

VIRGINIA DEPARTMENT OF HEALTH
ENGINEERING DESCRIPTION SHEET

DATE: June 4, 2007

CERTIFIED CLASS: IV

WATERWORKS NAME: Deer Creek Estates

COUNTY/CITY: Franklin County **TYPE:** Community

LOCATION: From Booker T. Washington National Monument head east on State Route 122 for approximately 1.5 miles; take Scruggs Road east approximately 5.5 miles; Dear Creek Estates waterworks is located on the right (south) side of the road.

OWNER: Petrus Environmental Services, Inc.
1807 Murry Road, Unit O
P.O. Box 21173
Roanoke, VA 24018
Phone No. (540) 344-9800
Fax No. (540) 334-9806

OPERATOR: Certified Class VI Operator Required

PERMIT NUMBER: 5067093

EFFECTIVE DATE: August 8, 1979 Amended
July 01, 1985
May 09, 1989
June 21, 1991
June 4, 2007

TYPE OF TREATMENT: Corrosion Control and Continuous Chlorination

SOURCE: Two Drilled Wells

DESIGN CAPACITY: 32,000 gpd

DESCRIPTION OF THE WATERWORKS

Operation Permit History: This waterworks was previously permitted to the Deer Creek Water Company, Incorporated.

This system consists of two drilled wells, two 30,000-gallon atmospheric-type storage tanks, a 30-gallon pressure tank, a 100-gallon hydropneumatic tank, a 2000-gallon hydropneumatic tank, two booster pumps, corrosion control treatment, continuous chlorination treatment and approximately 17,880 feet of 4, 3 and 2-inch diameter pipes for the distribution system.

Well No. 1: This well is located on Lot 40, Section 6 and is housed in the control building. The well is a class II-B well that is drilled to a depth of 240 feet with 6-inch diameter casing to a depth of 50 feet and grouted to a depth of 50 feet. A submersible pump driven by a 1½ HP electric motor is installed at a depth of 231 feet and is capable of delivering 20 gpm at 215 feet TDH. The well yielded 20 gpm after a 48-hour drawdown test performed on October 3, 1981. The well is equipped with a sanitary seal, screened vent and a connection for a drawdown gauge. The well discharge pipe is equipped with a check valve, gate valve, sample tap, water meter, shut off-valve, pressure gauge and blow-off. This well's pump delivers water directly into the atmospheric storage tanks. A bypass is provided to pump water directly into the distribution system.

Well No. 2: This well is located on Lot 15, Section 2 and is housed in a 6-foot square wooden building that has a 6 foot by 6 foot by 6 inch concrete floor slab, floor drain and houses a 30-gallon pressure tank. The well is a class II-B well that is drilled to a depth of 100 feet with 6-inch diameter casing to a depth of 63 feet and grouted to a depth of 63 feet. A submersible pump driven by a 1½ HP electric motor is capable of delivering 24 gpm at 120 feet TDH. The well yielded 20 gpm after a 48-hour drawdown test performed on October 3, 1981. The well is equipped with a sanitary seal and screened vent. The well discharge pipe is equipped with a check valve, gate valve, sample tap, water meter, shut off-valve, pressure gauge and blow-off. This well's pump delivers water directly into the atmospheric tanks. A bypass is provided to pump water directly into the distribution system.

Hydropneumatic Storage Tanks: The 2000-gallon hydropneumatic tank is housed in the control building with Well No. 1. The tank has a diameter of 5 feet and is 13 feet 8 inches in length and is equipped with an access manhole, a vacuum relief, pressure relief valve, pressure gauge, sight glass and a screened drain. This tank is also equipped with a pressure control system that controls the operation of the booster pumps between 28 psi and 50 psi. The 100-gallon hydropneumatic tank is also housed in the control building and is equipped with a pressure gauge, a vacuum relief, pressure relief valve and a protected drain. The 30-gallon pressure tank (housed with Well No. 2) is equipped with a pressure gauge, a pressure relief valve and a protected drain.

Atmospheric-Type Storage Tanks: The two 30,000-gallon atmospheric-type storage tanks are located adjacent to the control building. They are installed horizontally on concrete supports. Each tank has a diameter of 12 feet and is 34 feet 8 inches in length. Each tank has an effective volume of 27,146 gallons measured from the booster pump low-water-level cutoff (1½ feet above the tank bottom) to the overflow (4-inches below the tank top). The two 30,000-gallon atmospheric-type storage tanks are equipped with access hatches, screened vents, screened overflows and screened drains.

Booster Pumps: There are two centrifugal type pumps (located in the control building) with a combined capacity of 141 gpm at 60 feet TDH that are each driven by a 2 HP electric motor. Each booster pump is provided with a shutoff and check valves, pressure gauges, compound gauges and low-level cutoffs. These pumps transfer water from the atmospheric-type tanks to the 2,000-gallon and 100 gallon hydropneumatic tanks and then into the distribution system. Each booster pump is provided with shutoff and check valves, pressure gauges and compound gauges.

Treatment: The treatment building is located adjacent to the atmospheric tanks. The corrosion control treatment blended phosphates and continuous chlorination treatment consists of 15-gallon solution tanks from each chemical feed system, chemical metering pumps rated at 12 gpd each with anti-siphon devices. Both chemical metering pumps operate with the well pumps. The treated water is stored in the atmospheric tanks before being sent into the booster pumps and then distribution system.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: Commonwealth of Virginia *Waterworks Regulations*
One Equivalent Residential Connection (ERC)= 400 gpd

1. Source Capacity:

Well No.	Well Yield (gpm + 0.5gpm/ERCx400gpd/ERC)		Pump Capacity (gpd) (gpm x 1440 min/day)		Effective Capacity (gpd)
1	20 gpm	16,000 gpm	20 gpm	28,800 gpd	16,000 gpd
2	20 gpm	16,000 gpm	24 gpm	34,560 gpd	16,000 gpd
Total Effective					32,000 gpd

2. Storage Capacity:

Gross Volume

Effective Volume

Atmospheric Tanks (2) 60,000 gallons 54,292 gallons
Hydropneumatic Tank 2,000 gallons * 1/3 = 667 gallons
Hydropneumatic Tank 100 gallons * 1/3 = 33 gallons

54,992 gallons/200 gals/ERC = 275 ERCs or 110,004 gpd

3. Booster Pumps:

Estimated Combined Capacity of 141 gpm

Maximum hour domestic demand flow: $Q = 11.4N^{0.544}$ $141 = 11.4N^{0.544}$ $N = 102$ ERCs

102 ERCs x 400 gal/ERC = 40,800 gpd

Conclusion:

This waterworks is permitted for a design capacity of 32,000 gpd, due to limited source capacity described above.

RLP/nfb/jk



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER

WATERWORKS OPERATION PERMIT

Petrus Environmental Services, Inc. is hereby granted permission to operate a Class VI community waterworks having a design capacity of 32,000 gpd at Deer Creek Estates located in Franklin County in accordance with Title 32.1 of the *Code of Virginia*, and 12 VAC 5-590-10 *et seq.* of the *Waterworks Regulations* of the Virginia Department of Health. This permit is issued in accordance with previously issued Operation Permit No. 5067093 dated June 21, 1991 and with the understanding that this owner will operate the waterworks in accordance with Part II, "Operation Regulations for Waterworks," of the *Waterworks Regulations* of the Virginia Department of Health and any variances or special requirements noted below.

Variances, Exemptions, or Special Permit Requirements issued: (☒) None () See Attached

An Engineering Description Sheet is attached dated June 4, 2007

PERMIT NO.: 5067093

EFFECTIVE DATE: June 4, 2007

APPROVED *[Signature]* P.E.
Director, Office of Drinking Water
for the State Health Commissioner pursuant to VA Code § 2.2-604