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Offering Memorandum - CD

# **OFFERING MEMORANDUM**

## **Potable Water Treatment Plant Tennessee Valley Authority Reservation Muscle Shoals, Alabama**

### **1.0 INTRODUCTION**

Tennessee Valley Authority (TVA) has owned and operated a 2.0 million-gallons-per-day (MGD) potable water treatment plant in Muscle Shoals, Alabama (Figure 1) since the 1930s. Muscle Shoals, along with Florence, Sheffield and Tusculumbia, comprise a metropolitan area north and south of the river, within Lauderdale and Colbert Counties (Figure 2). The TVA Muscle Shoals Reservation is located on the Tennessee River, downstream of Wilson Lake and Wilson Dam (Figure 3). The water treatment plant is situated near and draws water from the Tennessee River on the Wilson Dam Reservation.

Muscle Shoals Reservation is comprised of approximately 2,600 acres, most of which are south of the Tennessee River. The reservation was originally used to produce explosives for the Department of Defense, beginning in World War II. Subsequently, the reservation was used to produce fertilizer and other agriculture related chemicals. Eventually, other non-industrial facilities were constructed there, such as research facilities and a credit union.

TVA began closing its manufacturing operations in the 1980s and is currently considering making approximately half of the reservation available for economic and community development by local governments. Therefore, TVA is offering the potable water treatment plant and the two intakes for sale or lease. TVA continues to provide utilities, including potable water, to the remaining TVA tenants and non-TVA tenants.

This report is included in its entirety on the enclosed CD. The CD also includes additional relevant text, photographs, drawings and figures that were not printed in the report.

## **2.0 DESCRIPTION OF MAJOR FACILITIES**

Wilson Dam and an associated Hydro Power Plant were constructed in the early 1900s to support the construction by the U.S. Army of a nitrate plant that was needed to produce ammunitions for World War I. The Nitrate Plant and the Phosphate Development Works (PDW) that were subsequently constructed produced fertilizers. TVA has owned and operated the 2.0 MGD potable water treatment plant since the 1930s (Figure 4). The potable water treatment plant is situated near and draws water from the Tennessee River and distributes it throughout the Muscle Shoals Reservation (Figure 5).

The manufacturing plants required large volumes of non-potable process water, which were supplied by two large water intake structures located on the Tennessee River (Figures 6 and 7). The intakes are known as the PDW intake pumping station and the Fleet Hollow intake pumping station. The PDW pumping station is located downstream of Wilson Dam, and the Fleet Hollow pumping station is situated upstream of the Wilson Dam. Both stations incorporate multiple pumps with pre-screening capability. Each station is capable of pumping 29 MGD.

The potable water treatment plant currently produces and distributes approximately 3.7 million-gallons-per-month (MGM) for the tenants. Because of substantial leaks in the distribution system piping, actual usage might be significantly less. One tenant, International Fertilizer Development Corporation, purchases approximately 325,000 gallons-per-month from TVA. The cost of water for all other tenants is incorporated into a fixed monthly lease.

After the Nitrate Plant and PDW plant ceased operations, TVA continued to supply 15,000 gallons-per-minute of untreated water from the two intakes to several Occidental Chemical (Oxy) plant operations located on the reservation. Oxy pays \$10,000 per month for the pumping stations operating expenses. The water supply contract (enclosed CD) also stipulates that TVA is granted the right to draw up to 1,400 gallons-per-minute of water off the main raw water line. Oxy recently announced its intent to close the majority of its operations at the reservation.

### **3.0 OPERATING PERMITS**

The facilities have all the required operating and environmental permits from the State of Alabama and EPA to own and operate the two intakes, the potable water plant and associated distribution piping system. The permits are valid, active and in good standing. Copies of all the permits are included in the attached CD.

#### **3.1 Raw Water Withdrawal**

State Of Alabama

Office of Water Resources

Certificate of Use

Certificate Number 0091.1

Issued November 15, 2005

Last Revised April 20, 2006

Expires January 01, 2016

	<u>Maximum Capacity</u>	<u>Average Use</u>
Fleet Hollow	28.8 MGD	10,368 MGY
PDW	28.8 MGD	5,184 MGY

#### **3.2 Potable Water Supply**

State Of Alabama

Department of Environmental Management

2.5 MGD Surface Water Treatment Plant

Permit No. 2006-534

PWS ID No. 0000334

Issued January 18, 2006

Expires December 31, 2011

#### **3.3 Wastewater Discharge**

Department of Environmental Management

NPDES Permit No. AL0003891

Outfall DSN001

Non-Contact Cooling Water

Groundwater

Storm Water

Filter Backwash

Steam Condensate to Pond Creek

Issued September 22, 2005

Effective October 1, 2005

Expires September 20, 2010

#### **4.0 WATER TREATMENT PROCESS DESCRIPTION**

The potable water treatment plant is a conventional system designed by Stone and Webster and was constructed in 1942. The permitted capacity of the plant is 2.5 million gallons-per-day, but the noted plant filter capacity is 2.0 million gallons-per-day. The process consists of aeration, rapid mixing, flocculation, sedimentation and conventional gravity filtration (Figure 8).

Water is pumped from either the PDW or Fleet Hollow Pump Stations to the potable water treatment plant where it flows by gravity through the entire system beginning with the aeration basin. Optionally, raw water can be pumped into and held in a 60 million gallon earthen reservoir and pumped from there into the process. The reservoir is used as emergency reserve and is therefore bypassed during normal operations.

Aeration is achieved by releasing pressurized water through nozzles arranged on a simple rectangular pipe header and then dropping into a concrete lined basin. Aerated water is fed into a baffled, concrete rapid mix chamber. The rapid mix chamber is used for chemical treatment. This consists of adding liquid alum for coagulation, lime slurry and sodium hydroxide for pH adjustment and chlorine for disinfection.

The chemically treated water is fed to a 500,000 gallon, solids contact, up-flow, circular clarifier for flocculation. The clarifier provides gentle mixing to help promote particle formation while minimizing floc damage. Clear supernate rises and decants off the top. The water is then fed to three concrete lined sedimentation basins. The basins can be operated simultaneously in parallel mode or in an individual mode one at a time. From there, the water is fed to four gravity multi-media filters. Each filter is rated at and

capable of 350 gallons-per-minute, at 2.0 GPM/FT<sup>2</sup>, for a capacity of 2.0 million gallons-per-day. Backwash waste and process sludge are transferred into two sludge ponds with a combined capacity of one million gallons.

Two buried concrete tanks, (125,000 gallons and 500,000 gallons) operate in series as the clearwells for the system. (Figure 9) Two elevated storage tanks (100,000 gallons and 75,000 gallons) serve the distribution piping system. Underground distribution piping consists of a total of 12 miles (Figure 10). Of this total, 11 miles is cast iron pipe, and approximately one mile is PVC pipe.

## **5.0 CONDITION OF EQUIPMENT**

Based on field observations, reconnaissance, review of readily available documents and interviews with key TVA people (managers, engineers, plant foreman and plant operators), no operational problems or compliance issues with the intake structures or water plant were identified by Barge Waggoner Sumner & Cannon, Inc. Overall plant operations, appearance, housekeeping, cleanliness and environmental compliance are indications that the 66-year-old plant has substantial useful life remaining.

A 1989 internal evaluation of the underground distribution piping system by TVA stated that much of the original piping is deposited with pipe scale that was left over after pipe cleaning was conducted in 1984. The evaluation report includes pictures of pipe sample sections that were removed for examination and were found to contain significant deposits. In response to the report, TVA initiated an ongoing flushing program and installation of use point filters to solve the problem. The report and associated pictures are provided in the enclosed CD.

## **6.0 TREATMENT PLANT PERFORMANCE**

Twenty-six (26) Alabama Department of Environmental Management (ADEM) monthly operating reports and four annual disinfection byproduct reports (2006, 2007 and part of 2008) are provided in the enclosed CD. The monthly operating reports document full compliance with plant turbidity performance standard, 0.3 NTU. The most recent monthly operating report (March 2008) documents an average plant final effluent turbidity of 0.085 NTU for production rates between 0.17 and 0.39 million gallons-per-day.

The four annual disinfection byproduct reports (January 2005 to April 2008) document compliance with the running annual average standard for trihalomethanes and haloacetic acids. The quarterly testing conducted on July 3, 2007 documented a spike of 120.7 parts per billion (ppb) for trihalomethanes, which exceed the running average compliance standard of 80 ppb. No other spikes above the 80 ppb standard were documented in the reports that were reviewed. The disinfection byproduct reports are included on the attached CD. Although no cause for the spike has been identified, the documented compliance history and the fact that water is drawn at a depth of twenty feet at the Fleet Hollow intake are sufficient cause to assume that the plant has been and is expected to continue to remain in compliance.

The Alabama Department of Environmental Management conducts an annual survey of all the permitted water treatment plants. Three annual survey reports for the years 2005, 2006 and 2007 are provided in the enclosed CD. The annual reports document that the system is well maintained and is operating satisfactorily. The annual reports suggested implementing a tank maintenance program and writing comprehensive standard operating procedures.

The March 2008 monthly operating report is typical of performance and it documents the following monthly average finished water quality and chemical usage:

Turbidity	0.085 ntu
Iron	0.04 ppm
Manganese	0.02 ppm
Total Alkalinity	65.3 ppm
pH	8.05 Standard units
Chlorine Residual	2.00 ppm
Alum Feed	99.1 lb/day
Lime	20.7 lb/day

## **7.0 LEGAL DESCRIPTION**

No legal deeds for the potable water treatment plant and the two intakes currently exist because they have not yet been parceled out from the 2,600-acre reservation. The available deeds for the reservation property from June 1918, August 1918, June 1924 and March 1930 are provided on the enclosed CD. The land was sold to the United States of America by private parties.

There are currently no easements associated with the intakes, plant, and distribution system. TVA recognizes that there are issues to be resolved regarding the distribution system. TVA further recognizes that some of these issues are related to the future development of the property. TVA is open to negotiating whether the sale of the plant and intakes is best effected via sale, sale with easements or lease.

## **8.0 PHOTOGRAPHS**

Photographs of structures are provided in Attachment I. A more comprehensive set of photographs are provided in the enclosed CD.

## **9.0 ENVIRONMENTAL**

The potable water treatment plant is and has been in compliance with its environmental permits. Extensive information about environmental permits and compliance is provided in the enclosed CD.

### **9.1 Permits**

- In addition to operation permits, the facility has air permits for two natural gas fired boilers associated with heating of buildings still in use. Copies of the permits and a boiler location map are available upon request.
- Asbestos and PCB abatement and monitoring documents are available upon request.
- A spill prevention control and countermeasures (SPCC) plan for the site is available upon request.
- Tier II forms for hazardous chemical reporting are available upon request.



## **9.2 Environmental Remedial Actions**

Two settling ponds associated with the water treatment plant were cleaned out in 2002 and 2005. The cleanout material was determined to have no environmental impact and was land-applied onsite. Sediment sampling reports, the categorical exclusion checklist for the proposed action, and photographs of the area of application, are available in Attachment II.

Under the Resource Conservation and Recovery Act (RCRA), multiple solid waste management units (SWMUs) have previously been identified on the TVA Muscle Shoals Reservation. None of these units are located in the water treatment plant area. These SWMUs are now closed and some are part of a post closure monitoring plan. Corrective measures for other SWMUs were implemented. Further details, including RFI closure history reports and maps of the units can be found in Attachment II as well as in the records located on-site. Documents applying to all SMWUs identified on the reservation are available upon request.