

**STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1 NATIONAL LIFE DRIVE
MONTPELIER, VERMONT 05620-3521**

FACT SHEET
May, 2016

PERMIT NO.: ID-9-0217
PIN: EJ95-0266.01

NAME AND ADDRESS OF APPLICANT: Catamount/Bolton Water & Sewer, LLC and
Mountain Operations and Development LLC
210 College Street Suite 201
Burlington, Vermont 05401

NAME AND ADDRESS OF FACILITY:

Catamount/Bolton Water & Sewer Wastewater Treatment and Disposal Facility
Bolton, Vermont

I. Proposed Action, Type of Facility, and Discharge Location:

The above named applicant submitted an application for renewal of ID-9-0217 to the Vermont Agency of Natural Resources which was deemed administratively complete on 1/19/2016. The permit authorizes the indirect discharge from the Catamount/Bolton Water & Sewer Wastewater Treatment and Disposal Facility which serves the Bolton Valley Ski Area development in Bolton, Vermont. The wastewater is initially treated in a central septic tank. The septic tank effluent is discharged to an equalization tank, then discharged to a Rotating Biological Contactor (RBC) for additional treatment. Prior to May, 2004 ferric chloride was added to the effluent from the RBC as a precipitant for phosphorus removal; currently, alum is being utilized for this purpose. Sodium hydroxide is added as a pH adjuster for the effluent prior to discharge to the secondary clarifiers.

From the secondary clarifiers the effluent is pumped to a tertiary sand filter for final clarification and then ultraviolet disinfection for final treatment. The treated effluent is discharged to the wastewater disposal area which consists of a pressure distribution/trench system to existing disposal fields 1A-1D and disposal fields 2A-2D.

This is a high rate disposal system and the permittee constructed additional disposal fields (3A – 3C and 4A – 4C) in 2003 to decrease the overall application rate to 8.82 gallons per day per square foot. These fields constitute a disposal system with 100% dual alternation and an approved disposal capacity of 92,000 gpd. In 2004, disposal fields 1A-1D were rehabilitated in place to remove stone clogged with ferric sludge. In 2005, disposal fields 2A-2D were rehabilitated in place to remove stone clogged with ferric sludge.

In 2015 the permittee's engineer detailed a "Fatal Flaw Analysis" and identified four weak points within the treatment facility that, if they failed, would have an "immediate and adverse impact on effluent quality." These are: Rotating Biological Contactor Drive and Shaft Bearings, Chemical Injection (no containment), Sand Filter (no longer functions properly) and Sludge Storage. This analysis necessitated some new permit requirements. The discharge from the disposal system is to groundwater that discharges to Joiner Brook. This indirect discharge can be located on the USGS Bolton Mountain 7.5' quadrangle map at Latitude N 44° 24' 32.6" and Longitude W 72° 52' 20".

II. Description of Discharges:

CATAMOUNT - BOLTON WATER AND SEWER LLC WWTF - EFFLUENT QUALITY SUMMARY														
SEASON	YEAR		NH3	NO2	NO3	NO2-NO3	TKN	TOTAL PHOSPHORUS	pH	<u>E COLI</u>	BOD5	Cl-	TSS	TOTAL NITROGEN
SUMMER	2015		0.8	0.2	26	26	0.5	0.36	7.11	1	1.4	140	4	26
SUMMER	2014		0.3	0.2	25	25	0.3	0.37	7.17	1	2.0	134	3	25
SUMMER	2013		0.2	0.2	20	20	0.8	0.26	7.1	1	2.0	152	3	21
SUMMER	2012		0.4	0.2	20	20	1.3	0.58	7.14	1	2.0	118	4	22
SUMMER	2011		0.3	0.2	23	22	1.3	0.84	7.13	2	2.4	121	5	23
WINTER	2014		2.0	0.3	22	23	2.8	0.72	7.08	1	6.0	173	4	26
WINTER	2013		3.5	0.4	20	20	3.5	0.40	7.15	2	2.4	180	5	23
WINTER	2012		2.9	0.7	20	21	4.3	0.42	7.06	2	3.1	172	4	25
WINTER	2011		1.1	0.2	18	18	2.3	0.85	7.06	2	2.7	192	7	20
WINTER	2010		1.3	0.2	17	17	2.3	0.68	7.33	4	3.1	232	8	19
<p>For the purposes of this summary, Summer includes months of June through October; Winter includes months of November through May. All concentrations represent averages for the period in mg/L except <u>E Coli</u> where the Geometric Mean was used and units are col/100 mL. pH averages calculated using [H+].</p>														

III. Downgradient Groundwater Chemical Monitoring Data:

CATAMOUNT/BOLTON WATER & SEWER GROUNDWATER QUALITY MONITORING DATA 2011 – 2015 [AVERAGE CONCENTRATIONS (in mg/L) except pH and <u>E. coli</u>]						
Well Designation	Location	Nitrate as N	Ph [Range in S.U.]	Total Dissolved Phosphorus	Chloride	E. Coli [Geometric Mean in col/100 mL]
105	Upgradient	0.07	5.0 – 6.5	0.009	2.8	2
7	Downgradient	7.5	5.8 – 7.2	0.009	78.4	1
106	Downgradient	16.7	4.9 – 6.2	0.039	128.6	1
107	Downgradient	14.9	4.6 – 6.3	0.008	105.4	1
108	Downgradient	8.3	5.1 – 6.7	0.012	87.2	1
Sample sizes (n): #105 (30); #7 (25); #106 (12); #107 (55); #108 (55);						

IV. Receiving Stream Chemical Monitoring Data

COMPLIANCE WITH VERMONT WATER QUALITY STANDARDS				
2011 – 2015 Results Parameter	Joiner Brook			
	Sample Results (n)	Upstream Mean (JB1)	Downstream Mean (JB3)	WQ Standard
Nitrate (mg/L) ¹	24	0.12	0.25	5.0
Total Phosphorus (mg/L) ¹	24	0.012	0.014	0.012 ²
Total Dissolved Phosphorus (mg/L) ¹	24	0.010	0.010	
Chloride (mg/L)	50	10.3	13.5	230
pH (standard units)	50	6.6	6.4	6.5 – 8.5
E coli (colonies/100 ml)	50	5	5	126

¹Only results from June – October used for compliance

²Standard for small, high gradient stream

(Note: No significant difference between upstream and downstream TP datasets).

V. Summary Interpretation of Monitoring Data

Effluent quality discharged by the wastewater treatment facility is currently very good with low Biochemical Oxygen Demand (5-day) (BOD₅) concentrations along with low Total Suspended Solids (TSS) concentrations.

There was one exceedance of the 18 mg/L daily maximum effluent limitation for BOD₅ and three exceedances of the 18 mg/L daily maximum effluent limitation for TSS. There were four exceedances of the 2 mg/L daily maximum effluent limitation for Total Phosphorus (TP).

The 5-year average TP is 0.55 mg/L which is an increase over the average of 0.41 mg/L calculated during the previous 5-year period.

There were no exceedances of the 77 colonies/100 mL daily maximum effluent limitation for Escherichia coli bacteria in the effluent.

The permit required sampling of groundwater monitoring wells of #7, #105, #106, #107 and #108. All four downgradient wells appear to be intercepting the renovated effluent as evidenced by the average concentrations of chloride and nitrate nitrogen which far exceed the background concentrations indicated by the Well #105 results. Well #106, located closest to the disposal fields, has the highest average concentrations of chloride and nitrate nitrogen. Well #107, located further downgradient, also appears to be intercepting the renovated effluent, with additional dilution occurring from other sources, resulting in lower chloride and nitrate nitrogen concentrations than those found in #106. Well #108, located even further downgradient, shows lower concentrations of nitrate nitrogen and chloride relative to #107 indicating additional groundwater dilution. Therefore, the samples taken and analyzed from these three wells provide evidence for greater dilution by groundwater as one approaches Joiner Brook.

The average concentrations of nitrate nitrogen and total phosphorus appear to indicate a slight increase in these parameters when comparing the upstream station data (JB1) to the downstream station data (JB3). Upon further examination the difference between the stations is statistically significant for nitrate-nitrogen based on a non-parametric Mann-Whitney rank-sum test. The difference between the stations is not statistically significant for total phosphorus. The discharge is required to meet the Vermont Water Quality Standards (VWQS) in Joiner Brook and does so for the parameters of nitrate-nitrogen, chlorides and E Coli. As mentioned above there is no significant difference between the upstream (background) station JB1 and the station downstream of the indirect discharge (JB3) in regards to total phosphorus so no violation of the VWQS should be inferred. The downstream station also exhibits a slight, but apparently not statistically significant, decrease in pH relative to the upstream station. Turbidity and dissolved oxygen monitoring was not required by the previous permit but will be added to the list of monitored parameters in the permit renewal.

VI. Proposed Changes to the Permit

Condition A(3) - Expiration Date

This permit expires on March 31, 2021. The permittee should apply for renewal of the permit by December 31, 2020.

Condition A(4) – Effective Date

This permit becomes effective on the date of signing.

Condition C2.- Basis of Design Report: [NEW]

By August 1, 2016, the permittee shall have a Vermont-registered professional engineer submit a Basis of Design Report (BoDR) for the wastewater treatment and disposal facility using the format of the Basis of Final Design document previously supplied to the permittee on May 17, 2016. The BoDR shall outline the steps that the permittee will take to either correct existing system deficiencies, including the Rotating Biological Contactor unit, or replace system components with more efficient treatment technology. The BoDR shall be subject to the review and approval of the Secretary.

Condition C3 - Schedule for Implementation: [NEW]

The permittee shall follow the following schedule in addressing all four potential weak points identified in the Fatal Flaw Analysis submitted to the Secretary on September 15, 2015 by Michael A. Smith, P.E. of Weston & Sampson:

<u>Action</u>	<u>Date</u>
Obtain approval from the Secretary for the BoDR required by Condition C(2)	By October 15, 2016
Have a Vermont-registered professional Engineer submit plans for review and approval detailing the rehabilitation of the WWTF, or upgrading the components, as outlined in the approved BoDR	By December 1, 2016
Submit an application for amendment of ID-9-0217 to construct WWTF improvements	By February 1, 2017

Condition D4 - Septage and Sludge Disposal

This permit condition simply combines the requirements of two previous permit conditions.

VI. Proposed Changes to the Permit (continued)

Condition D(7) - Catastrophic Failure: [NEW]

Catastrophic failure of this wastewater treatment and disposal system shall be considered to have occurred if the wastewater treatment facility experiences mechanical failures that prevents the treatment of all sewage received to achieve the effluent limits listed for chemicals and bacteriological parameters in Condition D(2). Upon catastrophic failure the permittee shall follow the requirements of Condition D(6) and dispose of untreated, or partially treated sewage, at the Richmond WWTF or other municipal treatment facility approved by the Secretary. The alternate disposal location shall be noted on the monthly report in addition to all required monitoring information required by this permit. The disposal at the alternate location shall continue until the treatment system is restored such that the effluent discharged to the disposal fields can meet the effluent limits specified in Condition D(2).

Condition D(9) – Operator Certification

The following requirement has been added:

“On an annual basis by January 1st each year, the permittees shall submit the names of the operator and assistant operator employed for the following calendar year.”

Condition E(3) – Groundwater Monitoring

The permit condition now specifies that the depth to groundwater be reported as depth to water below ground surface (bgs).

Condition E(4) – Receiving Stream Monitoring

The stream monitoring frequency for Joiner Brook has been reduced from monthly to only during the months of February (for winter low flow conditions) and June – October (to be consistent with Water Quality Standards base flow requirements). A requirement for monitoring the dissolved oxygen and turbidity at both stations has been added.

Condition E(8) – Additional Monitoring Requirements

The second sentence now reads:

“However, the Secretary reserves the right to require additional monitoring of the system in accordance with Condition A(7) should operation of the system fail to meet the requirements of **Sections D(1), D(2) and D(5).**”

END OF PROPOSED CHANGES

Tentative determinations regarding conditions to be included in the pending Vermont Indirect Discharge Permit have been made by the Vermont Agency of Natural Resources, Department of Environmental Conservation. The conditions imposed will assure that the Vermont Water Quality Standards and applicable provisions of 10 V.S.A. Chapter 47 will be met.