



Northfield Mountain Station
99 Millers Falls Road
Northfield, MA 01360
Ph: (413) 659-4489
Fax: (413) 659-4459
Internet: john.howard@gdfsuezna.com

John S. Howard
Director- FERC Hydro Compliance

June 28, 2013

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Northfield Mountain Pumped Storage Project, FERC Project No. 2485
Turners Falls Hydroelectric Project, FERC Project No. 1889
FirstLight Submittal of Information Concerning Request for Noise Study

Dear Secretary Bose:

FirstLight Power Resources' Proposed Study Plan (PSP) for the Northfield Mountain Pumped Storage Project does not include a requested study of noise from operation of the Project (PSP Section 4.4). FirstLight does not believe there is any nexus between noises the study requesters have heard and operation of the Project, as previously explained in the PSP.

FirstLight is submitting for the record additional information concerning this matter, specifically: (1) communications between the United States Air Force and FirstLight concerning a study to measure surface vibration from the Project's underground pump generators; (2) a memorandum to FirstLight from Douglas Luebner, MSME, who recently conducted vibration analyses for FirstLight in connection with a maintenance issue; and (3) the presentation made by Warren Ondras at the June 12, 2013, study plan meeting.

FirstLight believes the first two documents support FirstLight's conclusion that there is no evidence of any nexus between operation of the Project and the noises that the study requesters, who live a very substantial distance from the deep underground pump generators, are hearing.

If you have any questions, or need additional information, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "John Howard", is written over a white background.

John Howard

Attachments

Cc: Distribution List

Attachment 1

**Emails between John Howard, FirstLight Power Resources,
and US Air Force regarding surface vibration studies (May 8-17, 2013)**

**Memorandum for Northfield Mountain Station Manager
Department of the Air Force
Air Force Reseach Laboratory
March 18, 2010**

Howard, John

From: PACLEB, CURTIS W Capt USAF 10 AF/TMN [curtis.pacleb@us.af.mil]
Sent: Friday, May 17, 2013 12:34 PM
To: Howard, John
Subject: RE: Northfield Mountain - Massachusetts

Hi John,

The frequencies we detected that seemed to be associated with the turbines were 60hz and 90hz. Please let me know if you need more information.

Curt

-----Original Message-----

From: Howard, John [mailto:John.Howard@gdfsuezna.com]
Sent: Monday, May 13, 2013 7:30 PM
To: PACLEB, CURTIS W Capt USAF 10 AF/TMN
Subject: Re: Northfield Mountain - Massachusetts

Curt

Thank-you for responding. Would you be able to tell me the frequency of the vibrations your equipment sensed?

John

On May 8, 2013, at 8:15 AM, "PACLEB, CURTIS W Capt USAF 10 AF/TMN" <curtis.pacleb@us.af.mil> wrote:

> Hi John,

>

> We were doing our measurements right above the turbine area in a fenced in area. We could not feel it or hear it ourselves, but our equipment could sense the vibrations.

>

> We'll be glad to help where we can. What kind of information were you looking for? Also, I did leave the shop back in 2011. The lead scientist may have continued work on it and may be able to provide more information. His name is Frank Clark and he now works at Aerodyne in Bedford Massachusetts.

>

> Regards,

>

> Curt Pacleb

>

> -----Original Message-----

> From: Howard, John [mailto:John.Howard@gdfsuezna.com]

> Sent: Tuesday, May 07, 2013 11:19 AM

> To: john.holbrook@us.af.mil; PACLEB, CURTIS W Capt USAF 10 AF/TMN

> Subject: RE: Northfield Mountain - Massachusetts

>

> John or Curtis -

>

>

>

> I am contacting you to request any information you might be able to provide me in regards to your "surface vibration" study conducted at Northfield Mountain. I am requesting in reference to a complaint I received (first ever) from a resident living approximately one mile north of the project's upper reservoir. The complaint is hearing the noise of our pumped - turbines in that they create a deep humming or throbbing noise and is requesting we study "noise, infrasonic pressure or vibration." Any information you could provide to help me better understand this issue, if there is one, would be appreciated.

>

>

Howard, John

From: PACLEB, CURTIS W Capt USAF 10 AF/TMN [curtis.pacleb@us.af.mil]
Sent: Wednesday, May 08, 2013 8:15 AM
To: Howard, John
Subject: RE: Northfield Mountain - Massachusetts

Hi John,

We were doing our measurements right above the turbine area in a fenced in area. We could not feel it or hear it ourselves, but our equipment could sense the vibrations.

We'll be glad to help where we can. What kind of information were you looking for? Also, I did leave the shop back in 2011. The lead scientist may have continued work on it and may be able to provide more information. His name is Frank Clark and he now works at Aerodyne in Bedford Massachusetts.

Regards,

Curt Pacleb

-----Original Message-----

From: Howard, John [mailto:John.Howard@gdfsuezna.com]
Sent: Tuesday, May 07, 2013 11:19 AM
To: john.holbrook@us.af.mil; PACLEB, CURTIS W Capt USAF 10 AF/TMN
Subject: RE: Northfield Mountain - Massachusetts

John or Curtis -

I am contacting you to request any information you might be able to provide me in regards to your "surface vibration" study conducted at Northfield Mountain. I am requesting in reference to a complaint I received (first ever) from a resident living approximately one mile north of the project's upper reservoir. The complaint is hearing the noise of our pumped - turbines in that they create a deep humming or throbbing noise and is requesting we study "noise, infrasonic pressure or vibration." Any information you could provide to help me better understand this issue, if there is one, would be appreciated.

Regards - John

John S. Howard

Director FERC Hydro Compliance

GDF SUEZ Energy Generation NA, Inc.

FirstLight Power Resources, Inc.

FirstLight-S_GS_Pcopie

Tel: (413) 659-4489

Cell: (413) 237-5642

Fax: (413) 422-5900



DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY (AFRL)

18 Mar 10

MEMORANDUM FOR NORTHFIELD MOUNTAIN STATION MANAGER

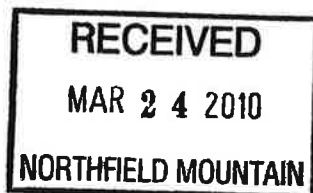
FROM: AFRL/RVBY
29 Randolph Road
Hanscom AFB MA 01731

SUBJECT: Request for site visit

1. The Air Force Research Lab is interested in doing a study at the Northfield Mountain Station. Specifically, we are interested in geophysical activity in the ground surrounding the underground pump generators. Our goal is to measure the surface vibration of the ground above the generators.
2. To accomplish this task, we need to take surface readings, when the generators are on and when they are off, over a period of two to five days. We also need to know some basic information about the pumps including how many revolutions per minute each pump generator operates at.
3. I understand that your pumps will not be in operation through most of May. We can do the measurements after that, but I would like to send a few of my staff to conduct a preliminary site visit in the near future. It would also be very helpful if they could meet with one of your resident experts to discuss how the pump generators operate. I understand that the area is secure and access to certain locations may be limited.
4. Lt Curt Pacleb of my staff is the point of contact for the site visit and geophysical study. Please let him know if and when a preliminary site visit is convenient for you. He can be reached at curtis.pacleb@hanscom.af.mil and 781-377-8315. I appreciate your support for this important study by the Air Force Research Laboratory.

A handwritten signature in black ink that reads "John C. Holbrook".

JOHN HOLBROOK
Acting Chief, Battlespace Surveillance Innovation Center
Battlespace Environment Division



Attachment 2

**Memorandum to John S. Howard, FirstLight,
From Douglas Luebner, HydroExpertise USA
June 26, 2013**



June 26, 2013

John S. Howard

Director FERC Hydro Compliance
GDF SUEZ Energy Generation NA, Inc.
FirstLight Power Resources, Inc.

Re: What frequencies would you expect could be picked up from our rotating machinery?

Dear John:

You asked me what frequencies I would expect to be picked up from the rotating machinery at Northfield Mountain. I have a Masters in Mechanical Engineering and a certified Level II Vibration Analyst and have been providing noise and vibration analysis services for 27 years.

I am currently involved in recording and analyzing wicket gate vibration on the Northfield Unit 1 turbine generator in order to determine the vibration that may be contributing to reduced wicket gate shear pin life. The vibration instrumentation being used is capable of measuring vibration between 0.5 Hz to 2000 Hz and is installed at a location where vibration from rotational and hydraulic forces can be measured. Vibration was recorded during generate and pump operations during the past two weeks in an effort to identify vibration amplitudes and frequencies at different operating conditions. In regards to your question I can offer the following:

- **Generate Mode** – When the Northfield units are generating they show multiples of 30 Hz with the 90 Hz harmonic having the highest amplitude. The 30 Hz vibration frequency relates to pump turbine vane pass frequency ($7 \text{ blades} \times 257 \text{ rpm}/60 \text{ rpm}/1 \text{ Hz} = 30 \text{ Hz}$) and the 90 Hz vibration frequency relates to interaction between thrust bearing shoes and thrust runner split [$12 \text{ thrust shoes} \times 2 \text{ (runner split)} \times 257 \text{ rpm}/60 \text{ rpm}/1 \text{ Hz} = 90 \text{ Hz}$]. I would expect 90 Hz vibration to be the most significant since the thrust bearing supports the entire weight of the approximate 600 ton rotating assembly. I would concur with the Department of Air Force Research Laboratory findings in regards to their equipment detecting 90 Hz.
- **Pump Mode** – When the Northfield units are pumping, the steady state pump operation shows similar 30 Hz and 90 Hz harmonics as when generating.

I reviewed the power point presentation from L. McLoughlin and W. Ondras dated June 12, 2013. I have not noticed any significant vibration at 42 Hz in generate and 42 Hz does not lineup with any rotating component frequencies at Northfield Mountain.

I trust this information will prove helpful.

Regards

A handwritten signature in black ink that reads 'Douglas Leubner'. The signature is written in a cursive, flowing style.

Douglas Leubner MSME
Hydro Expertise USA
145 Pine Haven Shores Rd.
Suite 2095
Shelburne, VT 05482

Attachment 3

**Appeal to Rejection of Proposed Northfield Mountain Noise Study
L. McLoughlin / W. Ondras
June 12, 2013**

Appeal to rejection of proposed Northfield Mountain noise study

L. McLoughlin / W. Ondras

June 12, 2013

Overview

- Responses to reasons for rejection
- Observations
- Proposed actions

- Reason stated for rejection (4/23/13):

Environmental baseline for project is what is existing;
no study is required by license conditions

- Reason this should be revisited:

No noise problems were heard before the landslide on May 5, 2010. After this, "baseline" conditions changed. Also, plant ownership changed around this time, which may have resulted in operational changes.

- Reason stated for rejection (June 12th Agenda.pdf):

“The study would not inform the development of feasible PME measures or license conditions.”

- Reason this should be revisited:

If there are no feasible Protection, Mitigation, and Enhancement measures, it is all the more important to study this before the license is granted.

- Reason stated for rejection (June 12th Agenda.pdf):

“The Project has operated for almost 50 years without any evidence that noise from pumping and generating equipment can be heard outside the immediate vicinity of the equipment.”

- Reason this should be revisited:

Again, this does not concern the entire history (41 years of actual operation), only possible recent changes, perhaps due to the sediment event and new ownership. If a problem exists, further changes could make it more severe.

Observations

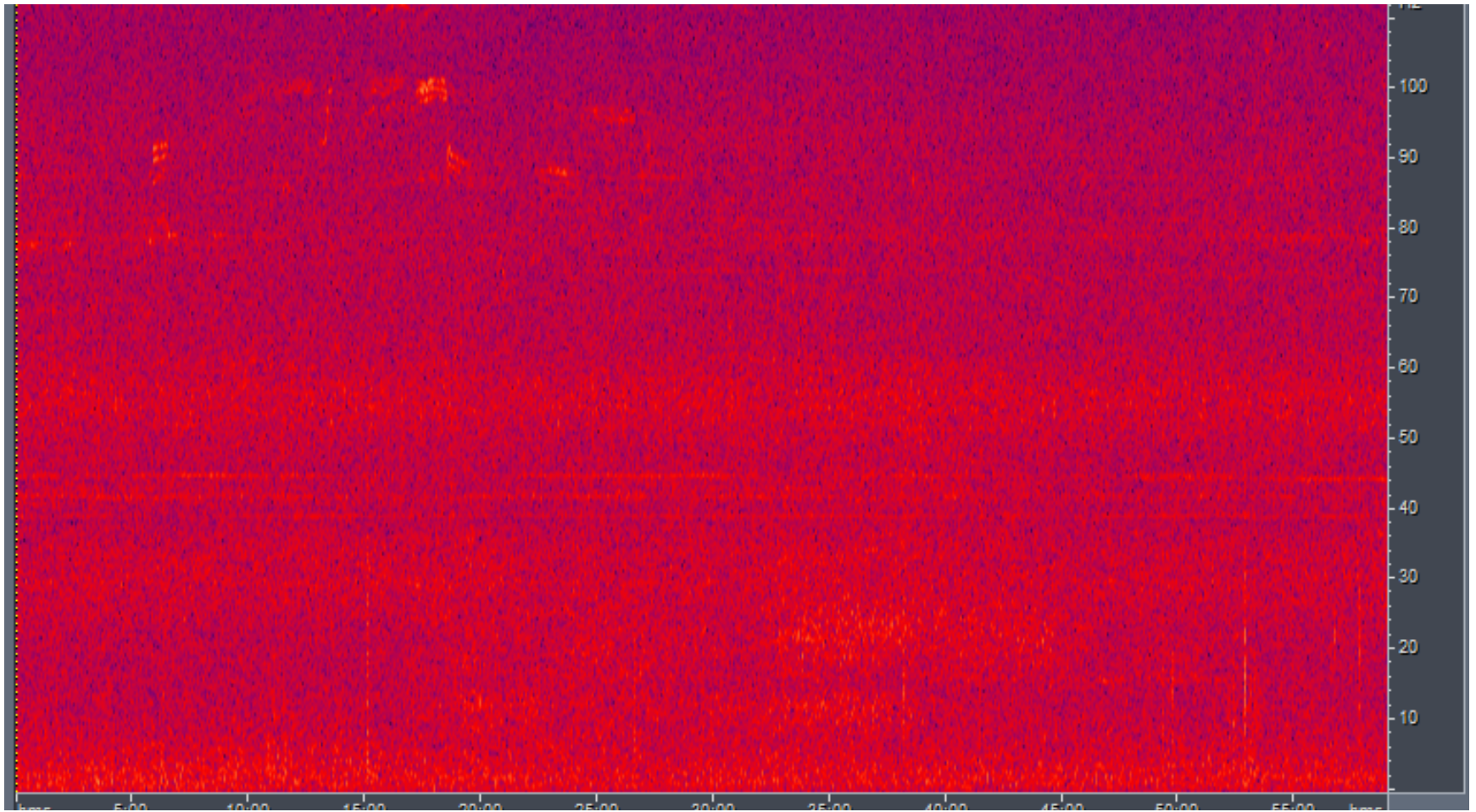
Disturbances do correlate with plant operation

Date	Time	Description	Bob's Generator Running?	Units On-line	Notes: List any equipment on at time
2/11/13	2:58am	deep humming	No		----
2/19/13	7:42 PM		Possibly		train
3/15/13	3:54am and earlier	deep humming then throbbing	No	Unit 2P on 0100 off 0504	Unit 2P
3/16/13	10:33pm and earlier	deep humming then throbbing	Possibly	Unit 2G on 2235 off 2345	Unit 2G; possibly Bob's Gen
3/29/13	~1:45am	?	No		---
4/14/13	~4:50am	1 deep humming	No	Unit 1P on 0022 off 0703 Unit 3P on 0203 off 0744	Units 1P & 3P
4/16/13	10:20pm	deep humming	Possibly	Unit 2G on 1706 off 2237	Unit 2G: Possibly Bob's Gen
	~4:40am	deep humming	No	Unit 3P on 0114 off 0609	Unit 3P

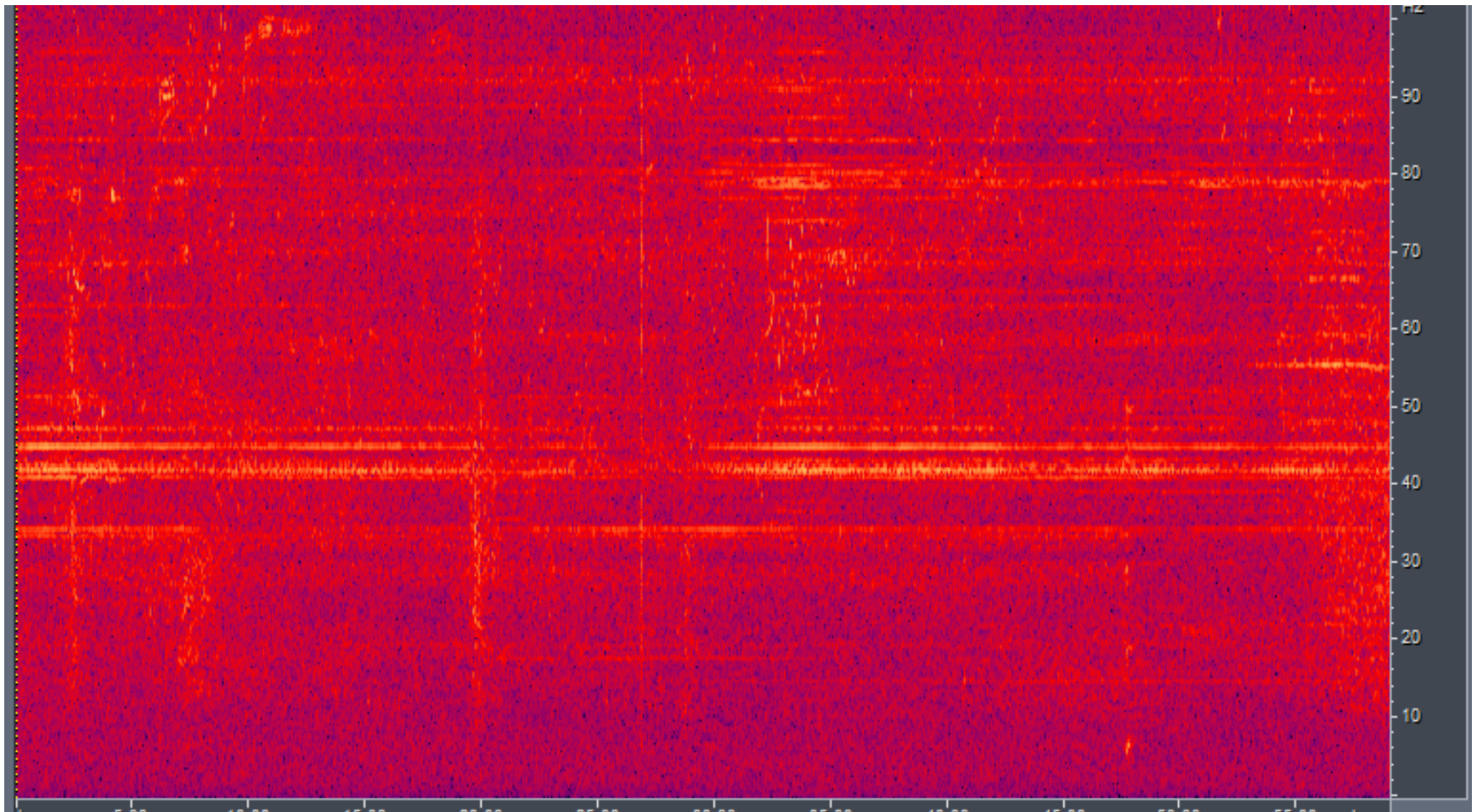
Measurements

- Simple, preliminary tests using smartphone recordings and audio editing software
- Some sounds easily attributable to trucks, trains, airplanes, etc., but many are not

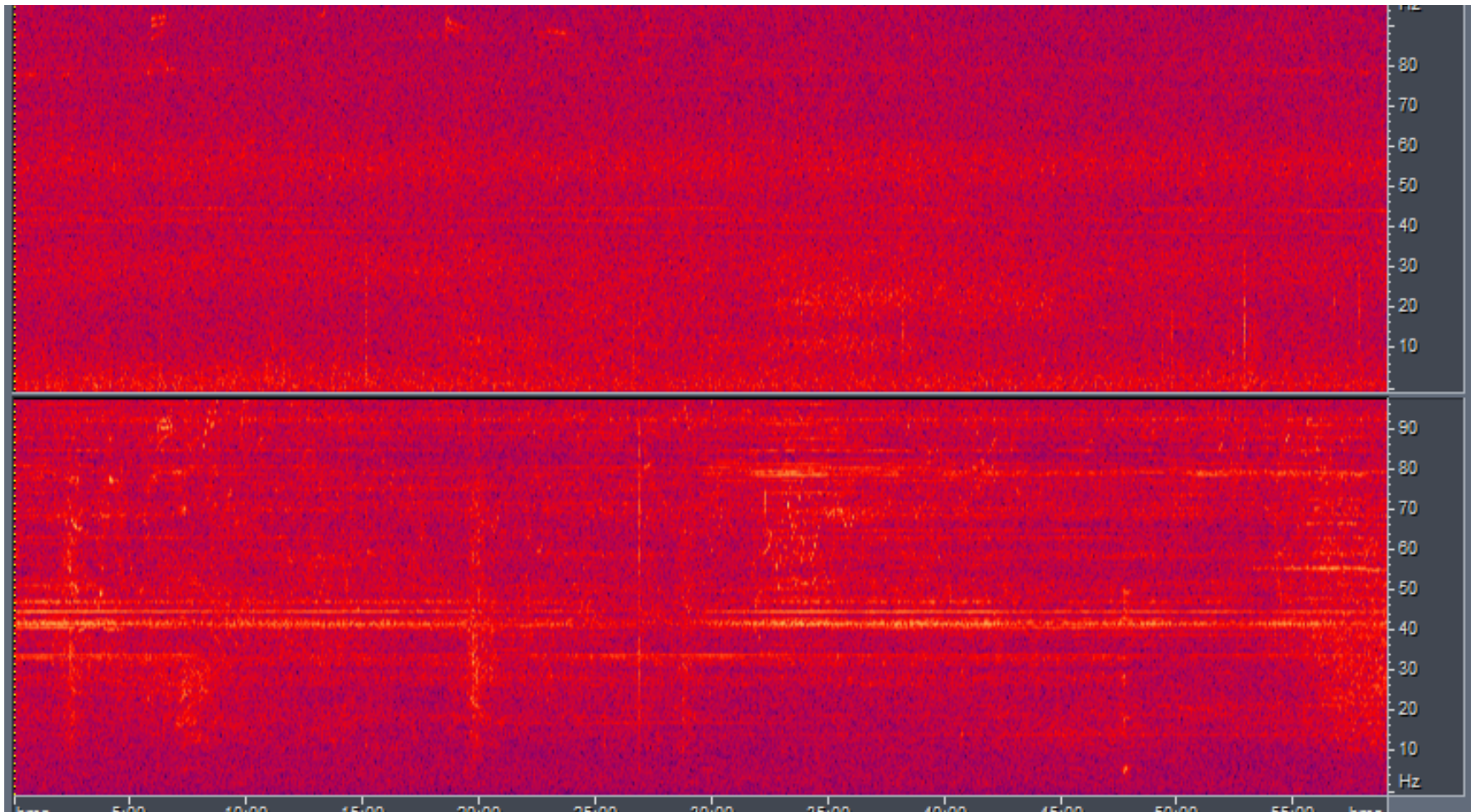
Persistent 42 Hz Tone



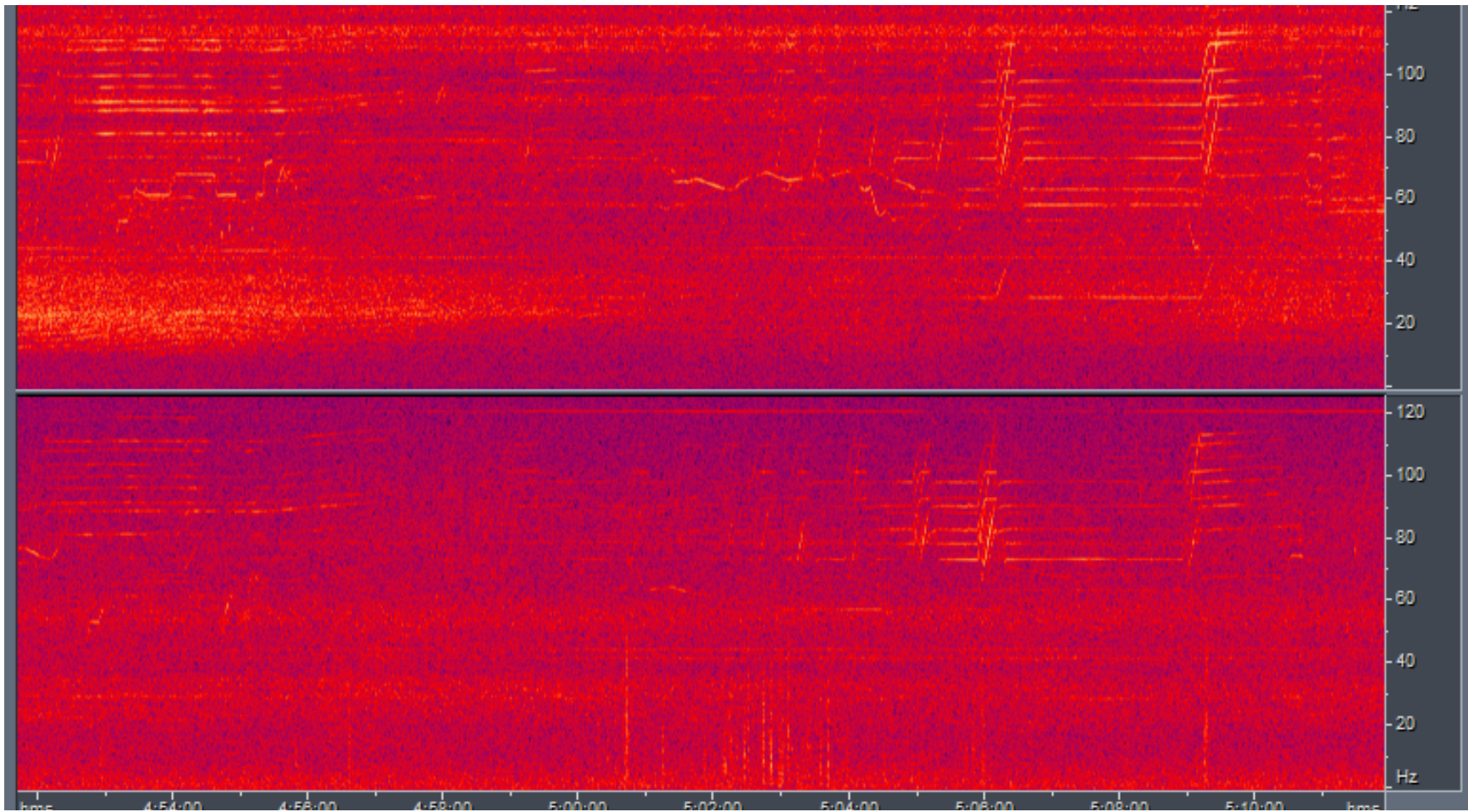
Persistent 42 Hz Tone - Closer



Persistent 42 Hz Tone - Correlated



Rising/Falling Tones - Correlated



Other events

- Steady tones at other frequencies
- Frequencies as low as 7 Hz
- Various wavering bands

Common Massachusetts Regulations

CMR 310 7.52 states:

“The policy specifies that the ambient sound level, measured at the property line of the facility or at the nearest inhabited buildings, shall not be increased by more than 10 decibels weighted for the "A" scale [dB(A)] due to the sound from the facility during its operating hours.”

“The guideline further states that the facility shall not produce a pure-tone condition at the property line (or at the nearest inhabited buildings). A **pure-tone** exists if the sound pressure level, at any given octave band center frequency, exceeds the levels of the two adjacent octave bands by three (3) or more decibels.”

Proposed Action

Study to determine if neighbors hear noises.

- Send neighbors within 3 miles in all directions a blank table of date, time, noise description for each person in the house to fill out. Also ask about pets being disturbed.
- Create a website where anyone can enter incidents. Collect these tables after 3 months or more. See if there is a trend coinciding with running of Northfield Mt. equipment.

If there is a trend, do further studies with an audio engineer to measure sounds at the locations where they are heard.
Work in concert with the EPA.

Thank You

Document Content(s)

FLPR Noise Issue Information.PDF.....1-24