

State of Vermont
Public Service Board

Joint Petition of Green Mountain Power Corporation,	)	Docket No. 7628
Vermont Electric Cooperative, Inc., and Vermont	)	
Electric Power Company, Inc. for a certificate of public	)	
good, pursuant to 30 V.S.A. Section 248, to construct up	)	January 7, 2014
to a 63 MW wind electric generation facility and	)	
associated facilities on Lowell Mountain in Lowell,	)	
Vermont, and the installation or upgrade of	)	
approximately 16.9 miles of transmission line and	)	
associated substations in Lowell, Westfield and Jay,	)	
Vermont	)	

**COMMENTS ON GMP'S PROPOSED CONTINUOUS SOUND MONITORING PLAN
BY DONALD AND SHIRLEY NELSON**

NOW COME Donald and Shirley Nelson, *pro se*, ("the Nelsons") and pursuant to Rule 59(e) of the Vermont Rules of Civil Procedure hereby submit the following comments on GMP's proposed continuous monitoring plan.

MEMORANDUM

1. Introduction

On September 25, 2013, the Public Service Board ("Board") issued a Procedural Order Re Continuous Noise Monitoring ("Order"), in which the Board gave Green Mountain Power (GMP) 90 days to further develop, "an agreement that would direct payments to the costs of continuous monitoring in lieu of the imposition of a civil penalty under Section 30."¹

¹ Sept. 25 Order, page 2

² There has been some confusion about the due date for these comments. In its 9/25/13 Order, the Board

A proposal was submitted on behalf of GMP by Resource Systems Group (RSG) on December 23, 2013.²

In our comments, we will outline a number of reasons why we believe the RSG proposal is significantly flawed. We offer alternatives for the Board to consider.

2. GMP's premature attempt to start monitoring

On December 30, more than a week before these comments were due, we received this email from GMP's Josh Castonguay.

From: "Castonguay, Josh" <Josh.Castonguay@greenmountainpower.com>
Sent: Dec 30, 2013 10:01 AM
To: Shirley and Don Nelson <ds-nelson@peoplepc.com>
Subject: Continuous Sound Monitoring

Dear Mr and Mrs Nelson:

As you have likely seen in our filing for Docket 7628 dated December 23, 2013, our recommendation is to conduct an extended monitoring period this winter, beginning in January 2014.

It would be preferable to conduct this monitoring on your property, in the same location that has been used for all previous monitoring periods, with the one potential change of moving the background monitor behind the house rather than the barn.

Before we make plans to place the equipment for additional time, we would like to confirm that you would be acceptable to this extended period of exterior monitoring.

Please do not hesitate to contact me by email (josh.castonguay@greenmountainpower.com<<mailto:josh.castonguay@greenmountainpower.com>>) or by phone 802-324-8359, with any questions.

Best Regards,
Josh Castonguay

² There has been some confusion about the due date for these comments. In its 9/25/13 Order, the Board stated that, "parties with standing on the issue of noise shall have 14 days in which to file comments on and recommendations in response to the report." In a letter accompanying the RSG report, GMP noted that comments on the proposal were due on January 8, 2014.

We did not respond to his email. We received GMP's proposed monitoring plan two days before Christmas and had not even looked at it.

In its cover letter of December 23, 2013 to the Board that accompanied the submission of the proposal for continuous monitoring, GMP wrote,

The Board's Order provides for comments on this report by January 8. GMP has decided, however, to implement this continuous sound monitoring plan at the Nelson farm beginning in early January and ending on April 1, in order to capture as much of the winter period as possible, and thereby provide reliable, continuous monitoring data through this entire period. At the conclusion of this period, GMP will file a report summarizing the data. GMP will provide an analysis of the data relating to any period in which a complaint was received by GMP. If requested, GMP will also provide direct reporting during times of any complaints by the Nelsons.

As noted above, GMP did not get our permission to do what it has "decided" it is going to do on our property. GMP is acting as though it can do whatever it wants on our property, and we wish to remind GMP and the Board that we still own our property and we have rights that we intend to protect. GMP is trying to jump the gun, implying it has an agreement with us.

We have not given permission to GMP to have RSG do the monitoring on our property that is proposed in their letter of December 23.

We are as interested as anyone in having the continuous monitoring start soon, and in fact we filed a motion with the Board in October 2013 asking for GMP to respond sooner than 90 days with its plan. Our request was denied. So this rush to get something going with RSG doing the monitoring, before we have had a chance to read the proposal and comment on it, is especially offensive to us.

3. The goal of the continuous monitoring

Based on what GMP wrote in its cover letter, as noted above, GMP seems to think the goal of continuous monitoring is to show that the wind project complies with the conditions of the CPG and does not violate the 45 dBA 1-hour Leq sound standard for exterior sound levels. GMP proposes to prove this by setting up unattended equipment on our property and letting it run for three months, and then submitting a report to the Board that includes analyzing the data. This approach does nothing to provide information that will help resolve the problems we and others are having with the regularly excessive sound levels coming from GMP's wind turbines.

GMP has repeatedly tried to make it seem like we are the only ones complaining and we are the only neighbors. We are the only ones who have been willing to participate in the difficult process the Board has set up to complain, but we are not the only people in our neighborhood complaining or getting sick from the wind turbine noise.

The goal of continuous monitoring should be to identify exceedances right away and require GMP to respond to them immediately. If the goal is to reduce impacts from exceedances, it makes no sense to log data for weeks and then produce a report months later. A response to any specific events under the circumstances GMP is suggesting would be impossible. We want absolutely nothing to do with that testing format. We want to see a system put in place that provides information on turbine sound levels and turbine output in real time, and when the turbines are

shown to be exceeding approved levels, to reduce the turbine output or shut them down right away.

4. RSG as consultant

We have been dealing with RSG for several years, since before the project was built. We watched them put monitoring equipment next to a stream, come up with background levels that were higher than Les Blomberg of Noise Pollution Clearinghouse found, and put background monitors next to our metal barn that screeches and groans and makes lots of noise. RSG puts their monitors too close to trees with leaves that flutter, and RSG excludes data without anybody overseeing what they are doing.

We listened to RSG testify in Board hearings that the sound levels at our home would be about 40 dBA, and we know from our own monitoring that the sound levels often go above 45 dBA for more than an hour. RSG's expert, Ken Kaliski, said he has only been to our house once since the turbines started operating, and he said he didn't hear the turbines. He didn't stop to talk to us.

RSG has never done attended monitoring, even though they were supposed to. RSG was also supposed to monitor the turbines at full output, but as far as we can tell they never have. RSG was supposed to pick times to monitor when the turbines would be the loudest, but they seem to pick times when the turbines are the quietest, except during hunting season when there is a lot more traffic and noise here. RSG was supposed to describe in their reports how NRO mode is working, but they have never done that in their reports.

Another thing we have noticed is that when RSG's monitoring equipment is here, the wind turbines are kept at a lower noise level. When RSG's equipment is here, people will come by and say "they're quiet" and we show them the noise monitors. As soon as the monitoring equipment goes away, we get 57 dBA. Everybody around here notices this, not just us.

Lowell Mountains Group, of which we are members, hired Les Blomberg of Noise Pollution Clearinghouse to present expert witness testimony in the GMP Lowell wind docket. In his prefiled testimony of November 7, 2010, he said,

...the [B]oard must ensure that GMP (and its ratepayers if the costs are passed on) is paying for usable data, and not worthless data. It is possible to design a monitoring program that produces only worthless data. The cost of designing an ineffective monitoring system includes risks to public health and a terrible waste of ratepayers' money. Tens of thousands of dollars could be spent collecting little or no usable data. Any investment in monitoring, in order to be prudent, must ensure that the monitoring provides usable data.

Our experience with RSG leads us to believe that GMP is using ratepayer money to pay for ineffective monitoring that has increased the risks to public health and produces useless data. The Board's responsibility to ratepayers should be a factor in deciding the most effective monitoring plan going forward.

For all these reasons, we do not have any confidence in the work being done by RSG. We do not trust the way RSG monitored background noise levels before the project was built, we do not trust the way RSG is placing its monitors, we do not trust the way RSG interprets its data, and since GMP is paying RSG, we know that RSG is working to please GMP and will do whatever GMP wants. RSG is not looking out for us at all. RSG's interest is to show that the impacts from GMP's project are as minimal as possible. We want the Board to put into place a continuous sound

monitoring plan that produces useful data and protects our health and our rights to the peaceful enjoyment of our properties.

5. The use of our property for monitoring

We no longer want to host RSG's or anyone else's noise monitoring equipment.

6. Continuous monitoring is necessary

RSG/GMP propose several options for continuous monitoring, including complaint-driven monitoring. Asking someone to go out in the middle of the night and press a button is impractical. GMP is asking us to police their operation. It should be their job. Even asking us to call when the turbines are loud intrudes into our personal lives. Monitoring should be done 100% of the time and it should be checked by an outside source. There should be immediate information available so that if it goes over the 45 dBA hourly average they will know it immediately. They can be alerted every time it goes over 45 dBA. GMP will hide that unless it is made available to somebody we can trust.

Continuous monitoring is especially necessary given that GMP has not yet installed the synchronous condenser which is expected to enable the project to operate at full capacity. GMP testified that the project would operate at 35.87% capacity factor³. It is currently operating at about 20%.

Lowell 2013 Capacity Factor

January	18%
February	21.8
March	16.7
April	16.2
May	22.3

³ [http://vce.org/2011-6-20_ALB-CFT_First_Comments_GMP_Filings\(7628\)](http://vce.org/2011-6-20_ALB-CFT_First_Comments_GMP_Filings(7628))

June	18.5
July	15.9
August	19.7
September	27.1
October	29.1
<u>November</u>	<u>21.3</u>

Average capacity factor for 11 months of 2013 = 20.06 %

Even with the well-publicized improvement of a transmission line in November, the capacity factor reached only 29%, which is below what GMP promises will be the full output. We are suffering badly now, with an average capacity factor for 2013 of only 20%.

Continuous monitoring is the only way to assure that the increase in power output enabled by the synchronous condenser installation does not result in even greater sound levels and greater harm to us and our neighbors.

7. Proposal by Ambrose and Rand

After the August Show Cause hearing about GMP's violation of its CPG over noise levels, we contacted noise control experts Stephen Ambrose and Robert Rand. They put together the following draft proposal at that time and are prepared to produce a more complete proposal:

Per your request, this presents a sound monitoring plan for the collecting noise level data at two residential receptors east and west of the Green Mountain Power wind turbines. The proposed four-instrument system will operate as two-unattended outdoor noise monitors and two-indoor/outdoor monitors. Each instrument will communicate with acoustic monitoring personnel via cell tower or in-home internet connection.

Two-outdoor noise monitors will be battery powered weatherproof instruments mounted on a pole in an open area with cell-tower communication. These units will be fitted with solar panels for recharging. Each unit will include temperature, wind speed anemometer and direction. The microphone assembly may include a heater and auto-calibration capability. This system is commonly used as for airport noise monitoring.

Two-indoor/outdoor noise monitors will be located in nearby residences in a room with an outside wall. One- weatherproof microphone will be outside the room and one inside to measure the OILR (outside to inside level reduction). These units will be ac-powered with battery backup. Indoor low frequency energy will be measured with microbarographs connected to a data logger.

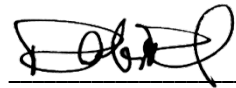
A hand-held sound level meter/analyzer will be purchased for supplemental measurements and time-history data logging. This instrument will be used exclusively for this project.

The estimated cost for the four-noise monitors, two-microbarographs and hand-held sound level meter is \$97,000. The man-hour estimate to setup and install is \$30,000. Once operational the monthly man-hour estimate is \$7,500.

Please feel free to call with any questions. Thank you,



Stephen E. Ambrose, INCE, Board Certified



Robert W. Rand, INCE

Robert Rand was one of the four acousticians who worked on the “Cooperative Measurement Survey and Analysis of Low Frequency and Infrasound at the Shirley Wind Farm in Brown County, Wisconsin”⁴. Stephen Ambrose is one of the experts participating in the Massachusetts DEP Wind and Noise Technical Advisory Group⁵. Ambrose and Rand are the authors of the “Bruce McPherson Infrasound and Low Frequency Noise Study”⁶. We trust Robert Rand and Stephen Ambrose and support having them manage the continuous sound monitoring, using the methodology outlined in their draft proposal.

⁴ http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=178263

⁵ <http://www.cbuiding.org/project/massdep-wind-turbine-and-noise-technical-advisory-group>

⁶ <http://randacoustics.com/wind-turbine-sound/wind-turbines-published-articles/the-bruce-mcpherson-ilfn-study/>

8. Type of equipment and project manager

On the subject of equipment companies with experience with continuous monitoring of wind turbines, RSG wrote on page 17 of its proposal, “The two exceptions are the Bruel & Kjaer and Rion directional microphone systems. These have, to our knowledge, never been used for continuous monitoring of wind turbines.” RSG is wrong. Bruel & Kjaer (B&K) *markets* their systems for use at wind turbine sites. Here is one example: <http://www.bksv.com/doc/bn0812.pdf>. They can use Type 4193 microphones which go down to 1 Hz.

For remote monitoring the equipment needs to include audio to monitor (listen to) the audio feed from the system to evaluate what is contributing to the sound level. The B&K single-microphone setup appears to meet the requirements of the GMP project, and is shown at the top of RSG's equipment listing in the back of their report.

As an example of B&K's service, here is the web link for the Denver Airport: <http://webtrak.bksv.com/den>. It shows real time 1-second sound levels on screen, and according to Robert Rand, there is much more data available through the contract arrangement.

Robert Rand is currently talking to B&K about setting up continuous monitoring at another wind turbine location. He is prepared to provide a complete proposal for the Lowell Mountain GMP wind project for the Board to consider.

We want to point out the difference between RSG's feasibility study and the options they lay out, and what you can see is possible, for instance at the Denver Airport. RSG's proposal ignores current technology that makes it possible to see

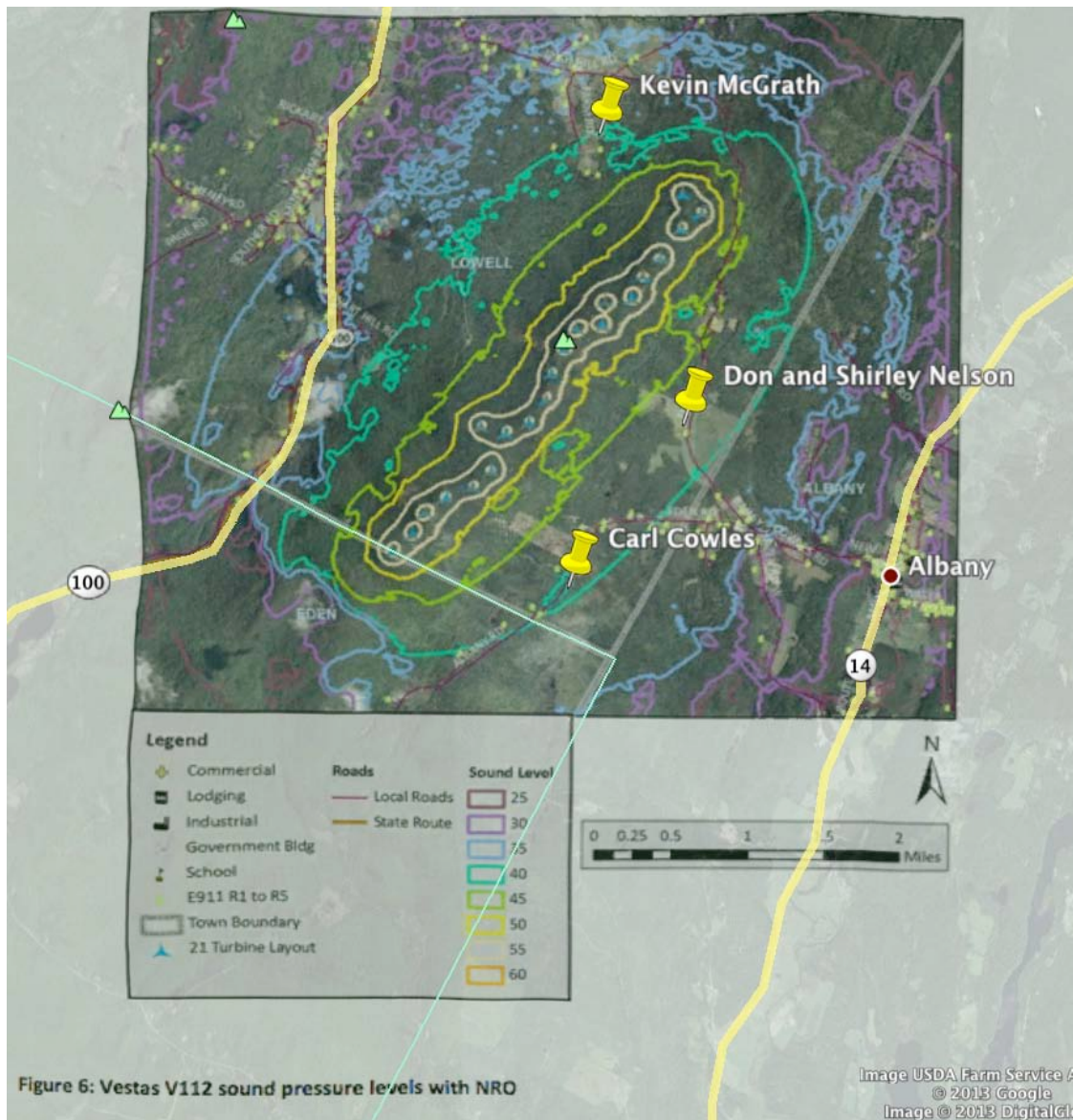
real time data on a website, to hear real time audio remotely, and at the same time see the SCADA turbine output data. In RSG's view of continuous monitoring, everything would be unattended, data would be logged and stored and evaluated later, which is very time-consuming and expensive.

The system that Robert Rand and Steve Ambrose are able to set up and monitor will provide the operator in the control room, the project manager, and an independent third party reviewer with the ability to see in real time what is happening and respond immediately to noise levels that exceed the standards set by the PSB. RSG's approach makes a lot of money for that company and enables GMP to keep operating the turbines at high noise levels, with violations identified weeks or months later. RSG's approach makes no sense if the goal is to protect public health and safety.

We hope the Board will take seriously our request to hire Robert Rand and Stephen Ambrose instead of RSG. This could be accomplished by the Board or the Department hiring them, billed back to GMP, if it is not possible for the Board to require GMP to hire a different firm. Throughout this experience with the Lowell wind project, GMP has been able to dictate to the Board the technologies and procedures that have been put in place. Our quality of life and health have been harmed by the standards and protocols the Board has approved. We would appreciate it if, in this instance, the Board would show the neighbors of the Lowell wind project some respect and approve the continuous monitoring plan that we support and trust.

9. Monitoring locations

Carl Cowles and Sandra Waterman of Lowell are agreeable to hosting the continuous monitoring system, including interior monitoring with audio. Please see their letter which is included as Attachment A. The map below shows the locations of the Cowles/Waterman homes, Kevin McGrath's home, and our home. Kevin McGrath is agreeable to hosting the monitoring equipment on the west side of the mountain. These two locations should be sufficient.



10. Infrasound and Interior monitoring

We are aware that the Board dismissed the relevance of infrasound when it issued the CPG. Page 100 of the CPG says, “The Petitioners have demonstrated wind turbines are not likely to emit audible or perceivable infrasound.” We also realize that the Board has not required interior monitoring, but instead was persuaded by RSG that an inside/outside test (which we understand is very intrusive) is appropriate. We ask the Board to include monitoring for infrasound and interior monitoring as a remedial step, as allowed for on Page 178 of the CPG which says,

40. In the event noise from operation of the proposed project exceeds the maximum allowable levels, the Petitioners shall take all remedial steps necessary to bring the sound levels produced by the turbine(s) into compliance with allowable levels, including modification or cessation of turbine(s) operation.

This condition means the Board can require GMP to make modifications. We believe that infrasound is part of what is making us sick, and needs to be evaluated. Interior monitoring is the logical way to determine interior noise levels so neighbors can sleep without being awakened. We are grateful to Carl Cowles and Sandra Waterman for being willing to host this equipment.

11. SCADA data

RSG neglected to outline a SCADA data review process that provides real-time and review data to a neutral (non-RSG or GMP) observer. SCADA data should be made available daily or real-time to a neutral observer. Real-time tracking from each turbine would give a much better understanding as to what is going on. It would also make power manipulations much more transparent.

12. LIDAR or SODAR

RSG neglected to include a SODAR or LIDAR in their proposal. Such a device is necessary to track wind shear from the valley floor or neighbor elevations up through the wind turbine elevations. This is a serious omission if they are serious about wind shear.

13. Independent Third Party Monitor

We suggest that an independent monitor from the Public Service Department should have authority over operations including SCADA data. Allan St. Peter who is an engineer at the PSD is someone we would be okay with in this role. One way to promote transparency would be if the system monitors the sound levels and computes the 10-minute level each minute, and issues notification by e-mail when levels are over limit in any 10-minute period. This would serve to alert the independent monitor to watch for a violation of the 1-hour standard.

14. Attended monitoring, staffed full time

RSG has come up with a very expensive proposal. Maybe their goal was to present something so expensive that the Board would reject the idea of continuous monitoring. For the same total quoted by RSG, the Board could require an attended system staffed full time, with well paid employees. GMP could rent a very nice house in the neighborhood, it could pay three individuals (3 x 8 hour shifts) \$40 an hour to monitor in person continuously, plus purchase all the equipment, and the cost would be in line with what RSG is suggesting it will cost to set up their machines and do unattended monitoring. As an example:

8760 hours x \$40 =	\$350,400
Equipment	100,000

Rental @ \$2000/mo	24,000
Total	\$474,400

15. Background noise

RSG has made a big point about the importance of background noise and shutting down the turbines. RSG is over-complicating the issue. Evaluating background noise would only need to take place when the monitors show readings of above 45 dBA for an hour, and/or people are calling and complaining. Only then do you shut down the turbines, and then bring them back up after 20 minutes.

With permanent monitors with audio recording and live audio monitoring available, a 20-minute shutdown for background can be ordered on the spot, if there is the authority to make that happen. The independent monitor can review data, and the permanent monitor is logging data that can be studied further,

That will give independent monitors a chance to determine the background levels, and is a far cry from shutting turbines down every six hours as RSG is suggesting has to happen.

16. Technology Issues

The biggest technology challenge for effective monitoring and data collection is connectivity, either by cell service, satellite, or internet. Carl Cowles and Sandra Waterman are agreeable to putting in place whatever connectivity solutions are necessary to make this work. They get AT&T cell service which would need to be evaluated to see if it could work, and if not, another system could be installed. However, their existing cell service may be sufficient.

17. Conclusion

For the foregoing reasons, the Board should require an independent firm, not RSG, to implement continuous full spectrum interior and exterior monitoring in two locations around the Lowell Mountains GMP wind turbine project as soon as possible.

Dated at Lowell, VT this 7th day of January, 2014.



Donald Nelson



Shirley Nelson

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