

1. The permittee shall comply with the requirements of Env-Wq 403 (formerly Env-Ws 388) and RSA 485-C at all times.
2. Water Conservation: The permittee shall implement the approved Water Conservation Plan, dated February 15, 2007, in accordance with Env-Wq 2101 (formerly Env-Ws 390) and NHDES' conditional approval dated March 6, 2007.
3. Metering Requirements: Withdrawals from Well 3 and Well 6 must be metered at all times. All meters must be selected, installed, tested, and maintained in accordance with the AWWA M6 manual as referenced in Env-Wq 2101. The permittee shall provide NHDES with a certificate of calibration and performance specifications for each meter. The permittee shall document and maintain records of all meter maintenance and calibration activities and submit this information to NHDES in an annual report by January 31 of each year. The permittee shall read source water meters to adequately report the following volumes to the reporting program referenced in condition No. 6 of this permit:
 - a) The 24-hour peak day volume withdrawn from each source during each month; and
 - b) The cumulative total volume withdrawn from each source during each month.
4. Monitoring and Reporting Requirements: The permittee shall establish and maintain the monitoring and reporting program as described below.
 - a) Groundwater Level Monitoring: The permittee shall install a pressure transducer and data logger and measure water levels at a frequency of at least once every four hours in Well 3 and Well 6. Water level monitoring shall commence upon initiating a withdrawal from Well 6 and shall continue indefinitely as a condition of this permit.
 - b) Surface Water Monitoring: The permittee shall implement the surface water monitoring program of the Middle River as described in the Final Report Addendum titled "North Conway Water Precinct, New Hampshire, Well 6 Final Report Response Letter" prepared for the permittee by Camp Dresser & McKee, Inc. (CDM), dated January 2010, incorporated herein by reference, subject to the following conditions:
 - i. Beginning May 1, 2010, monitoring shall occur using the methods proposed, and at the frequency proposed, at the Middle River monitoring locations listed in the table titled "Summary of Proposed Well 6 Long-Term Environmental Monitoring Program" and depicted in Sheet No. 1 titled "Site Plan with Environmental Monitoring Points Shown" included as Appendix D of the above-referenced submittal.
 - ii. By November 1, 2010, the permittee shall propose a trigger monitoring period and trigger groundwater level in monitoring well OW-6 for incorporation into a low-flow pumping restriction program to protect low flows in the Middle River. The trigger monitoring period and trigger groundwater level shall be derived based on an analysis of groundwater and surface water level elevation data collected during 2008, 2009, and 2010.
 - iii. Upon review and approval of the proposed trigger monitoring period and trigger groundwater level, NHDES will incorporate into the permit the provisions for implementation of the low-flow pumping restriction program which shall commence upon initiating a withdrawal from Well 6 and continue indefinitely as a condition of the permit.

- c) Wetland Monitoring: The permittee shall implement the wetland monitoring program as described in the Final Report Addendum titled "North Conway Water Precinct, New Hampshire, Well 6 Final Report Response Letter" prepared for the permittee by CDM, dated January 2010, incorporated herein by reference, subject to the following conditions:
- i. Monitoring shall occur using the methods proposed, and at the frequency proposed, at the wetland monitoring locations listed in the table titled "Summary of Proposed Well 6 Long-Term Environmental Monitoring Program" and depicted in Sheet No. 1 titled "Site Plan with Environmental Monitoring Points Shown" included as Appendix D of the above-referenced submittal.
 - ii. In addition to the wetland monitoring locations listed in the above-referenced table, the wetland monitoring program shall include monitoring of water levels in piezometer PZ-2 and monitoring well OW-2. Monitoring shall occur using the same methods, and at the same frequency, proposed for other water level monitoring locations.
 - iii. By May 1, 2010, the permittee shall identify and gain access to a reference wetland located outside the zone of contribution of Well 3 and Well 6 and submit a description of the reference wetland, and a site plan depicting the location of the reference wetland, to NHDES for review and approval.

The wetland monitoring program shall continue indefinitely as a condition of this permit. All work shall be conducted under the direct oversight of a New Hampshire Certified Wetland Scientist. Results of the wetland monitoring and surveys must provide a determination as to whether or not an adverse impact has occurred, may occur, or has not occurred over the monitoring period.

All water level monitoring shall be completed by a person who can demonstrate, by education or experience, competency in collecting and reporting hydrogeologic measurements.

Monitoring locations and frequencies may be added or changed if the data obtained contradict the information provided in the permittee's application, or if additional data points are required to assess the potential for adverse impacts to occur.

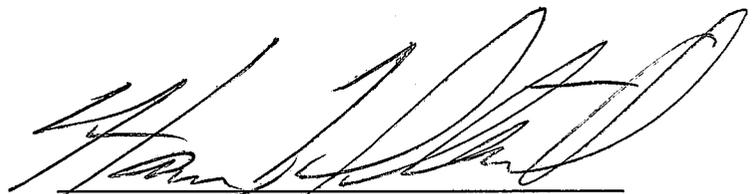
An annual monitoring report and all monitoring data shall be submitted to NHDES annually by January 31 of each year. The annual monitoring report shall note any relevant observations that may affect the groundwater or surface water level measurements or wetland plot observations and include all field notes documenting the monitoring activities for the preceding year. All field notes shall be signed and dated by the personnel responsible for collecting measurements. The results of the tri-annual wetland surveys and associated impact assessment shall be included in the annual monitoring report unless requested sooner by NHDES.

The annual monitoring report and all monitoring data collected per sections 4b and 4c above shall be submitted in an electronic format and hard copy format. All water level monitoring data collected per section 4a above shall be submitted in an electronic format only.

5. Mitigation Requirements

- a) In the event that an adverse impact occurs, the permittee shall comply with all of the requirements below and with the impact mitigation and source replacement requirements of Env-Wq 403.
 - b) Prior to initiating the large groundwater withdrawal, the permittee shall notify in writing via certified mail the owners of all properties served by private wells within the area estimated to be the influence area of Well 6, as depicted in Figure H-1 titled "180-Day Zone of Influence with Water-User Inventory Information" included in the Final Report Addendum titled, "North Conway Water Precinct, New Hampshire, Well 6 Final Report Response Letter," prepared by CDM for NCWP, dated January 2010. The permittee shall provide a map depicting the locations of the properties notified, a copy of the notification letter, and copies of the certified return mail receipts to NHDES. The permittee shall explain to property owners with wells in the identified area that their well may be influenced by the withdrawal at Well 6. The permittee shall provide the property owners with contact information for both the permittee and NHDES in the event they believe they may be adversely impacted by the withdrawal.
 - c) Where the status of an unanticipated impact is not clear, the permittee shall gather information needed to quantify the impact and determine its status relative to the adverse impact criteria defined under RSA 485-C:21, V-c and provide this information to NHDES within 48 hours of being notified by NHDES. A verified adverse impact shall be mitigated in accordance with Env-Wq 403.
 - d) NHDES will routinely review the results of all monitoring data, and if water level monitoring data indicate that groundwater is being extracted at a rate that exceeds natural recharge on average, then NHDES will modify the permit in accordance with Env-Wq 403 in order to prevent adverse impacts from occurring.
6. The permittee shall register its new source of water with the NHDES Water Use Registration and Reporting Program and maintain the water use reporting requirements established by RSA 488, Env-Wq 2102, and this permit.
7. The permittee shall apply for renewal of this permit at least 365 days prior to its expiration date in accordance with Env-Wq 403. The permittee shall continue to comply with all conditions in this permit until the permit is renewed or the facility is closed in accordance with all applicable requirements, regardless of whether a renewal application is filed.

Any person aggrieved by any terms or conditions of this permit may appeal in accordance with RSA 21-O:7, IV within 30 days.



Harry T. Stewart, P.E.,
Director Water Division

PROJECT NARRATIVE

Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2010-0002 North Conway Water Precinct, EPA ID 0511030, Well 6 North Conway, New Hampshire

March 23, 2010

BACKGROUND

The North Conway Water Precinct (NCWP) has submitted an application to the New Hampshire Department of Environmental Services (NHDES) requesting approval of a large community production well and issuance of a large groundwater withdrawal permit for the withdrawal of up to 1,440,000 gallons per day (gpd) or 1,000 gallons per minute (gpm) over a 24-hour period. NCWP is requesting approval for this new well to be used in combination with its existing sources for the purposes of public water supply.

The purpose of developing the new community production well (designated Well 6) is to: 1) offset losses in production from two of the system's other groundwater sources; 2) provide source diversity and redundancy for the system; and 3) provide additional water supply capacity for potential future increases in system demand.

Historically, NCWP has been served by five large overburden production wells: Well 1, Well 2, Well 3, Well 4, and Well 5. Well 1, located approximately 940 feet north of Well 6, was taken off-line in 2000 due to diminished yield. It is anticipated that Well 2, located approximately 5,900 feet southeast of Well 6 near the eastern bank of the Saco River, will be taken off-line in the near future due to river bank erosion and subsequent encroachment of the river on the well site. The removal of Well 1 and the pending removal of Well 2 from service served as the basis for development of Well 6.

Well 6 is located approximately 0.6 miles west of North Conway Village on a 17 acre wooded parcel owned by NCWP on the south side of River Road in the north-south trending valley of the Saco River. Well 3 is located approximately 200 feet north of Well 6 on the same property. (Well 3 and Well 6 are herein referred to collectively as "the well field.") The well field is bounded on the east and south by the Saco River and on the west by the Middle River. The area west of the well field and Middle River is characterized by mixed forested, scrub/shrub and emergent wetlands and wooded uplands.

The well field is underlain by stratified drift deposits common throughout much of the Saco River Valley as the predominant overburden aquifer. The aquifer, approximately 39 square miles in areal extent, trends north to south from Bartlett, New Hampshire to Conway, New Hampshire and then northeast and east into Fryeburg, Maine. The aquifer is comprised of glacial ice-contact and outwash deposits consisting mainly of coarse-grained, highly permeable sand and gravel deposited as buried eskers, kame terraces, or sub-glacial stream deposits. The sand and gravel deposits are interbedded with layers of fine-grained lacustrine silt and clay deposits in some areas. The drift deposits are underlain by biotite-granite bedrock (Conway Granite) of the White Mountain Plutonic-Volcanic Suite. In the vicinity of Well 6, the aquifer is unconfined with a total thickness on the order of 90 feet and a saturated thickness of approximately 75 feet or greater. Well 6 was completed to a depth of 86 feet below ground surface and is screened from 61 feet to 86 feet in the stratified sand and gravel deposits.

The potential impact area of the withdrawal encompasses a portion of the Saco River watershed upgradient of the confluence of the Swift River and Saco River, located approximately five miles south (downgradient) of the well site. To the northeast of the well site, the potential impact area extends into the towns of Bartlett and Chatham to Bartlett Mountain and Kearsarge North and includes the drainage area of Kearsarge Brook. To the west of the well site, the potential impact area extends to Cathedral Ledge and White Horse Ledge; and to the east of the well site, the potential impact area extends to the Green Hills mountain range and includes the drainage area of Artist Brook. To the southwest of the well site, the potential impact area extends into the town of Albany to the Moat Mountains.

WITHDRAWAL TESTING AND CONCLUSIONS

A withdrawal testing program was conducted by Camp Dresser & McKee, Inc. (CDM) from January 10, 2008 through January 24, 2008. The purpose of withdrawal testing is to provide data to estimate long-term sustainable water quantity and quality; observe the response of the aquifer to pumping; evaluate the degree of hydraulic connection with overlying deposits; and, assess the potential for adverse impacts to water resources and users that may result from the proposed withdrawal. The withdrawal testing program included monitoring during pre-pumping, pumping, and water level recovery periods, where Well 6 was pumped at approximately 1,060 gpm and Well 3 was pumped at approximately 880 gpm between January 18, 2008 and January 23, 2008.

Discharge from the wells was metered during the withdrawal testing program to maintain a constant pumping rate, and water quality samples were collected from Well 6 during the pumping period to characterize the quality of the water derived from the well.

During the withdrawal testing program, water level measurements were collected at: Well 6; Well 3; seven on-site overburden monitoring wells; four off-site overburden monitoring wells (two east of the Saco River and two west of the Middle River); three piezometers; and four surface water staff gauges. Piezometer and surface water level measurements were recorded to assess the degree of hydraulic connection between the aquifer, the Saco River, the Middle River, and the wetlands west of the Middle River.

The closest properties to the well site that are served by private domestic wells are approximately 0.5 miles to the northwest, outside of the estimated 180-day zone of influence of the withdrawal and its 1,000-foot buffer. As such, no private domestic wells were monitored during the withdrawal testing program.

Water level measurements collected during the withdrawal testing program indicate that water levels at all of the monitoring points, except the surface water level measurement points in the Middle River and Saco River located upgradient of the well site, responded to pumping.

Pumping-induced drawdown of water levels in the on-site monitoring wells ranged from approximately 1.1 feet to 16.4 feet and was greatest in wells located closest to the production wells. In the off-site monitoring wells, pumping-induced drawdown of water levels ranged from approximately 0.1 feet to 1.2 feet and was greatest in wells located to the northwest of and closest to the production wells. In the piezometers installed adjacent to the Middle River channel and in the wetland west of the Middle River, pumping-induced drawdown was on the order of 0.8 feet to 1.8 feet and was generally greater in piezometers screened at greater depths (5 feet below ground)

than in those screened at shallower depths (2 feet below ground). At staff gauges located in the Middle River channel, pumping-induced drawdown was on the order of 0.2 feet to 0.3 feet.

Based on graphical projections of water level responses in the overburden monitoring wells that assume 180 days of continuous pumping with no net recharge from precipitation to the aquifer, and inference from the refined conceptual hydrologic model of the withdrawal, pumping-induced drawdown is estimated to extend on the order of 1,400 feet from the well site.

Under the same projected conditions (i.e., 180 days of continuous pumping with no net recharge), the pumping-induced drawdown of surface water levels in the Middle River and shallow groundwater levels beneath areas adjacent to the river channel and in the wetlands west of the Middle River is estimated to range from approximately 0.4 feet to 3.2 feet.

Overall, based on monitoring results presented in the final report, a production rate of 1,440,000 gpd (1,000 gpm) is a production rate that Well 6 and the aquifer can sustain. However, observations of the effects of pumping on surface water levels in the Middle River and shallow groundwater levels adjacent to the river (including wetland areas) indicated that a groundwater withdrawal at this rate would cause water level drawdowns that may negatively affect more critical low surface water levels or flows in the Middle River and result in a violation of the State's surface water quality standards specified in Env-Wq 1700, which is a criterion for adverse impacts under RSA 485-C:21, V-c. This issue is addressed through conditions of the large groundwater withdrawal permit as described below.

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of pH, was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL). Results of the water quality sampling program also indicate that the concentration of radon is elevated in water derived from Well 6.

PUBLIC INVOLVEMENT

Pursuant to RSA 485-C:21, II through V-a, materials submitted in support of the large groundwater withdrawal permit (the preliminary application, final report, and supplemental materials) were sent (via certified mail) to municipalities and public water suppliers in the potential impact area of the withdrawal. Municipalities that were sent copies of the above-referenced materials are the towns of Albany, Bartlett, Chatham, and Conway. Public water suppliers that were sent copies of the above-referenced materials are Brook View Village, PAC/Birch Hill East, Cathedral Ledge, Cedar Creek, Deerbrook Condominiums, Echo Lake Woods, Forest Edge, Forest Park Village, and Hales Location. No public hearings were requested, and no public meetings were held regarding the application for this large groundwater withdrawal permit.

LARGE GROUNDWATER WITHDRAWAL PERMIT PUBLIC NOTIFICATION, MONITORING, REPORTING AND WITHDRAWAL REQUIREMENTS

To provide a means for notification in the event of an unforeseen impact, the large groundwater withdrawal permit requires NCWP to notify any property owner with a private well within the estimated zone of influence of Well 6 prior to initiating a large groundwater withdrawal from the well. As part of the notification, NCWP must explain to each property owner that their well may be influenced by the withdrawal at the production well and provide them with contact information

at NCWP and NHDES in the event they believe their well may be impacted by the withdrawal. More information concerning this requirement is provided in the large groundwater withdrawal permit under condition No. 5b.

The large groundwater withdrawal permit requires NCWP to implement an impact monitoring and reporting program that includes monitoring of on-site and off-site wells, the Middle River, and off-site wetlands. General monitoring requirements are summarized as follows:

- Groundwater – The permit requires that NCWP monitor water levels in production Wells 3 and 6 so that water level fluctuations in the Middle River and wetlands west of the Middle River can be compared to the operation of the production wells. The permit also requires that NCWP monitor water levels in monitoring wells OW-2 and OW-6 as part of the wetland and surface water monitoring programs, respectively.
- Surface water – The permit requires that NCWP establish a surface water monitoring program to assess the potential for and/or detect the occurrence of an adverse impact in the Middle River via observations of surface water levels in the Middle River; shallow groundwater levels adjacent to the river channel; and riverbank plant communities. Condition No. 4b of the permit requires that NCWP propose to NHDES by November 1, 2010 a trigger monitoring period and trigger groundwater level in an on-site monitoring well for incorporation into a low-flow pumping restriction program to protect low flows in the Middle River. Upon review and approval of the proposed trigger monitoring period and trigger groundwater level, NCWP will be required to implement a low-flow pumping restriction program upon initiating a withdrawal from Well 6.
- Wetlands – The permit requires that NCWP implement a wetland monitoring program to assess the potential for and/or detect the occurrence of an adverse impact in off-site wetlands via observations of groundwater and surface water levels at piezometers and staff gauges and plant communities in the off-site wetlands, and a reference wetland located outside the zone of contribution of the well field.

In the event that an adverse impact is reported and verified, an impact mitigation program would be implemented in accordance with conditions of the large groundwater withdrawal permit and Env-Wq 403. More information concerning these requirements is provided in the large groundwater withdrawal permit under condition No. 5.

NCWP is required to submit an annual monitoring report in hard copy and electronic format to NHDES by January 31st of each year. As stipulated in the permit, the annual report shall include a summary of trends and variability observed in the monitoring data, all monitoring data and records required by the permit, and an assessment of the potential impacts associated with the withdrawal from Well 6. The annual report will be available to the public for review. A complete description of monitoring and reporting requirements is presented in more detail in the large groundwater withdrawal permit under condition No. 4.