LAW OFFICE OF MARC S. GERSTMAN

Marc S. Gerstman, Esq.
OF COUNSEL
Meave M. Tooher, Esq.
John L. Barone, Esq.

December 20, 2010

Mr. Willie Janeway
Regional Director
New York State Department of Environmental Conservation
Region 3
21 South Putt Corners Road
New Paltz, New York 12561

Re: Hudson River Valley Resort
DEC Tracking number 3-5146-00063/00007

Dear Mr. Janeway:

I write on behalf of Save The Lakes ("STL") regarding the ongoing review of the DEIS in the above matter. Based on the analysis of the hydrogeology of the site by Dr. Ralph Ewers, the DEIS remains incomplete and should not be presented for public review and comment until the deficiencies have been corrected.

As you know, your Department, working closely with the Town of Rosendale, determined that the services of an independent expert were required to assist in reviewing the adequacy of the DEIS' analysis of the site's complex hydrogeology, including the presence of underlying Karst geology.

To that end, Dr. Ralph Ewers was retained to review the relevant portions of the DEIS. His report was very critical of the DEIS' analysis, or lack thereof, of the potential karstic nature of the site. It appears that, after persuading the Town and DEIS that Dr. Ewers review should be limited, the applicant now seeks to diminish Dr. Ewers' opinion by noting that he only conducted a limited review. It is our understanding that the applicant initially protested the need for such an expert at all, but was nonetheless successful in limiting the scope and cost of Dr. Ewers' review. Despite the alleged limited view, Dr. Ewers, based on his expertise in the area, provided a scientifically based critique of the DEIS and its failure to address the actual Karst features of the site. While STL would have preferred that Dr. Ewers have the opportunity for a site visit, nonetheless, his analysis provides a window into the applicant's failure to conduct the environmental review in accordance with the Scope.

This debate is not, as some would indicate, an "academic" exercise. Proper characterization of the site's surface and groundwater regimes is a necessary predicate to analyzing the project's environmental impacts. Unfortunately, the work to date does

not provide such a characterization, does not conform to the requirements of the Scoping document, and thus the DEIS remains fundamentally flawed.

The Applicant has steadfastly maintained that the area does not exhibit Karstic features, despite much evidence to the contrary. Their most recent submissions continue in this vein. It was somewhat surprising, then, that the applicant's recent submission, after essentially refuting the karstic nature of the site, nonetheless appends a document entitled "Living with Karst". Again, this is not merely an academic exercise, but a very necessary step in assessing the project's impacts.

Attached to this letter please find a document recently prepared by Paul Rubin for STL which discusses the ongoing insufficiencies of the applicant's analysis of the ground and surface water regimes. Mr. Rubin's conclusion is that the work to date fails to properly characterize the surface and groundwater flows on the site, and that further work is necessary to do so.

The applicant's recent submissions attempted to discredit Mr. Rubin, and Dr. Ewers' reliance on some of his observations by pointing out that Mr. Rubin was retained by STL. Mr. Rubin's work on these issues long predates any work done for STL, and his personal observations are very useful for understanding the complex hydrogeology of the site. There is absolutely nothing wrong with Dr. Ewers' relying on these observations. Indeed, at our request Mr. Rubin's earlier submissions were forwarded by the Department to Dr. Ewers for his consideration.

Given the magnitude of this project, and the potential for significant impacts to both ground and surface waters, it is imperative that the Department insist that there be a robust and scientifically defensible analysis of the site's hydrogeology. It is clear from Dr. Ewers' report and the supplemental submission from Mr. Rubin that this is not yet the case.

We believe that, at a minimum, Dr. Ewers should be retained to conduct a site visit and then review the applicant's response to his report. We further believe that when that review is concluded, it will again be clear the work to date is insufficient to properly characterize the site's complex hydrogeology, and further field work and analysis will be necessary before the DEIS can be accepted for public review and comment.

Sincerely,

Warren P. Reiss

Enc.: December 16, 2010 letter, Rubin to STL

Cc: Rebecca Crist, DEC
Patrick McDonough, Town of Rosendale

HydroQuest

HydroQuest
P.O. Box 387
Stone Ridge,
NY, 12484
845-657-8111
URL: hydroquest.com
hydroquest@yahoo.com

December 16, 2010

Save the Lakes
P.O. Box 153
Rosendale, New York 12472-0153

RE: Williams Lake HRVR Hydrogeologic Characterization Flaws

To Whom It May Concern:

It has been brought to my attention that HRVR seeks to obtain NYSDEC signoff on completion of their hydrogeologic assessment of the Williams Lake area so that they may sufficiently complete their DEIS for public review and comment. Whereas I have only briefly examined a copy of HRVR's draft DEIS obtained through the Freedom of Information Law and recent HRVR submissions to NYSDEC dated November 30, 2010 (Tim Allred letter) and November 15, 2010 (HDR Memo), I am compelled to provide preliminary comments regarding some of the many glaring inaccuracies present in these documents. None of this material represents a comprehensive hydrogeologic study that adequately characterizes water elevations and water movement in the watershed. One important aspect of the hydrogeology that must be addressed is that of the site's complex karst hydrogeology. A second important topic that requires correction is the proper characterization of surface flow into and out of both the Fourth Lake and Williams Lake basins. Not only has the methodology not been sufficient to characterize the site's hydrology and hydrogeology, HRVR continues to deny the existence of karst features even though they are in possession of HydroQuest photographs, GIS maps, and karst papers documenting many of them.

In their letter of November 30, 2010 and in the press, HRVR has questioned the work and conclusions of Dr. Ralph Ewers (a highly respected karst hydrologist), in part, because he referred to photographs I had taken of karst features on HRVR property. The underlying thought process advanced here is that this information somehow altered the objectivity and independence of his report. Because written text can be misinterpreted by some, the format of my comments presented below is presented as bulleted key issues, often with photographic documentation of hydrologic and hydrogeologic points. In this manner, anyone viewing the material and photographs presented here may readily reach their own conclusions regarding the presence or absence of karst on the Williams Lake property. All told, review of bulleted issues and the photographs presented here provide documentation that characterization of the Williams Lake hydrogeology still requires significant field work and analysis, to be followed by a complete revision of the draft DEIS by HRVR prior to acceptance by NYSDEC for public review.

- The DEIS asserts that the outflow from Williams Lake is continuous year round, even during very dry periods of time, as documented by over 30 years of historical observations by the site maintenance department (DEIS page 8-3). HRVR modeled the projected lake outflow using the severe drought conditions of 1964-1965 and determined that at all times there would be a minimum lake outflow of 187,000 gpd (130 gpm) (DEIS page 5-3). This "observed" and modeled outflow is needed for water supply and waste water treatment and is presented as "*self-supporting in terms of its water requirements during a drought*." There are extended periods of time where there is no outflow and very limited outflow from Williams Lake. Example photos 1 and 2 (see attached photo composite), taken during the summer of 2010, document that the DEIS, HRVR water budget, and model results are flawed while establishing that project water withdrawals may "mine" Williams Lake water.

- Long-term flow monitoring by HRVR (July to September 2009) of the outflow of Williams Lake showed that "*daily flows averaged over the month ranged from 322,460 to 479,520 gallons/day*" (DEIS page 5-3). Review of the flow measurement method and data presented shows widely variable flows occurring over short time increments that are not in keeping with established USGS stream flow measurement accuracy (DEIS figures 5-3, 5-4, and 5-5). This data and associated graphs are of no value and should not be presented to the public for DEIS review or for use in water availability assessment. Furthermore, this information should not be used as a basis for waste water treatment assessment.

- Bathymetric map information used by HRVR to establish lake water volume lacks supportive empirical lake depth data that is needed for reservoir water availability assessment. This information should be included in the DEIS prior to public review.

- Significant portions of the southern and northern fringe of Williams Lake support shallow rooted wetland vegetation that is of importance both ecologically and to the lake fishery present (see Photo 3). Because Williams Lake has a small watershed area with no and limited outflow for significant periods of time (see first bullet above), daily project development water withdrawals may "mine" the upper one to three feet of the lake surface, thereby degrading the established wetland and fishery.

- HRVR portrays the surface hydrology of much of the Fourth Lake and surrounding area as flowing toward Fourth Lake and then south-southwest toward the wetland west of Williams Lake and then southward toward Sawdust Road (DEIS Figure 5-1 – Major Watersheds and Drainage Patterns). This depicted surficial flow direction and related modeling are approximately 180 degrees off from the actual surficial flow direction that, in all but extreme flood conditions, does not occur. As depicted on HydroQuest GIS maps, surficial flow from the wetland west of Williams Lake splits and flows partially south-southwest and partially to the north-northeast into Fourth Lake. Photos 4 and 5 depict surface

flow west of Binnewater Road emerging from the culvert under Binnewater Road and flowing eastward into Binnewater Lake. This flow direction is opposite that depicted in a HRVR surface flow map. Because HRVR has incorrectly characterized surface flow directions, both their hydrology and water budget assessments must be completely redone before their DEIS can be provided to the public for review.

- As discussed in the bullet above, HRVR has incorrectly determined and portrayed the surficial flow direction of a significant portion of the watershed area that flows into HRVR property. Therefore, both their water budget and hydrogeologic characterization are in error. With the exception of extreme flood conditions, all surficial runoff incident to Fourth Lake enters it and is pirated into the underlying karst aquifer. Because Fourth Lake has no surface outflow route, except in the event of extreme flooding, it effectively operates as a large sinkhole. Lake water enters solution conduits present in the eastern portion of the lake and flows off-site to a down gradient spring location that HRVR has not yet assessed. Similarly, chemical contaminants associated with planned development in the Fourth Lake watershed will also enter the same groundwater flow system. Confirmation of the subsurface groundwater flow route requires assessment via tracer testing. This is an important component of the hydrogeologic study that requires completion.

- Relative to disappearing streams, such as a Coxsackie example found in the same carbonate beds as those present on the HRVR site and referred to by Dr. Ewers, HRVR states that "*No such karst related features have been found on the HRVR site.*" The loss of substantial quantities of water from Fourth Lake (i.e., **a disappearing lake**) provides irrefutable evidence of the karstic nature of the Williams Lake property. Recognition that runoff from throughout the Fourth Lake watershed enters subsurface solution conduits in carbonate bedrock is obvious. HydroQuest photos 6 and 7 show the level of Fourth Lake down approximately 10 feet. Photos 8 and 9, taken by Burmeister on October 26, 2003, depict the lake level down approximately 20 to 25 feet below flood level. Natural annual lake evaporation in the northeastern US, absent groundwater flux, is on the order of 10 to 20 inches (US Dept. of Commerce). Therefore, the loss of up to 20 plus feet of water from the surface of Fourth Lake in dry years provides solid documentation of subsurface flow loss via karstic solution conduits. It is highly likely that these conduits are within the Coeymans and Manlius limestones. **The daily loss of Fourth Lake water through karstic solution conduits is in the millions of gallons per day.** This high volume of rapid groundwater flow requires open solution conduit pathways. Clearly, HRVR's statements that "*such voids are inhibited by thinner bedding, deformation and faulting*" are erroneous. The karstic nature of the Williams Lake area is obvious to local residents who have observed low Fourth Lake levels for years and in the dramatic seasonal lake level declines. The HRVR hydrogeologic report needs to address the actual operating karst hydrogeology, confirm where this water goes via tracer tests, and

needs to address potential off-site, down gradient, impacts to receptors (e.g., surface water, wetlands, ecosystems, fauna and flora).

- HRVR and the public have previously seen photographs of a natural cave that is present near the southeastern terminus of Fourth Lake (Photos 10 and 11). Solutional pock marks or scallops on the walls of this cave provide further evidence of aggressive, turbulent, flow into this cave to an undocumented down gradient location. Tracer testing is required to determine where this water and the groundwater below the nearby planned housing development goes. The chemical plots provided by HRVR cannot be used to assess groundwater pathways and down gradient receptors. The hydrogeologic study needs to assess the site's karstic and non-karstic hydrogeology. This assessment should be conducted prior to issuance of a DEIS for public review.

- HRVR asserts that natural caves are not present on the Williams Lake property, instead concluding that "*the nature of these formations at the site due to thinner bedding, deformation, and faulting constrained the development of solution enhanced pathways and inhibited the significant growth of interconnected voids and caverns in these formations."* Statements such as this do not hold up in the face of physical evidence. Even a few examples observed during very limited site reconnaissance point out the need for greatly expanded hydrogeologic investigation throughout the site by experienced karst hydrologists. Evidence of conduit flow through three separate karstic conduits is presented here. The first is the steady, continuous, loss of millions of gallons of water per day from Fourth Lake (discussed above). Photos 12, 13, and 14 depict two streams sinking into carbonate bedrock on HRVR property. These are classic karst features. Again, the need for hydrogeologic assessment of the site and tracer studies to determine subsurface flow paths is accented.

- HRVR asserts that caves are not present on the Williams Lake property and cannot form due to thin bedding in bedrock, deformation, and faulting. Again, this reasoning does not hold up in the face of physical evidence. Photographs 15 and 16 depict "Mossy Cave" on HRVR property. Photo 15 has a 6 foot engineer's ruler upright in it. Note the actively flowing groundwater within Mossy Cave in photo 16. The flow in non-laminar (i.e., rapid and turbulent), as is typical of karstic groundwater flow. The subsurface conduit flow from Fourth Lake is of a similar nature, except that it occurs under conduit full flow conditions.

- Dr. Ewers used photographs of karst features from locations not directly on HRVR property. In large part, this is because he had limited access to photographs of karst features on HRVR property. However, as an expert in karst hydrology, Dr. Ewers recognizes that karst features may be expected throughout cave-forming geologic units, often tens or hundreds of miles distant from a particular site. This is borne out by numerous sinking streams, sinkholes, springs, and caves in carbonate beds throughout the region. The local karst hydrology has

been addressed by Rubin, Burmeister, and Folsom (2006, Karst Resource Management: Groundwater Protection and Developmental Considerations in the Kingston-Rosendale Aquifer System; Ulster County, N.Y.), as well as by Palmer and Rubin (2007: Karst of the Silurian-Devonian Carbonates in Eastern New York State, with emphasis on the Cobleskill Plateau; including a section on karst of the Hudson Valley) in professional papers and conferences. HRVR was aware of both of these karst papers but elected to not acknowledge them. Photo 17 depicts Salamander Cave which, like Mossy Cave, formed in upturned geologic beds just north of the HRVR site in Kingston. Similarly, Photo 18 depicts Surprise Cave formed in structurally upturned beds south of HRVR property in Mamakating. Cave development in structurally deformed regions, such as the Valley and Ridge, is well documented and commonly follows fault pathways for long distances. HRVR's assertion that folding and faulting are impediments to karst formation does not hold up to observed on-site karst development. Photo 19 depicts extension veins found proximal to a fault in an entrance area of Mossy Cave. The underlying understanding of karst hydrology in the HRVR DEIS is flawed and requires a new field effort by karst hydrologists as part of the DEIS hydrogeologic study preparation process.

- HRVR asserts that thinly bedded carbonates impede karst formation. Photos 20 (Mossy Cave) and 21 (a cave east of HRVR property) depict cave development in thinly bedded carbonates. In fact, the best cave forming bedrock unit, the Manlius Limestone, is recognized worldwide for its extremely thin "millimeter" beds. HRVR's arguments regarding thinly bedded, folded, and deformed carbonates used to assert that the hydrogeologic setting of the Williams Lake property precludes karst development is unfounded. As such, the entire hydrogeologic study needs to be redone.

- Part of the hydrogeologic investigation process contemplated in the ASTM standard is finding and assessing springs that represent the resurgence of groundwater issuing from conduits in carbonate bedrock. Springs are routinely used as water quality monitoring locations in karst and contaminant investigations. This basic component of assessing the hydrogeology of the Williams Lake property has not been addressed. Spring flow is commonly dynamic in nature, increasing in response to precipitation and runoff events. For example, such a response through a carbonate conduit can be observed in Honey Spring located south of HRVR property. Photo 22 shows Honey Spring during low flow conditions and Photo 23 shows the same spring under higher flow conditions. Closed sinkhole depressions, like the HRVR property sinkhole illustrated in Photo 24, can be significant contaminant sources when development is placed within or draining into them. Drainage into sinkholes infiltrates into underlying karst aquifers and eventually surfaces as spring flow. In locating karst springs, it is important to understand the bigger hydrogeologic picture that commonly extends far beyond individual site boundaries. This critical component of the HRVR hydrogeologic study, and related tracer studies, have not been conducted. This should be completed before a DEIS is issued for public review.

HRVR's opinion that the structural complexity of the site does not provide a favorable geologic setting for the development of vertical or laterally continuous dissolution pathways required for the development of karst systems does not hold up in the face of observable geologic and hydrologic features addressed both previously and in this letter. Furthermore, it is clear that no concerted effort was made to locate or recognize obvious karst features present on the HRVR property, including expansive sinkholes readily observable on USGS topographic maps. No inventory of karst features (e.g., sinkholes, sinking streams, caves, springs, voids encountered in boreholes) has been completed as would be needed in the early development of a conceptual hydrogeologic model that adequately describes the flow and transmission characteristics of the site under investigation (as contemplated in ASTM D5717-95). In addition, reports, letters, GIS maps, several public presentations documenting the presence of site karst features, and personal discussion with Tim Allred while looking at maps depicting site karst features were ignored. I recommend that the entire hydrogeologic study be redone by karst hydrologists who are provided with full site access.

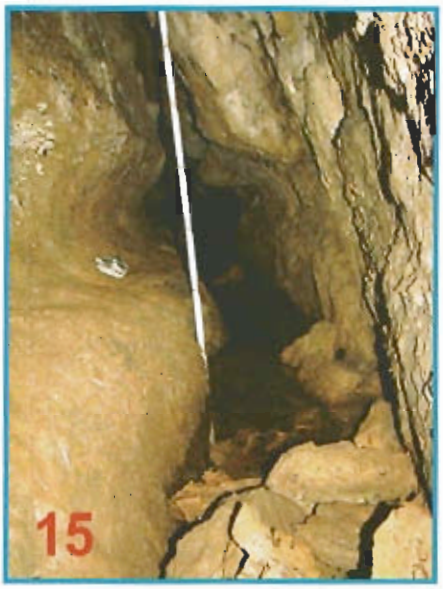
Sincerely yours,

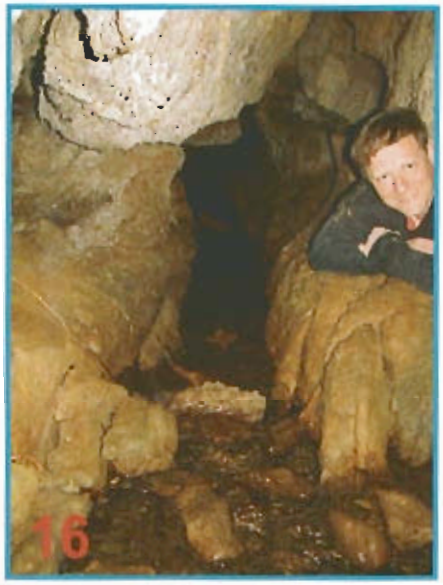
Paul A. Rubin

Paul A. Rubin
HydroQuest

HydroQuest Photocomposite 1

HydroQuest Photocomposite 2





HydroQuest Photocomposite 3

HydroQuest Photocomposite 4