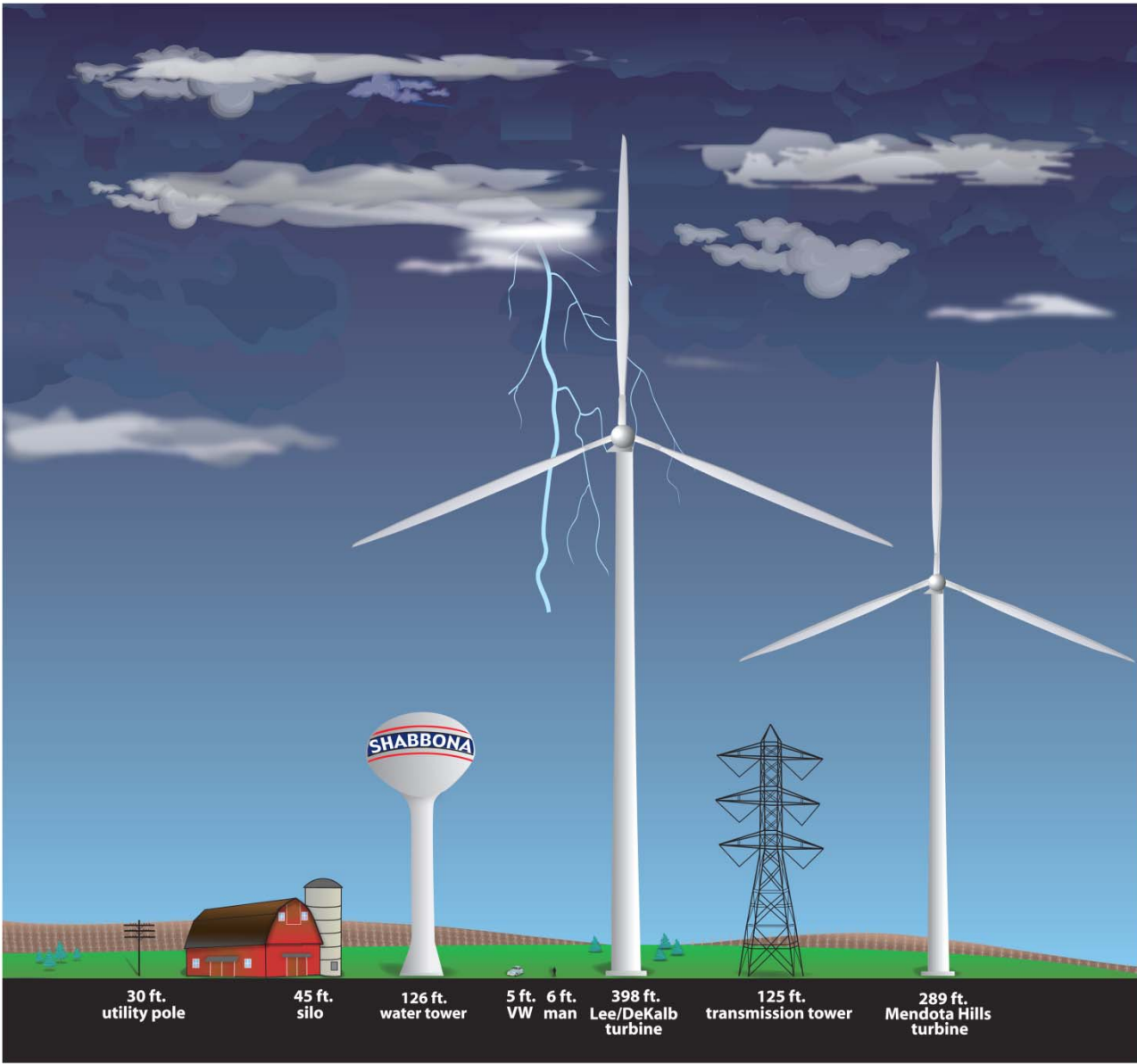


# Mars Hill Wind Turbine Project

## Health Effects — Preliminary Findings

- 28 turbines, 389 ft tall
- Online Dec 06, Complete Mar 07
- 20 homes North and East of turbines
- 35 adults, 16 children live within 3400 feet
- 15 people interviewed (13 face to face Mar 12, 2009) to date



30 ft.  
utility pole

45 ft.  
silo

126 ft.  
water tower

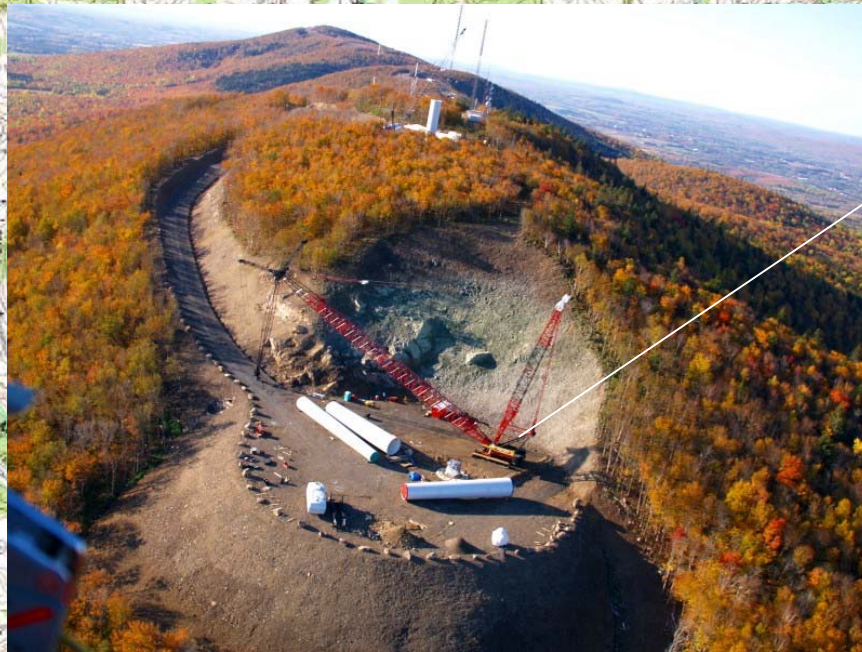
5 ft. 6 ft.

398 ft.  
Lee/DeKalb  
turbine

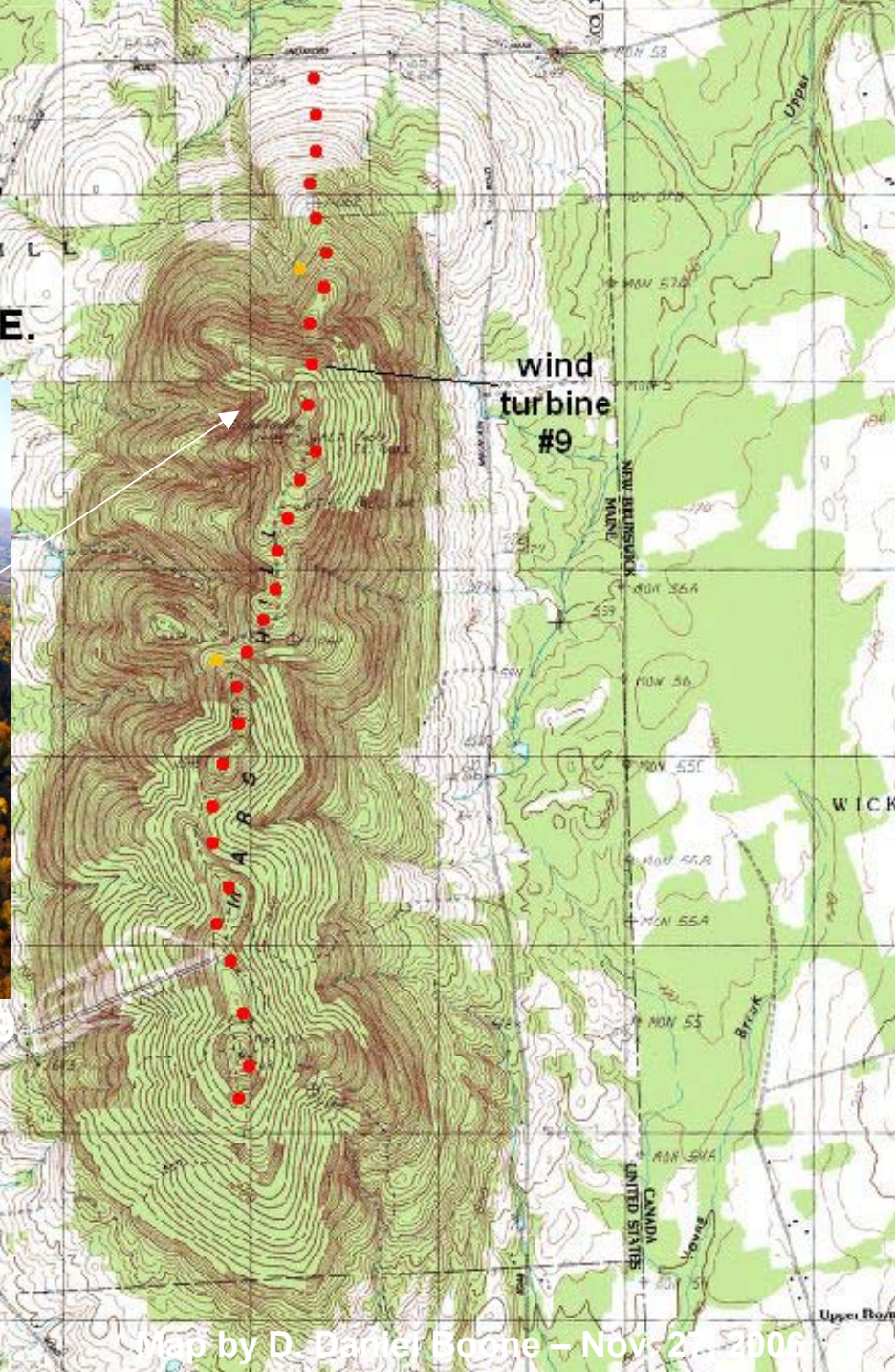
125 ft.  
transmission tower

289 ft.  
Mendota Hills  
turbine

**Locations of 28 wind turbines (red dots)  
and 2 meteorological towers (gold dots),  
based on coordinates included in the  
FAA's 7460-1 database for the  
Mars Hill windplant, Aroostook County, ME.**



Source: [www.windaction.org/pictures/5919](http://www.windaction.org/pictures/5919)





Mars Hill's North End - East Ridge Road



wind turbine #9



Aerial photo of Mars Hill taken during Summer of 2006

# Mars Hill Experience



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Questionnaire Used

Name	Age	Turbine Dist.	Years here	Occupation	Telephone #	email
Information provided by:			Address:			
Pre existing medical conditions or diagnoses:						
Medications prior to WTP:						
New medical conditions or diagnoses since WTP:						
New medications or dose changes since WTP:						
Sign/Symptom	Frequency/Severity	Freq/Sev PRIOR to WTP	Improves when away?	Seen a doc? New Rx or Tx?	Comment	
Sleep disturbance:						
Difficulty falling asleep:						
Waking up mid. of night:						
Headaches <input type="checkbox"/>						
Migraines <input type="checkbox"/>						
Dizziness						
Ears ringing						
Balance probs						
Unusual body sensations (specify):						
Weight: gain <input type="checkbox"/>						
loss <input type="checkbox"/>						
Palpitations						
Changes in appetite (spec):						
Feelings of 'Stress'						
Feelings of 'Anger'						
Feelings of 'hopelessness'						
Feelings of 'anxiety'						
Feelings of 'irritability'						
Feelings of 'Depression'						
Other						

1. Has your quality of life been altered in any way since the wind turbine project went online?
2. How so?
3. Have you considered moving away?
4. Why haven't you moved away?

I understand and consent to this information being collected as part of a medical investigation. I understand no names shall be used in any report generated with this information, and that no patient names will be released at any time. The report or excerpts from the report may be presented to government or to other bodies such as the Maine Medical Association, and may be published in journals or other media.

\_\_\_\_\_ signature \_\_\_\_\_ date

\_\_\_\_\_ print name



Michael A. Nissenbaum, MD, March 2009



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Population Sample - Demographics

- 20 homes in affected area
- Members of 9 homes interviewed
- ***None of 16 children interviewed***

### Interviewed:

- 7 females, age range 41-73, mean 59 years
- 8 males, age range 47-75, mean 61 years
- Distance to nearest turbine ranges 1200 – 3400 ft  
Mean distance 2500 feet

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Population Sample - Demographics

Sex	Age	Occupation
F	confidential	confidential
F	confidential	confidential
F	confidential	confidential
F	confidential	confidential
F	confidential	confidential
F	confidential	confidential
F	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential
M	confidential	confidential

Distance to nearest turbine (ft)
3400
2400
2500
3000
3200
1200
2300
3400
2400
3000
3200
1200
2100
2400
2300

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### **SLEEP DISTURBANCES** (new onset)

<b>Sleep Disturbance (total)</b>	<b>14</b>	<b>93%</b>
<i>Waking up middle of night:</i>	13	87%
<i>Difficulty falling asleep:</i>	7	47%
<i>1-2/WK</i>	3	20%
<i>3-4/WK</i>	2	13%
<i>5-7/WK</i>	9	60%
<b>Discussed with MD:</b>	<b>13</b>	<b>87%</b>
<i>Offered Rx:</i>	12	80%
<i>Accepted Rx:</i>	5	33%
<i>Offered &amp; Declined Rx:</i>	7	47%



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### Headache

<b>Increased Headache:</b>	<b>8</b>	<b>53%</b>
<i>New onset headaches:</i>	<b>6</b>	<b>40%</b>
<i>Increased migraine frequency:</i>	<b>2</b>	<b>13%</b>
<b>New Rx</b>	<b>2</b>	<b>13%</b>
<b>Increased Migraine Rx</b>	<b>1</b>	<b>6%</b>



Michael A. Nissenbaum, MD, March 2009

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

<b>Dizziness</b>	<b>3</b>	<b>20%</b>
<b>Tinnitus</b>	<b>1</b>	<b>6%</b>
<b>Unsteadiness</b>	<b>1</b>	<b>6%</b>
<b>Unusual Body sensations:</b>	<b>3</b>	<b>20%</b>
<i>Chest pulsations</i>	<b>2</b>	
<i>Pulsatile ear pressure</i>	<b>1</b>	



Michael A. Nissenbaum, MD, March 2009



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### *Hypertension*

<b>New Dx Hypertension</b>	<b>3</b>	<b>20%</b>
<b>Worsened BP</b>	<b>1</b>	<b>6%</b>
<b>New Rx offered or increased:</b>	<b>4</b>	<b>27%</b>
<b>New Rx accepted or increased:</b>	<b>3</b>	<b>20%</b>
<b>New Rx declined:</b>	<b>1</b>	

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### *Troubled by Shadow Flicker*

<b>Troubled by Shadow Flicker:</b>	<b>5</b>	<b>33%</b>
<i>nausea &amp; dizziness</i>	<b>2</b>	
<i>dizziness alone</i>	<b>2</b>	
<i>triggers migraine</i>	<b>1</b>	

*“ like turning a light switch on and off, on and off “*

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### *Weight Change*

<b>Weight changes since turbines online:</b>	<b>6</b>	<b>40%</b>
<i>Weight gain:</i>	<b>5</b>	<b>33%</b>
<i>Weight loss:</i>	<b>1</b>	<b>6%</b>



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### *Psychiatric Symptomatology*

#### *Feelings of:*

<b>“Stress”</b>	<b>11</b>	<b>73%</b>
<b>“Anger”</b>	<b>13</b>	<b>87%</b>
<b>“Anxiety”</b>	<b>6</b>	<b>40%</b>
<b>“Irritability”</b>	<b>4</b>	<b>27%</b>
<b>“Hopelessness”</b>	<b>11</b>	<b>73%</b>
<b>“Depression”(total)</b>	<b>8</b>	<b>53%</b>
<b>new:</b>	<b>7</b>	
<b>increased:</b>	<b>1</b>	

# **Mars Hill Wind Turbine Project Health Effects – Preliminary Findings**

## **Symptoms Survey Results**

### **Anger**

**“ Absolute rage – you feel you want to kill someone, and don’t know who to kill ”** *(67 y.o. woman)*

**“ So angry I could kill “** *(65 y.o. man)*

**“ Makes my blood boil ”** *(65 y.o. woman)*

# **Mars Hill Wind Turbine Project Health Effects – Preliminary Findings Symptoms Survey Results**

## **Hopelessness**

**“ Nobody will help us ”**

**“ No options – can’t leave, and can’t live here ”**

**“ This is an awful thing to have happen to you ”**

**“ People don’t believe us – (our complaints) fall on deaf ears ”**

**“ No one cares. No one listens.”**

**“ They just tread on us ”**

**“ It’s very hard watching my child suffer ”**

# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### *Depression*

<b>7 new subjective symptom complexes</b>	<b>47%</b>
<b>1 worsened prior Dx</b>	
<b>4 New Rx offered</b>	
<b>1 declined</b> (incompatible with job license)	
<b>3 New Rx: Cymbalta, Lexapro, Mirtazepine</b>	<b>20%</b>
<b>1 prior Dx, Rx increased/changed:</b>	<b>Zoloft, Trazodone</b>
<b><i>Tearful at points during interview:</i></b>	<b>4</b> <b>27%</b>
<b><i>2 women, 2 men</i></b>	



**Mars Hill Wind Turbine Project Health Effects – Preliminary Findings**  
**Symptoms Survey Results**

***New Prescriptions***

**Total Number of New and Increased Prescriptions: 15**

<i>New Rx</i>	12
<i>Increased</i>	3

*Cymbalta*

*Lexapro*

*Mirtazepine*

*Zoloft*

*Trazodone*

*Meloxicam*

*Hydrocodone*

*Tylenol III*

*Benazepril*

*Topamax*

*Anxiolytics (2)*

*BP meds (3)*

**10 Rx offered and declined**

## Mars Hill Wind Turbine Project Health Effects – Preliminary Findings Symptoms Survey Results

**Has your quality of life been affected?                      15            100%**

“Loss of joy in living . . .put a lot of life’s plans on hold”

“No desire to go outside”

“Feel trapped”

“Dreams have been dashed”

“Was our dream home . . . it’s all been stolen from us”

“We have no peace and quiet”

“My husband’s (who has advanced MS) only pleasure in life was to see the wild animals. They are gone.”

“No sleep”

“Sinking feeling every night when I (come home) and see them.”

“I used to be able to hear it snow, before. Now, I do not look forward to going home.”



# Mars Hill Wind Turbine Project Health Effects – Preliminary Findings

## Symptoms Survey Results

### Current survey weaknesses:

- Small sample
- Case Series structure
- Retrospective
- No study control
- No analysis for statistical significance as yet
  
- **Preliminary findings nonetheless alarming**
- **Do we have a right to subject the non coastal population of Maine to a 30 year prospective study?**

# Mars Hill ME DEP Nighttime Noise Variance 45=>50 dbA

“There are 4 protected locations where the noise level would be above 45 dBA, but less than 50 dBA, **which is approximately equivalent to the noise that songbirds make . . .** the Department finds that the applicants’ project will not have an unreasonable adverse impact . . . and therefore grants a variance from the noise standards for the windpower farm.”

DONE AND DATED AT AUGUSTA, MAINE, THIS 1<sup>ST</sup> DAY OF JUNE, 2004.

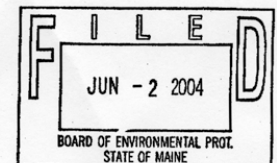
DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: *Dawn R. Gallagher*  
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application January 12, 2004  
Date of application acceptance January 22, 2004

Date filed with Board of Environmental Protection  
RC/L21635AN/BN

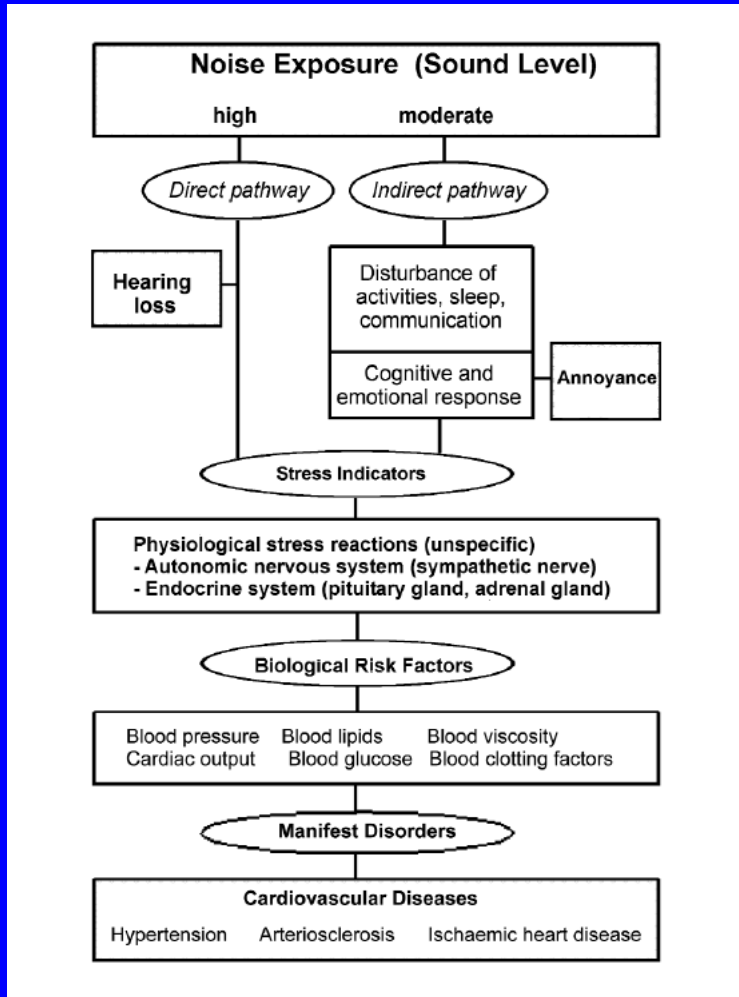


# Mars Hill ME DEP Nighttime Noise Variance 45=>50 dbA

In fact, the turbines at Mars Hill produce night time readings 52.5 dBA, which Andrew Fisk of MDEP has characterized as ‘substantially in compliance’, and has issued a letter of compliance to First Wind/UPC.

He acknowledged, during a recent meeting in Fort Kent, that this reflected an average measurement which included downtime, though the statute is meant to regulate sound sources during operation.

# Is this the Mars Hill Experience?



**Preliminary findings are alarming**

More detailed studies are required:

Diurnal cortisol studies

Larger population sample

Detailed cardiovascular studies

Detailed psychiatric assessments

**\*\*\*16 Children\*\*\* MUST be studied.**

Health Aspects of Extra-Aural Noise Research, W. Babisch, German Federal Environmental Agency  
Noise and Health 2004, 6;22, 69-81

# **DO NO HARM**

**In light of these growing, serious medical concerns, we propose a moratorium on the building of any such "wind farms" until more research is done on the health impact that such facilities will have on the communities surrounding such technology. These communities and the Maine DEP and Health Services must be allowed time to study and learn from the European and Canadian experiences, as well as from the many affected families in Mars Hill, Maine, and put into place appropriate regulations and ordinances, prior to expanding the wind industry in the State of Maine.**

*Excerpt, Statement of the Medical Staff of NMMC, March 2009*



# DO NO HARM

**The State of Maine has a vast, unpopulated hinterland. There is little need to site industrial wind developments in proximity to residential communities if there is a risk of negative health effects. Quality of life, quality of place, and a healthful environment should be the right of all residents of Maine, including those of the rural north.**

*Excerpt, Statement of the Medical Staff of NMMC, March 2009*

# Preliminary Findings are Alarming

## In the Meantime, DO NO HARM

### Options:

- Request moratorium until more extensive medical studies are done and current state of knowledge is fully understood by authorities and regulations reflecting risks and hazards put into place
- Request siting setbacks reflecting current state of knowledge and non US jurisdictions' best practices (France, Germany, Australia) – including use of db(C) calibration
- Request a Wind Developer “Code of Conduct” be established and enforced by the State’s Attorney General’s Office (similar to NY State)

# **Further Studies Must be Done NOW**

**How is any medical scientist going to conduct an epidemiological study of wind turbine health effects when ‘Good Neighbor’ and lease-holder gag clauses exist in land lease contracts?**



Effective immediately, an individual in the custody or under the effective control of an officer, employee, or other agent of the United States Government, or detained within a facility owned, operated, or controlled by a department or agency of the United States, in any armed conflict, **shall not be subjected to any interrogation technique or approach, or any treatment related to interrogation, that is not authorized by and listed in Army Field Manual 2 22.3**

*BARACK OBAMA  
THE WHITE HOUSE,  
January 22, 2009*

**Sleep Deprivation is not permitted in Army Field Manual 2 22.3**



# WHO 2000 *Guidelines:* *Community Noise*

- When low frequency components are present, noise measures based on dBA measurements are inappropriate - dBC is a better measure when health effects are to be minimized
- It should be noted that a large proportion of low frequency components may increase considerably the adverse effects on health and the evidence on low frequency noise is sufficiently strong to warrant immediate concern

*Berglund et al., 2000*