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Supporting Arguments for Noise Study

Summary of Current Situation:
FirstLight has rejected our request for a Noise Study, and upon appeal continues to resist doing a study to determine if their operation is making any noise that can be heard by its neighbors. A determination from FERC on our appeal is forthcoming. Mr. Hogan has asked us to submit further data, and has indicated it is proper to respond to FirstLight's reasons for rejection. We submit these arguments and data in support of a determination to do the study.

Overall Argument:
Our main argument is that in 2010, we started hearing noises we have not heard before. We live approximately 1 mile from the mountain, on the next line of hills. The noises we hear generally occur in the middle of the night and wake one or both of us. A pilot table of data from 2/11/13 to 4/17/13 has both confirmed coincidence of the sounds with Northfield Mt. operation (please see our presentation submitted by FirstLight as additional documentation 6/28/13---the confirmation of equipment running in the table on page 6 were submitted to us and Mr. Hogan by email by Mr. John Howard on 4/23/13).

We are asking FirstLight to do further study to determine if the noises we heard during and outside this period of time are created by them.

Responses to First Light's Stated Reasons to Reject our Requested Noise Study:
1.
FL (FirstLight): "...no other allegations of noise disturbance have previously been made since the plant went into service in 1972." (source: Northfield Mountain Pumped Storage Project (No. 2485) and Turners Falls Hydroelectric Project (No.1889) Updated proposed study plan, page 4-20)

Response: While it may be true that no noise complaints have reached FL, there have been noises heard by or reported to at least 2 other entities:
a) Our nearest neighbor, Bob English, has heard similar humming noise from the mountain since about the same time (2010) (source used with permission: private email communication 11/2/11).
b) The Town of Erving has received noise complaints about the mountain by residents of Erving who live near the mountain (source: member of Erving Conservation Commission, in-person conversation 6/30/13).

We feel doing a more complete survey of our neighbors may reveal other sources, as FL has not ever to our knowledge done a study to ask if anyone hears anything. *According to our research, we are not the only ones who hear noises coming from the mountain.*

2.

FL: "Due to the location of plant infrastructure deep inside of a mountain, FirstLight does not believe noise levels related to Project operations are at a level outside of the plant that could negatively impact the quality of life of Project neighbors. FirstLight believes the mountain, which the plant is located inside of, acts as a natural insulator of noise. This belief has been confirmed by FirstLight personnel who work outside of the mountain and have not heard excessive noise levels during Project operations." (source: Northfield Mountain Pumped Storage Project (No. 2485) and Turners Falls Hydroelectric Project (No.1889) Updated proposed study plan, page 4-20)

Response: Some of the project is deep within the mountain, and some is not. The project includes extensive waterways including a tailrace tunnel that exits into the river and carries many tons of water at high rates of speed, and an open air reservoir.

Secondly, the undocumented testimony of FirstLight employees who, in the course of their work, did not hear "excessive noise levels," is not a good indication of what is heard by neighbors trying to sleep in the middle of the night adjacent to the mountain. The Massachusetts Department of Environmental Protection (DEP) regulations on noise emphasize the effects on others outside the property line:

> "The MassDEP noise pollution policy describes criteria that MassDEP uses to evaluate noise impacts at both the property line and the nearest occupied residence or other sensitive receptor. When noise is found to be a nuisance or a threat to health, MassDEP requires the source to mitigate its noise.
>
> Noise levels that exceed the criteria at the source's property line by themselves do not necessarily result in a violation or a condition of air pollution under MassDEP regulations (see 310 CMR 7.10 U). **The agency also considers the effect of noise on the nearest occupied residence and/or building housing sensitive receptors** [emphasis added]. " (source: http://www.mass.gov/eea/agencies/massdep/air/programs/noise-pollution-policy-interpretation.html; accessed 7/2/13)

The speculation by FirstLight that all aspects of its operations are fully insulated by some of them being contained by the mountain is not definitive proof they are not making sounds heard by others elsewhere.

3.

FL: "Finally, even in the event noise levels were found to be audible to Project neighbors, PME measure would a) not be possible, or b) be far too expensive to be feasible." (source: Northfield Mountain Pumped Storage Project (No. 2485) and Turners Falls Hydroelectric Project (No.1889) Updated proposed study plan, page 4-20)

Response to Part a): This response does not take into consideration the important fact that no bothersome noises were heard before 2010. We believe that since we did not hear

noise before 2010, it is completely possible that FirstLight has, since 1972 until recently, operated in such a way that they do not make noise, and could do so again.
Here is a list of changes that have occurred at the mountain since 2010 that we know about, some of which are related to future changes the mountain wishes to make in its operations. There could be other changes we don't know about as well, but at least this list indicates somewhere to start investigations:

a. On May 5, 2010 (source: conference call 4/23/12 with John Howard, Ken Hogan, et al and Lisa McLoughlin and Warren Ondras), the mountain discharged a large amount of sludge into the river. This affected all operations downstream of the reservoir (basically everything in the project) and required massive cleanup. The full affects of this event on the project and its equipment are not known to the public. We assume that given the high rate of speed and volume of water moved, even a small injury to mechanical equipment or change in the shape of the tunnel could cause new vibrations or sounds.

b. The Project installed new equipment: unit 3 in 2011, unit 2 in 2012 (source: Mr. John Howard, open meeting 6/12/13). This development is especially important to study because the relicensing asks for more new equipment which may be similar to these.

c. Existing equipment has developed problems: currently unit 1 is being studied for reduced shear pin life on its wicket gate, possibly due to excessive vibrations (source: additional information submitted by FirstLight to Secretary Bose 6/28/13).

d. A solar array was installed over the tailrace area. This involved cutting down trees and other foliage adjacent to the tracks which may have reduced noise pollution from the mountain and/or from trains. (source: direct observation)

Response to Part b): The refusal states that the remedy would be too expensive. At this point it is impossible to tell if it would be too expensive to change noise levels because no one even knows what is causing them. This is exactly why a study is needed. All causes would not necessarily generate the need for expensive solutions. For example, if the sounds are trains or water exiting the tailrace that we hear more loudly because they cut the tree buffer to install solar panels, correcting this could be as easy and inexpensive as planting trees.

In short, many changes at the mountain have occurred since 2010 when the noise problems began. We would like to know if the noises we hear have to do with these changes, and if they do, we would like the mountain to operate in a way that does not cause or exacerbate them further----as it did prior to 2010.

4.
FL: "Moreover, contemporaneously with the filing of this Proposed Study Plan, FirstLight is filing in the project docket supplemental information which it believes shows there is no connection between the very localized noise associated with operation of the turbines and the noises heard by the requesters. " (source: Northfield Mountain

Pumped Storage Project (No. 2485) and Turners Falls Hydroelectric Project (No.1889) Updated proposed study plan, page 4-20)

Sources submitted by FirstLight include: 1) a letter to Secretary Bose 6/28/13, 2) "communications between the United States Air Force and FirstLight concerning a study to measure surface vibration from the Project's underground pump generators", 3) "a memorandum to FirstLight from Douglas Leubner, MSME, who recently conducted vibration analyses for FirstLight in connection with a maintenance issue," and 4) our presentation made at the 6/12/13 study plan meeting.

Response: We have reviewed the supplemental information, and believe it does not conclusively prove that FirstLight is not making the noises we have been hearing. The data is not comprehensive. For example, it does not cover the range in which we hear many of the noises, and it does not address the issue of noises heard outside the property boundaries.

Since FirstLight does not make specific arguments about why this information proves their case, we have nothing specific to respond to. So we will briefly outline some of our own points:

a. In the 6/28/13 letter to secretary Bose, last paragraph, FirstLight argues we live "a very substantial distance from the deep underground pump generators." We feel this statement is misleading in 2 ways. First, we live about a mile from the entire facility, on top of the next line of hills (that FirstLight knows this is confirmed by John Howard's email to John Curtis of 5/7/13, submitted with the supplemental documents to Secretary Bose on 6/28/13). We believe this falls short of "a substantial distance." Sound carries, and we hear other sounds from the same area including trains, lawn mowing, and occasional trucks. Secondly, we object to the attempt to limit the scope of the mountain's operations to "deep underground pump generators" when sounds could be coming from any aspect of project operation, including parts not deep underground.

b. Responding to the content of Supplemental Material "communications between the United States Air Force and FirstLight concerning a study to measure surface vibration from the Project's underground pump generators":

These emails between Mr. John Howard and Air Force personnel are to do with the Air Force's study of "geophysical activity in the ground surrounding the underground pump generators." (source: Memorandum for Northfield Mountain Station Manager 3/18/10). This study measured vibrations associated with turbines at 60hz and 90hz. It is not stated if other frequencies were detected from the turbines or from other sources. In addition, these studies were done right over the turbines, not at any other locations. The communications don't directly answer the question: could the turbines be making noises heard by others in another location, even though Mr. Howard's original email specifically asks for that information.

c. Responding to the content of Supplemental Material "Memorandum to John S. Howard, FirstLight, From Douglas Leubner, HydroExpertise USA, June 26, 2013":

The statement by Mr. Leubner directly addresses the question asked by Mr. Howard: "What frequencies would you expect could be picked up from our rotating machinery?" This question in itself is asking for speculation. In answering it, Mr. Leubner does speculate that the equipment should not make noises in the ranges we had previously measured. We have 2 responses to this. First, it is not conclusive to say that something shouldn't be making noises. We are asking for this to be measured.

Secondly, Mr. Leubner concludes that vibrations should occur in the 90 Hz and 30 Hz ranges. Further recording does show noises in this range---please see table attached.

In short, we believe this test, which was prompted by an excessive vibration, does not answer our questions, but does show that problems with vibration exist within the mountain's equipment, and that some of our recorded sounds are at the frequencies to be expected to be outputted by project machinery.

Conclusion:

Our data collection and analysis has shown that:

1) The mountain did not make any noises bothersome to us before 2010.

2) Currently, noises do in fact exist---they have been measured and are found to be louder nearer the mountain, while the same sounds simultaneously reach us on our hill about 1 mile away.

3) Some of the noises we hear are within the range that engineers expect the mountain's equipment to produce.

4) Many changes occurred in the operation of the mountain in 2010 including: new equipment, malfunctions with existing equipment, and the elephant in the room---the landslide within the holding basin that affected everything downstream of it.

5) Neither our neighbor's generator (see our presentation 6/12/13 page 6) nor noises from the power lines (source: email from WMECO 6/21/13) can account for these noises.

6) We are not the only people who hear noises (Page 1 of this document, #1).

In short, a study is needed because no one knows if the noises are coming from changes made at FirstLight since 2010. Relicensing includes making more changes that are likely to affect noise level in the same way, being of a similar nature to expand capacity, and so they are relevant to this relicensing process. Please approve a process for studying if FirstLight's operations are creating noise bothersome to its neighbors. Thank you.

Correlated sounds at house and end of tailrace
Night of June 9, 2013
(Times are approximate)

Start Time	End Time	Duration	Frequencies	Characteristics
6/10/13 12:31 AM	6/10/13 4:02 AM	3:31:00	42, 45	steady tones, intermittent periods
6/10/13 6:43 AM	6/10/13 6:56 AM	0:13:00	10	steady tones, intermittent periods
6/10/13 6:45 AM	6/10/13 6:49 AM	0:04:35	78	steady tones, intermittent periods
6/10/13 1:03 AM	6/10/13 1:05 AM	0:01:30	80-100	short wavering tones
6/10/13 1:16 AM	6/10/13 1:17 AM	0:01:25	50-100	up/down bands
6/10/13 1:55 AM	6/10/13 2:00 AM	0:05:04	50-100	up/down bands
6/10/13 3:25 AM	6/10/13 3:27 AM	0:01:52	100	wavering tone
6/10/13 3:35 AM	6/10/13 4:15 AM	0:39:56	60-110	up/down bands
6/10/13 4:29 AM	6/10/13 4:39 AM	0:10:00	40-90	wavering tones
6/10/13 4:35 AM	6/10/13 4:41 AM	0:06:00	100-55	single descending log slope (like a plane, but only one frequency)
6/10/13 5:57 AM	6/10/13 5:59 AM	0:01:32	20-200	broad noise
6/10/13 6:28 AM	6/10/13 6:32 AM	0:04:00	10-400	broad noise with descending tones (large planes?)
6/10/13 6:45 AM	6/10/13 6:53 AM	0:08:00	20-200	descending log slope bands (planes?)

Other instances of similar sounds at house

Start Time	End Time	Duration	Frequencies	Characteristics
5/26/13 12:16 AM	5/26/13 7:27 AM	7:11:10	42 Hz steady	Consistent
5/27/13 12:35 AM	5/27/13 2:46 AM	2:11:00	90 Hz	intermittent
5/27/13 12:35 AM	5/27/13 7:20 AM	6:45:42	42 Hz steady	present all night at varying volumes
5/27/13 12:37 AM	5/27/13 12:46 AM	0:09:02	90 Hz	intermittent, then louder

5/27/13 1:43 AM	5/27/13 1:45 AM	0:01:52	100/150/200	loud, wavering bands
5/27/13 2:42 AM	5/27/13 2:43 AM	0:00:29	325/440/460	train whistle
5/27/13 2:40 AM	5/27/13 3:32 AM	0:52:00	50-170	parallel bands, holds at varying pitches for 30-60 seconds
6/1/13 10:07 PM	6/1/13 10:08 PM	0:01:52	58, 120, 180	loud, with smooth log descent from 80, 160, 260 - different from plan
6/1/13 10:07 PM	6/1/13 11:07 PM	1:00:09	59	steady 59 Hz
6/1/13 10:10 PM	6/1/13 10:25 PM	0:14:47	120	louder than constant background
6/1/13 10:07 PM	6/2/13 6:45 AM	8:38:55		clusters of bands 38-45, 76-79, 86-88
6/1/13 11:54 PM	6/2/13 4:25 AM	0:00:03	121	8 bursts of 3-5 seconds; two were 40 seconds apart
6/4/13 12:29 AM	6/4/13 12:56 AM	0:27:51		up/down bands (train?)
6/4/13 6:55 AM	6/4/13 8:52 AM	1:56:35	90 Hz	
6/4/13 12:29 AM	6/4/13 8:52 AM	8:23:23	30, 45 Hz	consistent
6/4/13 12:29 AM	6/4/13 4:59 AM	4:30:00	34, 41 42 Hz	fade in and out
6/4/13 4:59 AM	6/4/13 8:52 AM	3:53:23	35	fade in and out
6/11/13 1:13 AM	6/11/13 3:17 AM	2:04:00	5.5 Hz	
6/11/13 12:29 AM	6/11/13 4:55 AM	0:21:00	15 Hz	intermittent
6/11/13 12:09 AM	6/11/13 6:46 AM	6:37:41	42, 45, 49 Hz	intermittent
6/11/13 12:45 AM	6/11/13 3:10 AM	2:25:00		up/down bands
6/11/13 4:37 AM	6/11/13 5:25 AM	0:48:00		up/down bands
6/12/13 12:10 AM	6/12/13 4:20 AM	4:10:00	43, 46, 49 Hz	fade out
6/12/13 12:10 AM	6/12/13 3:14 AM	3:04:00	23 Hz	occasional
6/12/13 6:29 AM	6/12/13 9:00 AM	2:30:46	90	fairly constant
6/12/13 6:52 AM	6/12/13 7:20 AM	0:28:00	45	
6/15/13 10:22 PM	6/16/13 12:07 AM	1:45:00	41 and 42 Hz	
6/16/13 5:34 AM	6/16/13 8:35 AM	3:01:47	39 and 42 Hz	
6/16/13 2:33 AM	6/16/13 2:44 AM	0:11:00	60-120	wavering, intermittent

6/16/13 2:40 AM	6/16/13 3:34 AM	0:54:00	45-165	bands at 7 Hz steps, slight waver, loudest at 90 and 113
6/16/13 9:36 PM	6/17/13 7:38 AM	10:02:16	11 Hz	intermittent during the entire recording
6/16/13 9:36 PM	6/17/13 7:38 AM	10:02:16	39, 42, 45	intermittent during the entire recording
6/17/13 12:16 AM	6/17/13 6:12 AM	5:56:00	30 Hz	intermittent
6/17/13 6:30 AM	6/17/13 7:38 AM	1:08:16	30 Hz	louder, steady
6/17/13 12:52 AM	6/17/13 1:37 AM	0:45:00	60-120	up/down bands, loud
6/17/13 10:49 PM	6/17/13 10:52 PM	0:02:37	50-600	smooth descending bands (probably small plane)
6/17/13 11:15 PM	6/17/13 11:16 PM	0:01:29		broadband and descending bands (probably large plane)
6/17/13 11:24 PM	6/17/13 11:29 PM	0:04:56		three more prob large planes
6/18/13 12:22 AM	6/18/13 6:19 AM	5:57:00	40-120	up/down bands, intermittent
6/18/13 12:34 AM	6/18/13 12:34 AM	0:00:26		train whistle
6/18/13 1:31 AM	6/18/13 1:32 AM	0:00:28		train whistle
6/18/13 1:54 AM	6/18/13 1:54 AM	0:00:11		train whistle
6/18/13 12:59 AM	6/18/13 4:55 AM	3:56:00	11	intermittent

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