

AIS Waiver Request for Double Offset Butterfly Valves

General Items

Project Name

Duchesne Aqueduct Improvement Project

Description of Work

The Central Utah Water Conservancy District (CUWCD) owns and operates the Duchesne Valley Water Treatment Plant (DVWTP) located in Duchesne County, Utah. CUWCD operates as a regional water wholesaler and owns and manages the DVWTP. The DVWTP is located near Duchesne, Utah and adjacent to Starvation Reservoir as shown in Figure 1.

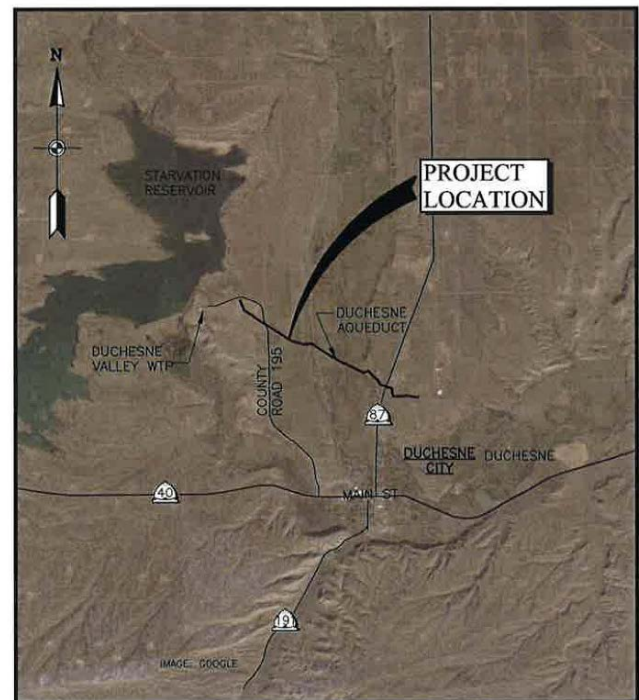


Figure 1. Duchesne Valley Water Treatment Plant

CUWCD also owns and operates the Duchesne Aqueduct that carries finished water from DVWTP to residents and businesses within Duchesne County (see Figure 2). The Duchesne Aqueduct was originally constructed in 1980 and CUWCD's ownership of the aqueduct is approximately 2.3 miles in length and ranges from 20-inches to 18-inches in diameter.

CUWCD conducted an assessment of the Duchesne Aqueduct in 2018 and determined that the aqueduct needed upgrades and improvements. These are listed below:

- Vault reconstruction:
 - West Bench Tank Turnout and Bypass
 - Duchesne Aqueduct Meter Vault
 - River Road Turnout
 - Farm Road Turnout
 - Blue Bench Turnout
 - Road Shed Interconnection and Turnout
- Approximate lengths of the following welded steel pipes ("WSP"):



PROJECT VICINITY MAP

Figure 2 Duchesne Aqueduct

- 325 lineal feet of 30-inch WSP (West Bench Tank Turnout and Bypass)
- 275 lineal feet of 20-inch WSP (Duchesne Aqueduct Meter Vault and River Road Turnout)
- 535 lineal feet of 18-inch WSP (River Road Turnout, Blue Bench Turnout, and Road Shed Interconnect)
- 25 lineal feet of 12-inch WSP (West Bench Tank Turnout and Bypass)
- 215 lineal feet of 8-inch WSP (West Bench Tank Turnout and Bypass, River Road Turnout, and Road Shed Interconnect)
- Approximately 320 lineal feet of 8-inch DR18 C900 PVC for the Duchesne City waterline loop.
 - Construction on a steep grade between connection in Hillside Avenue and top of hill near the Farm Road Turnout Vault
 - Crossing under the Rock Point Ditch Company 60-inch steel pipe
- Replacement/new mainline Duchesne Aqueduct air vacuum valves and vaults
- New Duchesne Aqueduct blow-off within the River Road Turnout Vault
- Reconstruction of existing Duchesne River blow-off
- New 12-foot wide access road about 1,000 lineal feet to the Duchesne River blow-off
- Associated aqueduct appurtenances including air vacuum valves, valves, and other appurtenances within the above listed vaults.
- Conduct final testing, training, warranty and startup services.
- Removal of deep-rooted vegetation within the Duchesne Aqueduct right-of-way and easements

Description of the Foreign and Domestic Construction Materials

The plans and specifications require the replacement of existing valves as well as the installation of new valves for the Duchesne Aqueduct including the use of 15 double offset butterfly valves ranging in size from 8-inch to 30-inch. The 15 double offset butterfly valves are constructed of stainless steel, bronze, and ductile iron and must be designed to withstand high velocities. Double offset butterfly valves are produced internationally; there are no domestic manufacturers that can meet the required specifications within the United States.

Unit of Measure

The valves listed above are measured by ‘each’.

Quantity

A total of 15 double offset butterfly valves listed in the table below.

Price

Double Offset Butterfly Valves			
Size (inch)	Quantity	Unit Price (each)	Total Costs
8	4		
12	5		
16	1		
18	1		
20	2		
30	2		
Total	15		

Time of delivery and availability

Delivery time of the double offset valves is not applicable to this waiver. However, double offset valves that meet the required specifications are not fabricated domestically in the United States.

For similar projects, the EPA conducted market research on the supply and availability of double offset butterfly valves and concluded that there are no domestic manufacturers of these valves that meet the technical specifications of those projects (similar to the Duchesne Aqueduct Improvement Project specifications). There are domestic manufacturers capable of providing double offset butterfly valves in the sizes required for the project but these manufacturers cannot provide valves that meet the 100 percent leak proof requirement and/or a product that meets the AWWA C504 Standard for high velocity design as specified.

Location of the construction project

The project is located in Duchesne County, Utah as described above.

Name and address of the proposed supplier

Rocky Mountain Valve
1310 South Swaner Road
Salt Lake City UT. 84104

A detailed justification for the use of foreign construction materials

The double offset butterfly valves, discussed above, are not manufactured domestically in the United States. The purpose of the double offset butterfly valves in the Duchesne Aqueduct is to provide isolation and shut-off service so that flow control plunger valves and flow meters can be maintained. It is essential that the butterfly valves not leak. These valves are located below grade in limited access confined space vaults. The vaults must remain dry since they contain power cables and electronic devices, especially when CUWCD personnel are present and conducting maintenance activities. The double offset design ensures a 100 percent leak-free valve by preventing the elastomeric seal from being compressed by the disc when the valve is in the open position. The compression set or permanent indentation(s) of the elastomeric seal on single offset or zero offset valves could become a leak path. The project's technical specifications also require that the valves comply with the American Water Works Association C504 Standard, meaning that the valves must allow a maximum velocity of 16 feet per second. In addition, the project's technical specifications require the butterfly valves to have a high

velocity elastomeric seal, which is rated to over 300 feet per second, because very high localized velocities could be produced when the valve is being closed. CUWCD and the prime contractor (WW Clyde) found no domestically manufactured double offset butterfly valves that meet this velocity criterion.

These valves are required and specified to isolate sections of the Duchesne Aqueduct. Isolating the Duchesne Aqueduct is necessary during maintenance times. The double offset butterfly valves provide improved performance over other types of valves and withstand leaking pressures. For these reasons, the Central Utah Water Conservancy District has specified double offset butterfly valves for use on the Duchesne Aqueduct Improvement Project.

This waiver request was submitted to the EPA by the state of Utah. All supporting correspondence and/or documentation from contractors, suppliers or manufacturers included as a part of this waiver request was done so by the recipient to provide an appropriate level of detail and context for the submission. Some referenced attachments with project diagrams, schedules, and supplier correspondence are in formats that do not meet the Federal accessibility requirements for publication on the Agency's website. Hence, these exhibits have been omitted from this waiver publication. They are available upon request by emailing DWSRFWaiver@epa.gov.

Availability Waiver Request

Double Offset Butterfly Valves

Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials

The double offset butterfly valves are not manufactured domestically in the United States. There are no domestically manufactured replacement valves that would meet the specifications for the Duchesne Aqueduct Improvement Project.

For similar projects, the EPA conducted market research on the supply and availability of double offset butterfly valves and concluded that there are no domestic manufacturers of these valves that meet the technical specifications of those projects (similar to the Duchesne Aqueduct Improvement Project specifications). There are domestic manufacturers capable of providing double offset butterfly valves in the sizes required for the project but these manufactures cannot provide valves that meet the 100 percent leak proof requirement and/or a product that meets the AWWA C504 Standard for high velocity design as specified.

Documentation of the assistance recipient's efforts to find available domestic sources, such as description of the process for identifying suppliers and a list of contacted suppliers

CUWCD requested that the prime contractor, WW Clyde, contact domestic suppliers of double offset butterfly valves. However, WW Clyde indicated that there are no domestic suppliers for the double offset butterfly valves that meet the project plans and specifications. WW Clyde's response attached.

Project Schedule

See attached

Relevant excerpts from project

See attached



January 10, 2020

Chris Elison
Central Utah Water Conservancy District
1426 E 750 N Suite 400
Orem, UT 84097

Re: Duchesne Aqueduct Improvement Project
Subject: AIS Waiver Prime Contractor Statement

Dear Chris,

The intention of the letter is to inform Central Utah Water Conservancy that the following permanent construction materials specified for the construction of the Duchene Aqueduct Improvement Project are not available from domestic suppliers.

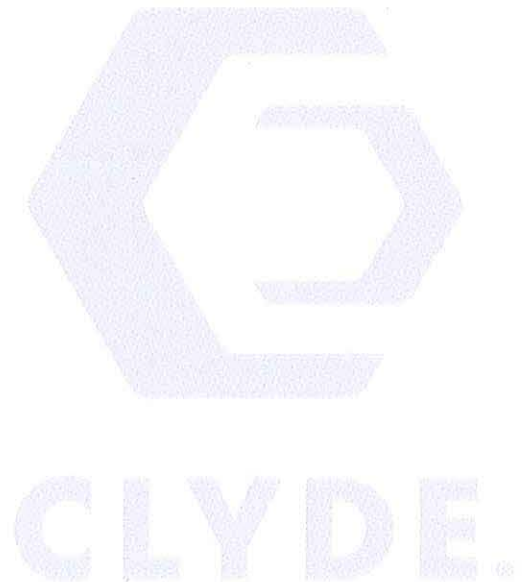
WW Clyde & Co. in an effort to meet the AIS requirements, has requested pricing for domestically produced double offset butterfly valves and plunger vales per specification 15202 and 15208 from the following suppliers Core and Main, HD Fowler, and Waterford. The suppliers have stated that the specified valves are not available from a domestic manufacturing source. The only manufactures currently producing the specified double offset valves and plunger vales are VAG Armaturen and AV-TEK.

Sincerely;

A handwritten signature in blue ink, appearing to read "Jeff Whinham".

Jeff Whinham
Project Manager

C.C Project Files



**SECTION 15200
VALVES, GENERAL**

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall provide valves, actuators, and appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 11000 - Equipment General Provisions, apply to the Work of this Section.
- C. The provisions of this Section shall apply to all valves and valve actuators except where otherwise indicated. Valves and actuators in particular locations may require a combination of units, sensors, limit switches, and controls indicated in other Sections of the Specifications.
- D. Where a valve is to be supported by means other than the piping to which it is attached, the Contractor shall obtain from the valve manufacturer a design for support and foundation that satisfies the criteria in Section 11000. The design, including drawings and calculations sealed by an engineer, shall be submitted with the Shop Drawings. When the design is approved, the support shall be provided.
- E. Unit Responsibility: A single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve; however, the Contractor shall be responsible to the Owner for compliance with the requirements of each valve section. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve.
- F. Single Manufacturer: Where two or more valves of the same type and size are required, the valves shall be furnished by the same manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with Section 01300 – Contractor Submittals
- B. Shop Drawings: Shop Drawings shall contain the following information:
 - 1. Valve name, size, Cv factor, pressure rating, identification number (if any), and specification section number.
 - 2. Complete information on valve actuator, including size, manufacturer, model number, limit switches, and mounting.
 - 3. Cavitation limits for control valves.
 - 4. Assembly drawings showing part nomenclature, materials, dimensions, weights, and relationships of valve handles, handwheels, position indicators, limit switches, integral control systems, needle valves, and control systems.
 - 5. Data in accordance with Section 15201- Valve and Gate Actuators for electric motor-actuated valves.
 - 6. Complete wiring diagrams and control system schematics.
 - 7. Valve Labeling: A schedule of valves to be furnished with stainless steel tags, indicating in each case the valve location and the proposed wording for the label.

- C. Technical Manual: The Technical Manual shall contain the required information for each valve.
- D. Spare Parts List: A Spare Parts List shall contain the required information for each valve assembly, where indicated.
- E. Factory Test Data: Where indicated, signed, dated, and certified factory test data for each valve requiring certification shall be submitted before shipment of the valve. The data shall also include certification of quality and test results for factory-applied coatings.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. General: Valves and gates shall be new and of current manufacture. Shut-off valves 6-inches and larger shall have actuators with position indicators. Gate valves 18-inches and larger or where chain wheel is required, shall be furnished with spur gear and hand wheel. Buried valves shall be provided with valve boxes and covers containing position indicators and valve extensions. Manual shut-off valves mounted higher than 7-feet above working level shall be provided with chain actuators.
- B. Valve Actuators: Unless otherwise indicated, valve actuators shall be in accordance with Section 15201 - Valve and Gate Actuators.
- C. Protective Coating: The exterior surfaces of all valves and the wet interior surfaces of ferrous valves of sizes 4-inches and larger shall be epoxy coated in accordance with Section 09910 - Pipeline Coating and Linings. The valve manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications. Flange faces of valves shall not be epoxy coated.
- D. Valve Labeling: Except when such requirement is waived by the construction manager in writing, a label shall be provided on shut-off valves and control valves except for hose bibbs and chlorine cylinder valves. The label shall be of 1/16-inch plastic or stainless steel, minimum 2-inches by 4-inches in size, as indicated in Section 15005 - Identification for Piping and Equipment and shall be permanently attached to the valve or on the wall adjacent to the valve as directed by the construction manager.
- E. Valve Testing: As a minimum, unless otherwise indicated or recommended by the reference Standards, valves 3-inches in diameter and smaller shall be tested in accordance with manufacturer's standard and 4-inches in diameter and larger shall be factory tested as follows:
 - 1. Hydrostatic Testing: Valve bodies shall be subjected to internal hydrostatic pressure equivalent to twice the water rated pressure of the valve. Metallic valves rating pressures shall be at 100 degrees F and plastic valves shall be 73 degrees, or at higher temperature according to type of material. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed. The duration shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes.

2. Seat Testing: Valves shall be tested for leaks in the closed position with the pressure differential across the seat equal to the water rated pressure of the valve. The duration of test shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes. Leakage past the closed valve shall not exceed 1 fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.
 3. Performance Testing: Valves shall be shop operated from fully closed to fully open position and reverse under no-flow conditions in order to demonstrate the valve assembly operates properly.
- F. Certification: Prior to shipment, the Contractor shall submit for valves over 12-inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.
- G. Valve Marking: Valve bodies shall be permanently marked in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

- A. General: Materials shall be suitable for the intended application. Materials in contact with potable water shall be listed as compliant with NSF Standard 61. Materials not indicated shall be high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Unless otherwise indicated, valve and actuator bodies shall conform to the following requirements:
1. Cast Iron: Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 2. Ductile Iron: ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
 3. Steel: ASTM A 216 - Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service, or to ASTM A 515 - Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.
 4. Bronze: ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.
 5. Stainless Steel: Stainless steel valve and operator bodies and trim shall conform to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or shall be Type 316 stainless steel.
 6. PVC: Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 12454.
 7. CPVC: Chlorinated Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 23447.
 8. NSF Standard 14: Materials shall be listed for use in contact with potable water.

2.3 VALVE CONSTRUCTION

- A. Bodies: Valve bodies shall be cast, molded (in the case of plastic valves), forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Welds on welded bodies shall be done

by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum temperature and pressure to which the valve will be subjected.

- B. Valve End Connections: Unless otherwise indicated, valves 2-1/2 inches diameter and smaller may be provided with threaded end connections. Valves 3-inches and larger shall have flanged end connections.
- C. Bonnets: Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.
- D. Stems: Valve stems shall be of the materials indicated, or, if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Bronze valve stems shall conform to ASTM B 584, except that zinc content shall not exceed 16 percent.
- E. Stem Guides: Stem guides shall be provided, spaced 10-feet on centers unless the manufacturer can demonstrate by calculation that a different spacing is acceptable. Submerged stem guides shall be 304 stainless steel.
- F. Internal Parts: Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.
- G. Nuts and Bolts: Nuts and bolts on valve flanges and supports shall be in accordance with Section 05500 – Metal Fabrications.

2.4 VALVE ACCESSORIES

- A. Valves shall be furnished complete with the accessories required to provide a functional system.

2.5 SPARE PARTS

- A. The Contractor shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The Contractor shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. Spare parts are intended for use by the Owner, after expiration of the correction of defects period.

2.6 MANUFACTURERS

- A. Manufacturer's Qualifications: Valve manufacturers shall have a successful record of not less than 5 years in the manufacture of the valves indicated.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

- A. **General:** Valves, actuating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written instructions and as indicated. Gates shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe.
- B. **Access:** Valves shall be installed with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment.
- C. **Valve Accessories:** Where combinations of valves, sensors, switches, and controls are indicated, the Contractor shall properly assemble and install such items so that systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on Shop Drawing submittals.

END OF SECTION

**SECTION 15202
BUTTERFLY VALVES**

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall provide butterfly valves and appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 11000 – Equipment General Provisions apply to this Section.
- C. The requirements of Section 15200 - Valves, General apply to this Section.
- D. The requirements of Section 15201 - Valve and Gate Actuators apply to this Section.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with Section 15200 – Valves, General.
- B. Shop Drawings
 1. Complete Shop Drawings of butterfly valves and actuators.
 2. Drawings showing valve port diameter complete with dimensions, part numbers, and materials of construction.
 3. Certification of proof-of-design test from the valve manufacturer.
 4. Certification: The Contractor shall obtain written certification from the butterfly valve manufacturer, addressed to the Owner, stating that the butterfly valves and the valve operators will efficiently and thoroughly perform the required functions in accordance with these Specifications and as shown, and that the manufacturer accepts joint responsibility with the Contractor for coordination of all butterfly valves and valve operators, including motors, drives, controls, and services required for proper installation and operation of the completely assembled and installed units. The Contractor shall submit all such certificates to the construction manager.
 5. Technical Manuals: The Contractor shall furnish technical manuals for the butterfly valves, manual operators, and electric motor valve operators under one cover and in accordance with the requirements of Section 01300 – Contractor Submittals.
 6. Valve Labeling: The Contractor shall submit a schedule of butterfly valves to be labeled indicating in each case the valve location and the proposed wording for the label.
 7. Field Procedures: Written instructions for field procedures for erection, adjustments, inspection, and testing shall be provided prior to delivery of the butterfly valves and valve operators.
 8. All submittals shall be in English language and in US Customary Units. Metric units are not acceptable.

1.3 QUALITY ASSURANCE

- A. Valves shall be subjected to performance, leakage, and hydrostatic tests in accordance with procedures and acceptance criteria established by AWWA C504.

PART 2 - PRODUCTS

2.1 BUTTERFLY VALVES 4-INCH AND LARGER – CLASS 150B AND 250B

- A. General: The butterfly valve shall be designed expressly for waterworks applications and shall be of the double offset design whereby the elastomeric seal is not compressed with the valve in the open position. Zero, single and API based triple offset butterfly valve designs are not acceptable. Butterfly valves for water working pressures up to 150 psi shall conform to ANSI/AWWA C504 Class 150B. Butterfly valves for water working pressures greater than 150 psi shall conform to the design requirements of ANSI/AWWA C-504, Class 250B. Valves shall be of the size and class indicated in the valve schedule or in the plans. All valves unless noted otherwise, shall be sized for bi-directional water service, full rated pressure and a line velocity of 16 feet per second and suitable for higher linebreak velocities of 50 fps. Lifting lugs will be provided for all valves 24" and larger.
- B. Flanges: Class 150B flanged valves shall have ANSI B16.1 Class 125-pound flanges. Class 250B flanged valves shall comply with ANSI B16.1 Class 250 up through 48-inch unless otherwise noted or if mating to ductile iron pipe. Above 48-inch, flange outside diameter, number of bolts, diameter of bolt circle, and diameter of bolts shall comply with ANSI/AWWA C 207 Class E.
- C. Body: Valve bodies shall be ductile iron, ASTM A536 65-45-12 or A536 60-40-18. Cast gray iron is not allowed due to near zero elongation and as it vulnerable to shear stress. The valve body shall include integrally cast support feet top and bottom. Valve shall comply with all aspects of AWWA C504. Valve lay lengths shall match the AWWA C504 "short body" designated lay length or the contractor and valve manufacturer shall be responsible for all required changes to the project (including but not limited to: pipe layout, pipe penetration location in structures, hatch or skylight sizes or locations, and all other impacts resulting from non-standard lay lengths.) as necessary to accommodate valves with lay lengths that differ from AWWA C504 short dimensions. Valve shall be mechanically equipped with a fastened stainless steel stamped or engraved tag indicating manufacturer and reference build data. Valves 54 inch and larger shall include two tags diametrically opposed. The valve build data shall be made available upon request by the customer and shall be retained by the manufacturer for no less than 70 years unless noted longer. The entire valve body and flanges shall be epoxy corrosion coat protected except for the valve shaft bores.
- D. Disc: The disc shall be ductile iron ASTM A536 65-45-12 or ASTM A536 60-40-18. The entire disc and all its wetted surfaces shall be coated without exception. The disc's elastomeric seal retainer shall be 316 of higher stainless steel. Neither bronze nor carbon steel is acceptable. Both the disc and elastomeric seal retainer shall have recesses designed to retain a dual shouldered seal under extreme localized velocities, at full differential opening and/or linebreak closing. The disc shall be mechanically fastened to the valve shaft by using Polygon "no fail" connection or equivalent stainless steel key connection or the disc shall be mechanically fastened to the valve shaft using tangential stainless steel shaft pins of or higher alloy. Disc pins shall extend completely through the valve and shall be mechanically fastened. The disc shall be completely coated except for the disc shaft bores.
- E. Shaft: Valve shafts shall be dual stub shafts of stainless steel ASTM A276 Type 316, 304, 431 or 420. The valve shaft material and thickness shall be suitable for the applications pressure and velocity without the use of its safety factors. Shafts may not be turned down to fit drive splines without accompanying torsional strength reduction calculations and its effect on the

safety factor.

- F. **Elastomeric Seal and Seal Ring:** Valve seals shall be EPDM, secured to a completely coated valve disc by a 316 stainless steel, continuous non-segmented seal ring and secured by 316 stainless steel fasteners. The seal shall not scallop, cold flow or tear at localized velocities less than 300 fps. The elastomeric seal shall not be penetrated by fasteners. The valve shall be bi-directionally leak free. The elastomeric seal shall be double shouldered and extend no greater than 0.25 inches past the disc edge to seat the valve. The seal shall be designed to flex in either flow direction. There shall be a small gap on both sides of seal which will allow for pipeline pressurized media to further expand the seal against the metallic seat- the higher the differential pressure or velocity. The elastomeric seal shall be field replaceable and adjustable in line. It shall not require special skills or tools to replace the seat. With access to the seat retaining bolts, the seat removal, replacement and readiness for service must be able to be accomplished in a maximum of 3 hours for all size valves. Seat methods which do not comply or use either irreplaceable vulcanized seals or which use hardened epoxy or grout in a dovetailed groove are not acceptable.
- G. **Metallic Seat:** The metallic valve seat shall be located in the valve body. It shall be a highly wear resistant stainless steel alloy (Inconel 625 (PREN = 50), ASTM B443 or equivalent alloy) or it shall be machined directly into the body of the valve and FBE Coated. There shall be no gap between the valve body and metallic body seat and consequently no potential for corrosion or lifting of the seat. The seat shall be applied through a high alloy weld overlay process or other manufacturing techniques such that metallic seats shall not be mechanically retained by fasteners.
- H. **Shaft Seals:** Shaft seals shall not need periodic manual adjustment. They shall be multi-O-ring seals protecting both the OD and ID of the shaft bearings. They shall prevent pressurized system water from entering the uncoated valve disc hub and valve body shaft bore. The valve shaft shall remain non-wetted and unpressurized. The non-wetted shaft shall allow the actuator to be removed without dewatering the pipeline. It shall prevent debris and system pressurized water from entering into the uncoated valve body shaft bore. It shall prevent waters or contaminated media, external to the valve, from entering through the valve shaft under vacuum/ negative pressure conditions in the pipeline, or hydrostatic pressure conditions external to the valve. Neither manual pulldown packing glands nor braided packing are allowed. The outer shaft seals shall be a replaceable cartridge type, bolted to the valve body. Packing shall not be held in place with an adapter plate or by the valve actuator.
- I. **Shaft Bearings:** Valve shaft bearings shall be corrosion resistant, self-lubricating sleeve type made of bronze, stainless steel or stainless steel backed PTFE. Bearing choice and consequent bearing friction shall be correctly added to valve input torque requirements.
- J. **Strength:** The proportion and dimensions of all parts of the valve and actuator shall be designed to withstand, without failure, the stresses occurring under the testing and operating conditions. The maximum allowable stress in any material shall not exceed 1/5 of the ultimate tensile strength or 1/3 of the minimum yield strength. Class 150B valves shall be rated to and shall receive a pressure test of 150 psi and Class 250B valves shall be rated to and shall receive a pressure test of 250 psi applied to one side of the disc with zero pressure applied to the other side of the disc while in the closed position, without damage or permanent deformation to any part of the valve, seat, disc or shaft. The valve shall be capable of withstanding such pressures in both directions.
- K. **Safety Disc Pinning:** Where noted herein, where noted on the plans or in the bid documents,

an integrated safety locking device shall be incorporated. The valve shall have an externally lockable disc in the closed position. Calculations shall be provided to verify that the disc cannot rotate even with the full stall output torque of the actuator. The disc shall remain in the zero leak sealed closed position even if the entire actuator is removed for safety or maintenance. With the actuator and or the adapter plate removed, the valve will not leak through the stem. The locking device shall be handwheel operated; stainless steel wetted construction, pad lockable and suitable for lockout/tag out safety procedures.

- L. Manual Actuators: Actuators shall conform to Section 15201 – Valve and Gate Actuators and to ANSI/AWWA C 540, subject to the following requirements. All actuators shall be self-locking and shall hold the valve disc in the closed, open and any intermediate position without creeping or fluttering. All actuators shall incorporate a mechanical stop-limiting device to prevent over travel of the disc. Unless direct buried or otherwise indicated, all manually actuated butterfly valves shall be equipped with a handwheel and external position indicator. The number of turns for direct buried valves shall be a minimum of 1.4 times the nominal valve size with no fewer than 25 turns. The valve manufacturer shall be responsible for mounting and testing the actuator. Screw-type (traveling nut) actuators are not permitted due to their inconsistent output torques through the 90 degree stroke. All manual direct buried service actuators shall be designed for a 300 foot-pound input torque against the closed and open travel stops. The owner reserves the right to field verify.
- M. Worm-Gear Actuators: All valves including submerged and buried valves, shall be equipped with Worm Gear Actuators: Valves 12-inches and larger shall be equipped with top tier AWWA worm-gear actuators, lubricated and sealed to prevent entry of dirt or water into the housing. Buried service valves shall be 90% or greater, grease packed. Submerged service valves in potable water applications shall be 100% grease filled with FDA approved food grade grease. Documentation for the selected grease for submerged service valves shall accompany submittals. The owner reserves the right to field verify grease levels. Non-complying gears shall be remedied by the factory, verified by the customer and signed off by both parties. No name or unbranded actuators will not be accepted.
- N. Hardware: All fasteners and hardware in non-wetted areas shall be type 316 Stainless Steel.
- O. Paint and coatings: The manufacturer is required to have and follow a system of valve preparation and coating which assures a quality holiday free application and which maximizes the available multi-decade protection the coating offers. Manufacturers that do not properly prepare or coat their valves properly will not be accepted.

The manufacturer must provide their written system of valve preparation and coating. This document shall include the methodologies used (quality compliance) as well as post application review (quality assurance). It will be based on a professional system of coating and grading such as NACE, SSPC, GSK, ISO or DIN and will include both text and color photo-documentation. The manufacturers coating system must be documented as well as implemented with a quality assurance program to prevent unacceptable deviation. This coating system shall be submitted for approval. It shall be titled, signed and dated by the manufacturers Coating Department Head, its' Compliance Officer or an equal ranking staff.

- 1. Valves 48" and smaller: All external and internal surfaces except for the seating surface shall be 400 degree F plus, heat bonded fusion coated. Coating damaged in shipping or installation shall be noted and properly repaired to the satisfaction of the utility or its authorized agent.

- 2. Valves 54-inch and larger shall be epoxy lined and coated in accordance with System No. 1. per Specification Section 09900 Protective Coatings. Coating damaged in shipping or installation shall be noted and properly repaired to the satisfaction of the utility or its authorized agent

P. Manufacturers, No Equal

1. VAG Armaturen, EKN Double Offset
2. AV-TEK, DEX Double Eccentric

2.2 PVC BUTTERFLY VALVES (4-INCH DIAMETER AND SMALLER)

- A. General: Valves shall be suitable for steady-state water working pressures and steady-state differential pressures up to 150 psi and for water having a pH range from 6 to 10 and temperature range from 33 to 90 degrees F. The Contractor shall be responsible to insure that the selected butterfly valve will fully open and close without any physical interference at all with schedule 80 PVC Van Stone flanges.
- B. Body: Butterfly valves shall be all solid thermoplastic Polyvinyl Chloride (PVC) butterfly valves of the lined body design and shall be suitable for bubble tight shut-off service as well as throttling service. The liner and disc shall be the only wetted parts. All non-plastic exterior valve components, including stem and miscellaneous hardware, shall be Type 316 stainless steel.
- C. Disc: The disc shall be made of Ethylene-Propylene-Dene Monomer (EPDM) or Polypropylene (PP) material. The chord length of the valve disc shall be less than the internal diameter of the pipe or flange to which it is to be installed.
- D. Seat: Seat shall be of EPDM material to provide bubble-tight seating. The seat shall totally encapsulate the body with no need for flange gaskets for installation. The seat shall be field-replaceable without special tools.
- E. Stem: Stems shall be made of Type 316 stainless steel. If connecting pins or screws are required for a particular manufacturer's design, then the disc as well as the connecting hardware shall be Type 316 stainless steel.
- F. Stem Bushing: The stem bushing shall be a non-corrosive, heavy-duty acetal bushing.
- G. Stem Seal: The stem seal shall be a double "U" cup seal or O-ring design which is self-adjusting and provides positive sealing in both directions, and is suitable for the service conditions.
- H. Flange Style: All PVC butterfly valves 8-inch and smaller on suction side of pumps shall be lug-style valves. All other PVC butterfly valves shall be wafer type, unless otherwise specified.
- I. Actuators: Actuators shall conform to Section 15201 – Valve and Gate Actuators and to ANSI/AWWA C540 – Power Actuating Devices for Valves and Sluice Gates. Unless otherwise specified, all PVC butterfly valves 6-inch and smaller shall have manual lever operators. Manual lever type actuators shall allow for positive throttling and have at minimum 10 stop positions from open to closed position for positive locking of the valve.

- J. Manufacturers, or Equal;
 - 1. Asahi America
 - 2. Hayward

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Exposed butterfly valves shall be installed with a means of removing the complete valve assembly without dismantling the valve or operator. Installation shall be in accordance with Section 15200 – Valves, General.
- B. Contractor shall use the provided lifting lugs to move all project valve(s). The use of chains, lifting straps, rope or any type other strapping through the valve body is strictly prohibited. Correct lifting procedures shall be the Contractor’s responsibility. As necessary, consultation with the valve manufacturer is recommended. The contractor shall be responsible for all damage and project delays resulting from improper lifting and moving procedures, these shall include but shall not be limited to: pulling the valve body out of round, gouges, scratches, displacing the gear box etc.
- C. Strict care shall be taken to assure valves are not installed under stress. In no instance shall adjacent mating flanges be forced into position. A progressive and proper star cross pattern shall be used to tighten valve flange mating bolts

END OF SECTION

**SECTION 15203
VALVES FOR PUMP CONTROL AND CHECK SERVICE**

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall provide check valves and appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 15200 - Valves, General apply to this Section.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with Section 15200 – Valves, General.

PART 2 - PRODUCTS

2.1 SWING CHECK VALVES (3-INCHES AND LARGER)

- A. General: Swing check valves for water and general service shall be of the outside lever and spring or weight type, in accordance with AWWA C 508 - Swing-Check Valves for Waterworks Service, 2-in. through 24-in. NPS, unless otherwise indicated, with full-opening passages, designed for a water-working pressure of 150 psi. Units shall have a flanged cover piece to provide access to the disc. Where indicated, swing check valves shall be provided with position indicators.
- B. Body: The valve body and cover shall be of cast iron conforming to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings, with flanged ends conforming to ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800, or be mechanical joint ends, as indicated.
- C. Disc: The valve disc shall be of cast iron, ductile iron, or bronze conforming to ASTM B 584 - Copper Alloy Sand Castings for General Applications.
- D. Seat and Rings: The valve seat and rings shall be of bronze conforming to ASTM B 584 or B 148 - Aluminum-Bronze Castings or of Buna-N.
- E. Hinge Pin: The hinge pin shall be of bronze or stainless steel.
- F. Dashpot: A bottom-mounted or side-mounted hydraulic dashpot shall be provided to prevent reverse flow and to alleviate water hammer during the closing cycle of the valve. The dashpot shall have 2 stage closing rates: For the 2 stage closing rate, the first stage shall be adjustable from 100 to 10 percent. The second stage shall be adjustable from 10 to zero percent. Each rate shall be infinitely and independently field adjustable depending on the system requirement. The dashpot shall be a self-contained oil system separate and independent from the pipeline fluid. The oil reservoir for the closing cycle shall be stainless steel, open to the atmosphere with an air breather cap to allow oil level changes in the reservoir and also

to prevent contamination of the oil from any outside source. The oil reservoir for the opening cycle shall be stainless steel, be hermetically sealed to contain pressure (air over oil), and shall be equipped with a 3-inch diameter pressure gauge and pneumatic fill valve. There shall be a provision for disconnecting the each dashpot from the valve for servicing, without removal of the valve.

- G. Manufacturers, or Equal
 1. APCO (Valve and Primer Corp.)
 2. Kennedy Valve
 3. Mueller Company
 4. Stockham Valves and Fittings
 5. Golden Anderson

2.2 SWING CHECK VALVES (2-1/2 INCHES AND SMALLER)

- A. General: Swing check valves for steam, water, oil, or gas in sizes 2-1/2 inches and smaller shall be suitable for a steam pressure of 150 psi and a cold water pressure of 300 psi. Units shall have screwed ends unless otherwise indicated, and screwed caps.
- B. Body: The valve body and cap shall be of bronze conforming to ASTM B 763 - Copper Alloy Sand Castings for Valve Application, or ASTM B 584 with threaded ends conforming to ASME B1.20.1 - Pipe Threads, General Purpose (inch).
- C. Disc: Valves for steam service shall have bronze or brass discs conforming to ASTM B 16 - Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines, and for cold water, oil, and gas service replaceable composition discs.
- D. Hinge Pin: The hinge pins shall be of bronze or stainless steel.
- E. Manufacturers, or Equal
 1. Crane Company
 2. Milwaukee Valve Company
 3. Stockham Valves and Fittings
 4. Wm. Powell Company

2.3 INTERNAL SPRING-LOADED CHECK VALVES (GLOBE STYLE – SILENT CHECKS)

- A. General: Internal spring-loaded check valves for water pumps (including all three raw water pumps and the backwash pumps on the DVWTP project), compressors, gas, air, and steam shall be of the full-flow internal spring-loaded poppet type. The valves shall be designed for a water-working pressure of not less than 150 psi unless otherwise indicated.
- B. Body: The bodies of valves 3-inches and larger shall be of cast iron conforming to ASTM A 126 with 125 lb flanged ends conforming to ASME B 16.1 unless otherwise indicated. Where necessary, there shall be a positive, watertight seal between the removable seat and the valve body. The stem guide shall be integrally cast with the body or screwed into the body. Valves shall be epoxy lined and coated.
- C. Valves smaller than 3-inches shall have bronze bodies with screwed ends conforming to ASME B 1.201, suitable for a minimum working pressure of 200 psi, and a temperature of 250

degrees F, unless otherwise indicated. The type of bronze shall be suitable for the intended service.

- D. Disc and Stem: The disc and stem of all valves in sizes 3-inches and larger shall be stainless steel. The stem shall have 2 point bearings. The downstream bearing shall have a bronze or other suitable bushing, to provide a smooth operation.
- E. Valves smaller than 3-inches shall have discs and retaining rings of Teflon, nylon, or other suitable material, and stems of bronze, brass, or stainless steel, suitable for the intended service.
- F. Stem Guide: The stem guide shall be either firmly fixed in the valve body to prevent it from sliding into the adjacent pipe and damaging the pipe lining, or the valve manufacturer shall provide each valve with one matching flange compatible with the adjacent pipe and its lining to prevent damage to the lining. The compatible flange shall be part of the Shop Drawing submittal.
- G. Seat: Valves for general service at temperatures up to 250 degrees F shall have bubble-tight shut-off with resilient seats of Buna-N, Teflon, or other suitable material. Valves for steam service and temperatures over 250 degrees F shall have metal-to-metal seating of bronze or stainless steel, as recommended by the manufacturer for the specific service condition. Resilient seats shall be firmly attached to the seating ring by compression molding or other acceptable method.
- H. Spring: Valves in sizes 3-inches and larger shall have Type 316 stainless steel springs, and valves smaller than 3-inches shall have stainless steel or beryllium copper springs, as suitable for the service. The spring tension of the valves shall be designed for the individual pressure condition of each valve.
- I. Manufacturers, or Equal
 1. APCO (Valve and Primer Corp.)
 2. CPV (Combination Pump Valve Company)
 3. Miller Valve Co., Inc.
 4. VAL-MATIC (Valve and Manufacturing Corporation)

2.4 PLASTIC BALL CHECK VALVES

- A. General: Plastic ball check valves for corrosive fluids, in sizes up to 4-inches, shall be used for vertical up-flow conditions only, unless the valves are provided with spring actions.
- B. Construction: The valve bodies and balls shall be of polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), polyvinylidene fluoride (PVDF), or polypropylene (PP) construction, as best suited for each individual service condition. They shall have unions with socket connections or flanged ends conforming to ASME B16.5 - Pipe Flanges and Flanged Fittings, class 150. Seals shall have Viton O-rings, and valve design shall minimize possibility of the balls sticking or chattering. The valves shall be suitable for a maximum working non-shock pressure of 150 psi at 73 degrees F.
- C. Manufacturers, or Equal
 1. ASAHI-AMERICA

2. George Fischer, Inc.
3. NIBCO Inc. (Chemtrol Division)
4. Spears Mfg. Co. (PVC, CPVC, AND PP only)

2.5 METAL BALL AND LIFT CHECK VALVES

- A. General: Metal ball check valves for saturated steam, oil, water, and gas in sizes 1/2- up to 1-inch shall be used for horizontal installation only. Lift check valves for LP gas in sizes 1/4 up to 2-inches shall be used for horizontal installation only.
- B. Construction: The ball check valve body and cap shall be bronze ASTM B 584. Ball disc shall be stainless steel construction, as best suited for each individual service condition. The union cap shall provide a tight joint and be easily dismantled when necessary. They shall have screwed connections. The valves shall be suitable for a maximum working non-shock pressure of 150 psi saturated steam or non-shock cold water, oil, and gas rating of 300 psi.
- C. The lift check valve body, and cap shall be leaded bronze ASTM B 763. Disc shall be special composition, as best suited for petroleum service condition. The disc shall be secured to the disc by means of a disc retaining nut. To protect against leakage on light oils and gases, the disc shall be sealed into the holder. The union cap shall provide a tight joint, easily dismantled when necessary. They shall have screwed connections. The valves shall be suitable for a maximum working non-shock pressure of 400 psi cold water, oil, gas, LP gases, and volatile fluids.
- D. Manufacturers, or Equal
 1. Crane

2.6 PLASTIC SWING OR WYE-CHECK VALVES

- A. General: Plastic swing or wye-check valves for corrosive fluids, in sizes up to 8-inches or as available, may be used for horizontal or vertical up-flow conditions.
- B. Construction: The valve bodies and discs or piston shall be of PVC, PP, or PVDF construction as best suited for each individual service condition. They shall have flanged ends conforming to ASME B16.5 Class 150, and flanged top access covers and shall shut positively at no-flow conditions. The seats and seals shall be of EPDM, Teflon, or Viton. The PVC valves shall be rated for a maximum non-shock working pressure of 150 psi at 73 degrees F for sizes 3-inches and smaller. For larger sizes and other materials and temperatures the pressure rating may be lower.
- C. Manufacturers, or Equal
 1. ASAHI-AMERICA
 2. George Fischer, Inc.
 3. Spears Mfg. Co. (Plastic Swing Check only)

PART 3 - EXECUTION

3.1 GENERAL

- A. Valves shall be installed in accordance with provisions of Section 15200 - Valves, General.

END OF SECTION