



SUSQUEHANNA RIVER BASIN COMMISSION

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Docket No. 20021008

Approval Date: October 10, 2002

BUCKNELL UNIVERSITY

Consumptive Water Use of Up to 0.485 mgd,
for Golf Course Irrigation and Institutional Use,
Lewisburg Borough and East Buffalo Township, Union County, Pennsylvania

Review Authority

This project is subject to review pursuant to Article 3, Section 3.10 of the Susquehanna River Basin Compact, P.L. 91-575, and Commission Regulations §803.4, relating to projects requiring review and approval, and §803.42, relating to the consumptive use of water. The Commission received the applications for golf course irrigation on August 2, 2000, and institutional use on July 2, 2001.

Description

Purpose. The purpose of the application is to request approval for the consumptive use of water at Bucknell University (the University) associated with irrigation of the golf course and athletic fields, and evaporative cooling for facility air conditioning.

Location. The project is located in the West Branch Susquehanna Subbasin, HUC 02050206, Susquehanna River Watershed, Lewisburg Borough and East Buffalo Township, Union County, Pennsylvania.

Project Features. The project sponsor has requested approval for the consumptive use of water of up to 0.485 million gallons per day (mgd). Pennsylvania American Water Company—White Deer District (PAWC) provides water to the University for the campus potable water system, a portion of which is consumed for the irrigation of athletic fields and landscaped areas and for building air conditioning (via chiller cooling towers). Currently, water supplied by PAWC averages 0.283 mgd on a yearly basis, and is metered at 50 locations throughout the campus system. The University was founded in 1846.

The University's peak-day consumptive water use is estimated to be 0.442 mgd. Peak monthly consumptive water use averages 0.210 mgd. During these peak periods, cooling tower makeup, and golf course and athletic field irrigation comprise almost all of the University's consumptive water use.

Electricity for campus use is generated at a 6-megawatt, gas-fired combustion turbine power plant on campus. However, the primary combustion turbine is not water-cooled, and the heat recovery steam turbine has no consumptive water use. The University has recently completed a centralized air-conditioning system that eliminated chiller cooling towers at seven separate campus buildings. Seven additional campus buildings have individually metered separate chiller cooling tower systems. The campus central steam system has three boilers.

Water from two wells at the University (Wells 2 and 3) is used to irrigate the University's 18-hole golf course. The wells were in operation prior to July 13, 1978, the effective date of Commission Regulation §803.43, regarding ground-water withdrawals. The wells supply a 570,000-gallon storage pond located at the ninth green, from which water is pumped to irrigate the golf course. Well 2 is located adjacent to the storage pond, while Well 3 is located at the clubhouse. Well 3 has a meter installed; however, well withdrawals are not currently monitored.

Water pumped from the pond and supplied to the irrigation system has been metered and monitored since April 2001. Also, potable water from PAWC is available as a backup supply for golf course irrigation; however, this water is metered only in conjunction with the clubhouse potable water supply.

The following table provides construction information for both University wells:

Well No.	Date of Initial Use	Diameter (inches)	Depth (feet)	Pump Capacity (gallons per minute)
2	1967	7	215	60
3	June 1978	6	298	85

All of the wastewater generated at the University is discharged to the sanitary sewer system at four unmetered outfalls and is treated in the Lewisburg Area Joint Sewer Authority (the Authority) wastewater treatment facility.

Findings

The project is subject to Commission approval and reporting requirements, as per Commission Regulation §803.42.

All water used for makeup water for chiller cooling towers, golf course irrigation, and athletic field irrigation is considered to be consumptively used. The quantities of all three categories of consumptive water use will be based on weekly- or daily-metered amounts.

The University obtains the water for its campus potable system from a public supplier. This water is metered at 50 locations throughout the campus on a monthly basis. Wastewater generated on the campus leaves the campus and is discharged to the sanitary sewer system through four unmetered outfalls.

Since the golf course storage pond at the ninth green predates the Commission's consumptive use regulation, the project sponsor is not required to provide compensation for the evaporative loss from the pond.

Additionally, Commission staff has determined that boiler feed makeup water for the steam heating of campus buildings is not consumptively used, since almost all of this water is returned to the Authority's sewer system as blowdown or condensate at individual campus buildings. Also, Commission staff has determined that consumptive water use resulting from the irrigation of ornamental plantings on campus is of a nominal amount.

Current maximum daily consumptive water use is estimated to be 0.442 mgd during peak summer days, based on current metered usage of makeup water requirements for the chiller cooling towers, and irrigation of athletic fields and the golf course. Peak monthly consumptive water use is currently estimated to be 0.210 mgd. Consumptive water use resulting from the irrigation of athletic fields, the golf course, and from chiller cooling tower makeup commonly occurs during the period from May 16 through September 15, annually.

Thus, the three categories that comprise the University's consumptive water use include makeup water for chiller cooling towers, golf course irrigation, and athletic field irrigation. All of these water uses are considered to be used consumptively.

The project sponsor has agreed to continue to meter and monitor the use of makeup water by each chiller cooling tower unit. Metered makeup water to the central air-conditioning system will be monitored and recorded on a daily basis, and metered makeup water to the seven independent chiller cooling towers at the Science Center, Physical Plant, Bertrand Library, Swartz Hall, Smith Hall (backup), Langone Center (backup), and the Dana Engineering building will be monitored and recorded on a weekly basis. Makeup water to all chiller cooling tower units is currently metered, except for the makeup water supplying the Dana Engineering building chiller cooling tower. The project sponsor has agreed to install a meter on this makeup inflow line by April 1, 2003.

Additionally, the project sponsor has agreed to continue to monitor the metered use of water for irrigating the athletic fields and golf course on a daily basis.

The project sponsor was consumptively using water at the University before January 23, 1971, the effective date of the Commission's consumptive water use regulation (Commission Regulation §803.42). The project sponsor has no records of consumptive water use from this time for makeup water used by the chiller cooling towers, but provided estimates of this prior use based on installed compressor cooling load capacity, type of chiller cooling tower system, and typical summer loading and usage rates for the cooling towers. These estimates were verified using current metered makeup flows to the chiller cooling towers. The pre-1971 consumptive water use for makeup water to the chiller cooling towers is determined to be 0.031 mgd. The pre-1971 consumptive water use of 0.025 mgd for golf course irrigation was estimated based on design flow rates for the sprinkler heads and irrigation practices for the irrigation system that existed at the time. There were no permanently-installed athletic field irrigation systems existing prior to 1971, although there were portable systems in use. The project sponsor has assumed that

pre-1971 athletic field irrigation was nominal. Commission staff concurs with this finding. The pre-1971 consumptive water use quantities of 0.031 mgd for makeup water to the chiller cooling towers and 0.025 mgd for the golf course are considered “grandfathered”, and are exempt from water compensation requirements.

The project’s consumptive use of water in excess of the grandfathered quantities is subject to water compensation requirements, as per Commission Regulation §803.42. To satisfy these requirements, the project sponsor proposes to make quarterly payments to the Commission in-lieu-of providing actual compensation water.

The project sponsor has proposed a spreadsheet accounting procedure quantifying the three categories of consumptive water use for quarterly reporting to the Commission. First, metered usage for the irrigation of the golf course will be monitored daily to determine the total daily consumptive water use for the golf course. The golf course’s daily grandfathered consumptive water use of 0.025 mgd will be subtracted from the total daily consumptive water use for golf course irrigation to determine the golf course consumptive water use subject to compliance compensation requirements. If the daily grandfathered amount exceeds the daily golf course consumptive water use, that day’s consumptive water use is considered to be zero.

Second, individually-metered makeup water usages for each of the independent chiller cooling tower units (currently seven) will be monitored weekly, summed, and prorated to a daily basis. This daily amount will be summed with the daily metered makeup water for the chiller cooling towers of the central air-conditioning system to obtain the daily quantity of water used for building air conditioning.

Third, metered athletic field irrigation for the football stadium practice field and west athletic fields will be separately metered, summed, and reported daily.

After summing daily consumptive water use from makeup water to the chiller cooling towers and athletic field irrigation, the daily grandfathered consumptive water use of 0.031 mgd for these two use categories is subtracted from the total daily consumptive water use on the main campus (excluding the golf course). This is the consumptive use subject to compliance compensation requirements. If the daily grandfathered amount exceeds the calculated daily consumptive water use for the main campus, that day’s consumptive water use is considered to be zero.

The daily consumptive water use for the main campus subject to compliance compensation requirements is added to the daily golf course consumptive water use subject to compliance compensation requirements to obtain the total project’s consumptive water use subject to compliance compensation requirements. Commission staff recommends approval of the project sponsor’s proposed spreadsheet accounting procedure, as described in these findings, for use in calculating daily consumptive water use for the project.

The project sponsor has requested a consumptive water use approval of up to 0.485 mgd, based on an expected increase in the future central air-conditioning system compressor cooling load capacity of 1,750 tons to serve seven proposed campus building sites. Other project

consumptive water uses, including golf course and athletic field irrigation, are expected to remain at present usage rates. Currently, maximum daily consumptive water use is 0.442 mgd during peak summer days. Should the project's future consumptive water use exceed or be expected to exceed 0.485 mgd, the project sponsor must apply for a modification to this docket at that time.

The project's withdrawals from Wells 2 and 3 for golf course irrigation predate the Commission's ground-water regulation. Well 3 has a meter installed, but withdrawals are not monitored and recorded. Withdrawals from Wells 2 and 3 are used to fill the ninth green storage pond. All water pumped from the storage pond for golf course irrigation is metered. At peak monthly irrigation rates, the storage pond holds only a 6-day supply. During periods of drought, staff has determined that the project relies almost exclusively on ground water for the irrigation supply. Therefore, the grandfathered ground-water withdrawal from all wells is estimated to be 0.025 mgd.

Commission staff finds that the ground-water withdrawal by the project sponsor is not subject to review and approval under Commission Regulation §803.43 unless the project sponsor increases its withdrawal from Wells 2 and 3 by 100,000 gpd over its grandfathered amount (to a total of 0.125 mgd). With the addition of fairway irrigation in 1996, ground-water withdrawals increased to a 30-day average of 93,700 gpd. Therefore, the current ground-water withdrawal does not require review and approval by the Commission.

During past periods of drought, the operation of Wells 1 and 2 have possibly impacted a neighboring domestic well. Well 1 is located approximately 400 feet from this well, and Well 2 is located about 550 feet from this well. Well 3 is located 1,200 feet from the neighbor's property. As a result of its neighbor's concern, Bucknell Golf Club has voluntarily discontinued use of Well 1 and removed the pump on Well 1. In addition, Well 2 is currently used only as a backup supply to Well 3 on an as-needed basis. These voluntary constraints on ground-water withdrawals by the project sponsor have apparently avoided impacts to the neighbor's well, and no complaints have occurred during recent drought events.

The project sponsor has agreed to install a meter on Well 2 and maintain the meter on Well 3, accurate to within 5 percent, and keep a daily record of the project's ground-water withdrawals from each well. If the project sponsor should exceed the ground-water standard in Commission Regulation §803.43, the project sponsor must submit the appropriate application for review and approval by the Commission.

The project is subject to water conservation requirements, as per Commission Regulation §804.20 (a) and (c).

The project sponsor has paid the appropriate application fee in accordance with Commission Regulation §803.28 and in accordance with Commission Resolution 98-19, as amended by Commission Resolution 2000-06. The project sponsor has provided all proofs of notification, as required by Commission Regulation §803.25.

The project is physically feasible, does not conflict with or adversely affect the Commission's Comprehensive Plan, and does not adversely influence the present or future use and development of the water resources of the basin.

Compliance Incentive Program

Commission staff has determined that the project sponsor is eligible to participate in the Commission's Compliance Incentive Program (CIP). Therefore, the project sponsor would not be subject to penalties for water consumed in violation of Commission Regulation §803.42 prior to January 1, 2001. In accordance with the CIP, payment to the Commission as a method of compensation for the project's consumptive water use shall be effective and applicable to all consumptive water used by the project beginning January 1, 2001.

Decision

The project's consumptive water use of up to 0.485 mgd is approved pursuant to Article 3, Section 3.10 of the Compact, subject to the following conditions:

a. The project sponsor shall comply with all Commission regulations, including consumptive water use reporting requirements, as per Commission Regulation §803.42.

b. The project sponsor shall keep daily records of the project's consumptive water use, and shall report the data to the Commission quarterly, and as otherwise required. The daily quantity of water consumptively used for the main campus shall be the sum of the daily metered usage for all athletic field irrigation and daily metered makeup water for the chiller cooling towers of the central air-conditioning/power plant system, and weekly metered makeup water to the independent chiller cooling towers, prorated to a daily basis. The daily quantity of water consumptively used for the Bucknell Golf Course shall be the quantity pumped to the golf course's irrigation system. The project sponsor shall maintain existing and proposed metering, as required, to calculate the consumptive water use, accurate to within five (5) percent.

c. Within sixty (60) days from the date of this approval, the project sponsor shall install a meter on Well 2 and maintain metering on Wells 2 and 3, accurate to within five (5) percent, to measure its individual ground-water withdrawals from each well. The project sponsor shall keep daily records of the project's ground-water withdrawal, and shall report the data to the Commission quarterly, and as otherwise required. The project sponsor may propose alternative monitoring to the Commission for staff review and approval. If the ground-water withdrawal exceeds the threshold contained in Commission Regulation §803.43, the project sponsor shall submit the appropriate application for review and approval by the Commission. The Commission reserves the right to inspect all measurement equipment and audit all measurement records.

d. To satisfy the Commission's current compensation requirements for consumptive water use set forth in Commission Regulation §803.42, the project sponsor shall make quarterly payments to the Commission based on the rate of \$0.14 per 1,000 gallons of water consumptively used by the project in excess of the grandfathered quantity. The daily quantity of

water consumptively used for the main campus shall be the sum of the daily metered usage for all athletic field irrigation and daily metered makeup water for the chiller cooling towers of the central air-conditioning/power plant system, and weekly metered makeup water to the independent chiller cooling towers, prorated to a daily basis. The daily quantity of water consumptively used for the Bucknell Golf Course shall be the quantity pumped to the golf course's irrigation system. Payment amounts shall be calculated by applying this rate to the amount of water used consumptively by the project, less the grandfathered quantities of 0.031 mgd for the main campus and 0.025 mgd for the golf course. If the respective daily grandfathered quantity exceeds the project's respective daily consumptive water use for the main campus and the golf course, that day's consumptive water use is considered to be zero. Quarterly payments are due and payable within thirty (30) days after the close of the preceding quarter. The rate of payment, after appropriate notice to consumptive users of water using this method of compliance, is subject to change at the Commission's discretion.

e. The project sponsor shall comply with the water conservation requirements contained in Commission Regulation §804.20(a) and (c).

f. The project sponsor is eligible to participate in the Commission's Compliance Incentive Program (CIP). Therefore, the project sponsor is not subject to penalties for its prior noncompliance. In accordance with the CIP, payment to the Commission as a method of compensation for the project's consumptive water use shall be effective and applicable to all water consumptively used by the project beginning January 1, 2001. The project sponsor shall provide records of its consumptive water use and make a payment to the Commission based on the rate of \$0.14 per 1,000 gallons of water consumptively used in excess of the grandfathered quantity of 0.031 gpd for the main campus or 0.025 mgd for the golf course, during the period from January 1, 2001, until the effective date of this approval. This payment shall be calculated and included in the first quarterly payment made by the project sponsor in accordance with the requirements of condition (d) above. Consumptive use occurring before installation and monitoring of the proposed meters for measuring athletic field irrigation and chiller cooling tower usage shall be estimated based on design specifications and approximate operating time of athletic field irrigation systems and chiller cooling towers, and verified following meter installation and monitoring.

g. Commission approval shall not be construed to exempt the project sponsor from obtaining all necessary permits and/or approvals required for the project from other federal, state, or local government agencies having jurisdiction over the project. The Commission reserves the right to modify, suspend, or revoke this action if the project sponsor fails to obtain or maintain such approvals.

h. The Commission reserves the right to inspect or investigate the project facility, and the project sponsor shall allow authorized employees or agents of the Commission, without advance notice or a search warrant, at any reasonable time and upon presentation of appropriate credentials, and without delay, to have access to and to inspect all areas where the project is being constructed, operated, or maintained. Such employees or agents shall be authorized to conduct tests or sampling, to take photographs, to perform measurements, surveys, and other tests, to inspect the methods of construction, operation, or maintenance, to inspect all

measurement equipment, to audit, examine, and copy books, papers, and records pertinent to any matter under investigation, and to take any other action necessary to assure that the project is constructed, operated, or maintained in accordance with the terms and conditions of this approval or any other rule, regulation, or order of the Commission.

i. If the project sponsor fails to comply with any term or condition of this docket, the Commission may suspend, modify, or revoke its approval of same, and may impose appropriate fines and penalties. Upon written notice by the Commission, the project sponsor shall have thirty (30) days to correct such noncompliance, unless an alternate period is specified in the notice. Failure to comply within thirty (30) days, or within the alternate period identified in the notice, shall result in a ninety (90)-day suspension of approval of this docket. If the project sponsor fails to address the noncompliance to the satisfaction of the Commission within the suspension period, this approval may be revoked. Nothing herein shall preclude the Commission from exercising its authority to immediately modify, suspend, or revoke this approval where it determines exigent circumstances warrant such action, or from imposing fines and penalties, regardless of the period of noncompliance.

j. The Commission reserves the right to reopen any project docket or issue such additional orders, as may be necessary, to mitigate or avoid adverse impacts or otherwise to protect public health, safety, welfare, or the environment.

k. Commission approval confers no property rights upon the project sponsor. The securing of all rights necessary and incident to the project sponsor's development and operation of the project shall be the sole and exclusive responsibility of the project sponsor, and this approval shall be subject thereto.

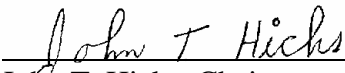
l. This approval is effective until October 10, 2027. The project sponsor shall submit a renewal application by April 10, 2027, and obtain Commission approval prior to continuing operation beyond October 10, 2027.

m. If the project is discontinued for such a period of time and under such circumstances that an abandonment of the project may reasonably be inferred, the Commission may rescind the approval of the project unless a renewal is requested by the project sponsor and approved by the Commission.

n. The project sponsor has a period of three (3) years from the date of this approval to initiate the project or such approval will automatically expire, unless an extension is requested by the project sponsor and approved by the Commission. Likewise, if the project is discontinued for such a time and under such circumstances that an abandonment of the project may be reasonably inferred, the Commission may rescind the approval of the project unless a renewal is requested by the project sponsor and approved by the Commission.

By the Commission:

Dated: October 10, 2002



John T. Hicks, Chairman
New York Commissioner