall submit a written report and certification that all work has been inspected and tested and is in accordance with all applicable provisions of AWWA D100, latest revision.

F. All costs associated with testing shall be paid by the Contractor.

PART 7. CLEANING

7.01 STANDARDS:

A. The tank structure shall be thoroughly cleaned after construction and prepared for coatings as per the coating manufacturer's recommendations.

PART 8. TANK MANUFACTURER'S WARRANTY

A. The tank manufacturer shall include a warranty on tank materials and workmanship for a specified period. As a minimum, the warranty shall provide assurance against defects in material, coatings and workmanship for a period of one (1) year.

**** END OF SECTION ****