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22nd November, 2012

Senator Doug Cameron
Chair
Senate Inquiry into "Excessive Noise from Wind farms Bill"

Dear Senator Cameron,

**RE: List of symptoms and medical problems**

As requested by you, I have provided details of the range of symptoms and health problems which have been reported to me by residents living near industrial wind turbines, which the residents and in some instances their treating doctors have told me are new since the wind development commenced operating, and which correlate with exposure to the operating wind development. I have also provided details of those conditions which the residents or their treating doctors have told me worsen with such exposure to operating wind turbines – ie the health conditions or symptoms were preexisting prior to the wind development commencing, but they consistently worsen with exposure and IMPROVE back to baseline when the resident is away from the turbines.

This pattern has been consistently reported by residents and some of their treating doctors in residents exposed to operating wind turbines, and is consistent with the existing peer reviewed published medical and acoustic research in related areas of the known adverse health impacts of low frequency noise, infrasound and vibration, including animal experiments, many of which occurred over 10 years ago. It is also consistent with existing clinical and research knowledge of vestibular disorders, neurophysiology, psychiatry, endocrinology, sleep medicine, and various other related fields of clinical medicine.

I have also attached a number of key papers and literature reviews listing relevant empirical research relating to infrasound, low frequency noise and vibration and their effect on human and animal health, or on the effects of sleep deprivation and stress on health. Most of these were available prior to July 2010, when the NHMRC Rapid Review on the subject was published, but were not included in that Rapid Review. Others have been published subsequently.

Yours sincerely

Dr Sarah Laurie,

CEO Waubra Foundation

**THE RANGE OF CLINICAL PATHOLOGY and SYMPTOMS REPORTED DIRECTLY TO THE WAUBRA FOUNDATION WITH EXPOSURE TO OPERATING WIND TURBINES and some other sources of INFRASOUND AND LOW FREQUENCY NOISE AND VIBRATION (ILFN & V)**

**CLINICAL FRAMEWORK**

The considerable range of clinical pathology and symptoms reported by sick residents and their treating doctors is best understood in the way clinicians assess symptoms with respect to the pattern of reported symptoms, the category of clinical specialty or body system they relate to, and how the symptoms and problems change over time with cumulative exposure. Only the pathology and symptoms reported directly to me is included in this list. Most of my information has come from residents in Australia. It is included only when I have been satisfied that it appears to be correlating with the operating wind turbines (or other sources of ILFN & V) ie there is a clear and consistent pattern in the resident's account of the symptoms or observations which consistently varies with exposure, or is unmistakably linked to it if it was a discrete episode of illness, or where there is relevant research which supports the linking of the symptom or described problem with ILFN & V.

I am aware that other trained medical practitioners who have taken first hand clinical histories from sick residents, such as Professor Robert McMurtry, and Dr Nina Pierpont, have had other pathology reported directly to them, which may not be listed here. There is nothing inconsistent with that, rather it is to be expected when the range of expression of this pathology in each individual is so varied. It is the PATTERN of exposure resulting in new or worsening symptoms, correlating with exposure to operating wind turbines or ILFN & V from other sources, which is the common link.

For the purposes of understanding which pathophysiological processes might be involved, these reported symptoms and problems have been divided into acute and chronic pathology. Because of the considerable complexity and range of information required to put the symptoms into the context of current clinical knowledge, I have first provided some background information.

**ACUTE EXPOSURE SYMPTOMS**

These include but are not limited to:

**Symptoms of VESTIBULAR DISORDERS**

These were investigated and described in considerable detail in a group of residents living near wind turbines from locations around the world by American Paediatrician Dr Nina Pierpont MD PhD, and given the name of "wind turbine syndrome". Other rural medical practitioners had collected data some years earlier, including Dr Amanda Harry (UK) and Dr David Iser (Australia). This cluster of symptoms was known previously to medical researchers and clinicians working in the fields of inner ear diseases, disorders of balance, and Meniere's disease, and is grouped together by clinicians as "vestibular disorders". Internationally acknowledged researchers who have worked in this field include Dr Owen Black MD. I have attached an affadavit written by Dr Black in 2009 which places Dr Pierpont's work in this context. Dr Black was one of a number of expert peers who reviewed her work. The continued assertion that her work is not "peer reviewed" is untrue.

Dr Pierpont connected the pattern of symptoms described to her by sick residents, to the symptoms known to acousticians with existing knowledge and research in this field of low frequency noise exposure, and recognized that vestibular disorders were the basis of much of the symptomatology being reported by these residents. These symptoms and their correlation with exposure to low frequency noise are also well known to some

occupational physicians and also to acousticians, such as Professor Geoffrey Leventhall, and Dr Malcolm Swinbanks, both from the United Kingdom.

Professor Leventhall has stated he is well aware of these symptoms and their connection to exposure to low frequency noise, and the precise quote from his court evidence and its source is listed in my attached letter to Professor Simon Chapman (also accessible at http://www.wind-watch.org/documents/letter-from-sarah-laurie-to-simon-chapman/ ). Also attached is the table from page 49 of Leventhall's 2003 DEFRA literature review, listing the symptoms identified in a case control study in 2000 identifying identical symptoms which were reported by residents to occur in response to LFN exposure. This DEFRA document is the same document which I highlighted in my oral evidence to the Senate inquiry as a serious omission from the NHMRC's Rapid Review of 2010, and can be accessed at http://www.wind-watch.org/documents/review-of-published-research-on-low-frequency-noise-and-its-effects/ ).

Dr Malcolm Swinbank's comments in a recent letter (at http://www.wind-watch.org/documents/infrasound-from-wind-turbines-letter-from-malcolm-swinbanks/ ) are reproduced below:

> "I would comment that I first became aware of the physical effects of infrasound when working extensively on site with an industrial gas turbine in 1980. I identified specific aspects which were closely related to some symptoms of sea-sickness with which I was very familiar, being a keen offshore sailor. Thus I did not doubt that infrasound under some circumstances can cause adverse effects, and the relationship to sea-sickness implied that there was probably some interaction with the balance mechanisms of the inner ear. So the more recent work of Dr Nina Pierpont did not strike me as heresy – rather, it endorsed an opinion that I had formed from my own direct, first-hand experience in an entirely different context, almost 30 years earlier."

Dr Swinbanks is not the only acoustician to have developed symptoms of low frequency noise exposure whilst working in an environment measuring ILFN. Robert Rand and Stephen Ambrose had the same experience whiles measuring the full acoustic spectrum inside a home in Falmouth, USA over three days. They have both since stated it took days to weeks to recover from the experience. (http://www.wind-watch.org/documents/bruce-mcpherson-infrasound-and-low-frequency-noise-study/ )

**Symptoms of Acute Sympathetic Nervous System Stimulation,** or activation of the fight / flight response
These include symptoms such as a tachycardia (rapid pulse), hypertension (high blood pressure), anxiety, and other rare pathologies related to acute elevations of circulating adrenaline, a stress hormone. These include specifically Tako Tsubo Heart Attacks, and Acute Hypertensive crises, both of which are reported to be occurring in the presence of known ILFN but **in the absence of the usual clinical precursors**. Such a precursor includes a sudden stressful traumatic event in the case of Tako Tsubo Heart Attacks (death of a close relative is the usual example cited) and an underlying tumour of the adrenal gland called a phaeochromocytoma in the case of an acute hypertensive crisis.

As Dr Pierpont and others have pointed out, there is overlap and connections between these two groups of acute pathologies and symptoms, which is grounded in the known science. Vestibular disorders which stimulate the fight flight response or as Professor Salt has called it "the alerting mechanism", (http://www.wind-watch.org/documents/perception-based-protection-from-low-frequency-sounds-may-not-be-enough/ ) will inevitably lead to a physiological fight /flight response as a consequence.

Dr Swinbanks has also recently highlighted the research by a Chinese team from 2004, (http://www.wind-watch.org/documents/an-investigation-on-the-physiological-and-psychological-effects-of-infrasound-on-persons/ ) showing that infrasound exposure in humans in a laboratory situation for a very short period of time, causes increases in heart rate and blood pressure as well as symptoms such as nausea, which confirms the coexistence of the physiological sympathetic nervous system stimulatory effect and the vestibular disorder symptoms (nausea). The link to Dr Swinbank's paper placing this important Chinese research in its correct

context was presented to the Inter Noise conference in New York in August 2012 downloadable at http://www.wind-watch.org/documents/numerical-simulation-of-infrasound-perception/ )

## CHRONIC CUMULATIVE EXPOSURE SYMPTOMS / PROBLEMS

### Consequences of Cumulative Sleep deprivation

The commonest reported symptom or problem by residents is disturbed sleep. Sometimes residents report hearing the audible noise of the turbines when they are woken, but other times they cannot hear the turbines and report a characteristic pattern of "waking suddenly in a panicked state". This can occur when they cannot see the turbines, (they are asleep!) cannot hear them, and have no way of knowing at the time inside their home whether the turbines are operating. This can happen numerous times each night, and correlates with wind direction and certain weather conditions which acousticians confirm are likely to enhance the perception of sound energy.

Being in a well insulated home can make the symptoms including sleep disturbance worse, which fits with the research evidence of Professor Alec Salt, confirming that the inner ear responds very differently when there is predominantly low frequency sound energy present, which can result in stimulation of the "alerting mechanism" of the brain. It fits with the acoustical survey data collected by Rand and Ambrose in the USA (http://www.wind-watch.org/documents/bruce-mcpherson-infrasound-and-low-frequency-noise-study/ ) and at multiple locations in Australia by Steven Cooper, where the acoustic profile inside a well insulated home can be quite different to that obtained concurrently outside the home. This is why internal home measurements of the full acoustic spectrum are so important – external measurements do NOT reflect the actual experienced ILFN exposures inside the home, and cannot be used as a substitute.

This identical pattern of sleep disturbance, and on occasions perception of vibration through the bed, has been reported by residents living near wind turbines and also by those living near coal mining activities in the Upper Hunter, where the mine was at least 5km away through a hill. Independent acoustic measurements taken at multiple locations near wind turbines and coal mining confirmed the presence of sound frequencies below 200 Hz, regardless of the source of the sound energy. These residents consistently report that their sleep pattern improves on those occasions when there is no sound energy from the source of ILFN & V, or when they are away from their homes.

The cumulative effects of sleep deprivation are very well known to clinical medicine, and result in both new disorders and exacerbation of existing conditions, regardless of the cause of that sleep disturbance. Conditions include mental health disorders (depression, anxiety), metabolic conditions such as diabetes, cardiovascular pathologies such as hypertension, ischemic heart disease, and impaired immunity leading to increased infections and in the long term malignancies (cancers). A recent meta analysis by Professor Capuccio from Warwick University provides a useful summary of the importance of sleep with respect to cardiovascular health, and is attached.

### Consequences of Chronic Stress

**Physiological stress**

The known connections from established research between low frequency noise exposure and cortisol, an important stress hormone, were outlined by Professor Leventhall in his 2003 Literature review for the UK Department of Food and Rural Affairs (DEFRA) in section 10. The existence of a relationship between physiological stress and LFN exposure is therefore established, as it is in animal studies listed in the National Institute of Environmental health sciences (NIEHS) Literature review of 2001, (see http://www.wind-watch.org/documents/infrasound-brief-review-of-toxicological-literature/ ) where animal studies showed elevated cortisol and adrenaline with exposure to infrasound in experimental studies. Both these documents are attached. Neither was referenced in the NHMRC Rapid Review of 2010. Professor Leventhall was aware that wind turbines emitted both low frequency noise and infrasound, from work done by Frits Van Den Berg

and presented at a conference in Maastricht in 2004 (as pointed out by Dr Malcolm Swinbanks at http://www.wind-watch.org/documents/infrasound-from-wind-turbines-letter-from-malcolm-swinbanks/ ).

Research is required to determine precisely what acute and chronic exposures and which frequencies are inducing these physiological stress responses in humans exposed to ILFN & V from a variety of sources including wind turbines. The clinical observations suggest that the dose response curves are much lower than acousticians have historically assumed, and that they may in fact decrease over time with cumulative exposure, because of sensitization or decreased tolerance for the same level of low frequency sound energy over time. Professor Salt's work using an animal model has shown that sound energy below the audible threshold can still be perceived, and this requires urgent research with human subjects, with acoustic monitoring concurrently with sleep and physiological monitoring.

**Psychological stress**

Professor Leventhall recognized the negative psychological impact on people adversely impacted by low frequency noise who were disbelieved or misdiagnosed. This ADDITIONAL psychological stress has been consistently reported to me by sick residents in Australia, and was reported to others prior to my involvement which commenced in July 2010. Perjorative descriptors have been used to describe these sick and vulnerable residents by wind developers and their supporters, and has contributed greatly to this damaging psychological effect, known as "victim blaming". It has been further magnified by some of the media reporting and on line blogs, where it is still common for sick, desperate and vulnerable people to be described as jealous, NIMBY's, or brainwashed by anti wind turbine advocates, with no empirical research evidence to support these psychologically damaging assertions. For those people driven out of their homes, off their farms, too sick or too tired to work safely and productively this is particularly difficult. This psychological damage is compounded when their pleas for help fall on deaf ears within the health and noise regulatory authorities.

**Combined effect of both physiological and psychological stress**

The combined effect of both physiological and psychological stress is well known to clinical medicine to be catastrophic for maintenance of good physical and mental health over the long term. Almost every body system will be adversely affected, based on longstanding and more recent clinical research. Just a few examples are given below:

Recent neurobiological research has shown that childhood trauma and consequent stress can result in a lifelong increased risk of developing depression, thought to be at least partly because the hippocampus in those circumstances may never grow to its full capacity to release hormones such as brain derived neurogenic factor, known as BDNF. The effect of chronic exposure to wind turbine noise is unclear, in children or in adults, but given the known connections between ILFN exposure and stress, it is likely that chronic stress plays a significant role in the longer term. Dr Pierpont, herself a practicing Paediatrician, has documented clear evidence of adverse effects on the health and development of the children in her study when exposed to operating wind turbines. Similar reports are emerging from concerned parents around the world, magnified if the children have disorders such as epilepsy, autism, and other conditions with known noise sensitivity. The account of the Dutch parent with a son with autism in submission number 29 to this inquiry is one such example.

Cardiovascular health is well known to be adversely impacted by chronic stress, as is the immune system, and is associated with increased risk of infections and malignancies (cancers). Evidence for a stress effect is further supported by night time salivary cortisol results which have been shown to be elevated in some residents chronically exposed to wind turbines, but when the turbines are off for a period of time the cortisol test has been repeated and shown to be normal (residents in the US, and in Ontario).

Bruce McEwen is an Australian researcher at the Rockefeller Institute in the USA in the field of stress, and in a review article in the New England Journal of Medicine in 1998 (attached) he described what happens when the

body's defences are overwhelmed because of chronic stress. He described the "rapid aging effect" observed in rats subjected to experimental conditions designed to elicit a stress response. The same "rapid aging effect" is being observed in residents living for any significant length of time, near wind turbines. Consistently the residents report improvement in their individual symptoms when they are not exposed to the ILFN & V. The longer the period of time of exposure, the longer the time to recovery back to baseline. Some people report they never attain their previous good health, and have residual health problems related to the exposure to ILFN & V even when they have been away for some years, despite an initial improvement and partial recovery.

**Tissue pathology**

The possibility of tissue pathology resulting from prolonged ILFN & V exposure has been investigated by researchers including the US military (vibration from helicopters being recognized as a potential risk to the health of unborn children, from studies of the effect of chronic vibration on chicken embryos, resulting in a ban on pregnant female helicopter pilots flying in certain rotary bladed helicopters (Shannon et al, attached, 1994). There are animal studies in the NIEHS Literature Review of 2001 (downloadable at http://www.wind-watch.org/documents/infrasound-brief-review-of-toxicological-literature/ ), eg abstract number 58 by Dadali et al, where focal organ damage was reported in rats exposed to infrasound regularly each day for 60 days. What Dadali et al found was that the rats given antioxidants showed much less focal organ damage in a variety of organs including brain, kidney, liver and testes than the rats not given that intervention. This suggests that oxidative stress may be one of the mechanisms of tissue damage from chronic exposure to infrasound.

There is also the work of Professor Mariana Alves Pereira, Dr Nuno Castelo Branco and their team, over a period of approximately 30 years in Portugal, identifying and investigating a range of reported tissue damage in people predominantly with occupational exposure to ILFN & V in the aviation industry. The pathology described included thickened collagen in blood vessels, pericardium, and altered tissues in a variety of organs including brains and lungs. Recently, identical pericardial and heart valve pathology to that described by the Portuguese researchers has been independently identified in a Taiwanese research group of aviation workers. There are also reports from residents in Germany with long term exposure to relatively small wind turbines that the characteristic cardiac valve and pericardial thickening has been identified on their recent echocardiography investigations. It has been asserted by some that this is a "Portuguese phenomena" but the emerging clinical and research evidence would suggest otherwise.

**SYMPTOM/PROBLEM LIST**

**ACUTE**

**Vestibular dysfunction/disorder** (first 12 also listed by Dr Owen Black MD in his attached affadavit)

- Sleep disturbance
- Headache, including migraines
- Tinnitus
- ear pressure (often described as painful)
- Balance problems, dizziness
- Vertigo
- Nausea
- Visual blurring
- Irritability
- Problems with concentration and memory
- Panic episodes
- Tachycardia (fast heart rate)

**Acute Sympathetic Nervous System Stimulation**

- Tachycardia (fast heart rate)
- Arrythmias, which residents might describe as palpitations
- Hypertension (High blood pressure) which has been reported by some residents to be considered unstable by their treating doctor or cardiologist, and to vary in response to exposure to operating wind turbines.

  The following three conditions are rare, but important to mention.
- Tako Tsubo heart attack (adrenaline surge related) in the absence of the usual acute emotional stressor (eg death of close relation) but closely correlating with exposure to operating wind turbines (2 sites in Australia), or to ILFN & V from coal mining in the upper Hunter in NSW, and also reported in Ontario with exposure to industrial wind turbines.
- Acute Hypertensive Crisis (Australia, Ontario) in absence of adrenal tumour (usual cause),
- Crescendo angina (the best description of this came from a couple in Germany who were stuck in a vehicle on an autobahn near large Industrial wind turbines, but the same has been reported in Australia by a resident subsequently advised verbally by his cardiologist never to go back home)

**Other (some of these have a chronic exposure component but manifest with acute symptoms)**

- Episodes of sensation of body vibration (specifically lips, chest cavity and abdomen)
- Episodes of intense anger (reported in workers as well as residents, also noted to a much lesser extent with short exposure to ILFN in experimental research in 1997 by Professor Leventhall in an office occupational setting)
- Bleeding from ear drum following intense and painful sensation of ear pressure
- Deteriorating hearing (confirmed sometimes with audiological assessment)
- Menstrual irregularities in women marked by heavy bleeding and noticeable hormonal cycle changes.
- Significantly decreased ability to "multi task" impacting noticeably on resident's ability to perform usual tasks
- **N**oticeable difficulties with mental arithmetic, when previously able to calculate easily
- Hyperacusis – extreme sensitivity to "normal" sounds which in some circumstances has persisted for over 6 years after removal from the exposure to ILFN.
- Disorders of thyroid metabolism which stabilize when away from ILFN

**CHRONIC**

**Sleep disturbance & its consequences**

- the sleep disturbance itself has been attributed by residents to the following (which they report does NOT happen when they are not exposed to operating wind turbines, and correlates with wind direction and weather conditions on the nights when they are affected in this way):
    - audible noise of the turbines (especially if their home is not well insulated, or the windows are open to cool it at night, and they live close to the turbines)
    - waking at night in the characteristic "panicked" state (many living further away who report this symptom say they cannot see or hear the turbines at the time they wake up)
    - violent and disturbing dreams in adults and children, which can happen repeatedly over the same night
    - increased need to urinate, sometimes as often as every 10 minutes for a period of up to one hour (sometimes this affects numerous people in the house at once)
    - bedwetting in children reported by parents to be previously "dry" at night for some years

- **known clinical consequences of repetitive sleep disturbance/deprivation**
    - cardiovascular disorders, including hypertension, ischemic heart disease, angina
    - diabetes
    - mental health disorders such as depression and anxiety

- impaired immunity, leading to increased acute and chronic infections, and in the longer term malignancies (cancers).
- fatigue related work impairment and accidents. This is a serious issue for rural communities and farms, where workplace injury is already a significant problem
- fatigue driving heavy vehicles and school buses – thus a concern for the safety of the wider rural community as well
- fatigue in workers such as health care workers (Australia), air traffic controllers (USA), well known to lead to impaired judgment which will detrimentally impact on the safety of the wider community, **in addition** to personal health problems for those individuals)

**Combined Stress (Psychological and Physiological) and its consequences**

- repetitive physiological stress as well as major acutely stressful event have both been linked with post traumatic stress disorder (PTSD). There are residents who have reported to me that symptoms of their pre existing PTSD (eg resulting from Vietnam War experiences or childhood sexual abuse) is triggered with exposure to operating wind turbines. Helicopter noise, and blast noise and vibration from mining has also been reported by other clinicians as triggers. All these are known sources of ILFN & V. There are also reports of people who develop PTSD after exposure to operating wind turbines, with ongoing problems 7 years after they moved away (bought out and silenced by the wind developer). This is a research area needing further investigation, and the connections between PTSD, vestibular disorders and ILFN exposure from other sources are currently being investigated in the USA under Professor Carey Balaban, an acknowledged world expert in this field, who also reviewed Dr Pierpont's work.
- Stress is an acknowledged long term contributor to dental disease via a number of mechanisms including impaired immunity and a dry mouth. Increased severity of dental infections has certainly been reported by some residents living near turbines who report this as one of a number of problems.
- Other illnesses either caused by or exacerbated by chronic stress have been well documented in peer reviewed published research literature for many years, and are being reported by these residents. Some overlap with those listed above for sleep disturbance, which is itself a source of stress. They include the following:
    - cardiovascular disorders, including hypertension, ischemic heart disease, angina, and transient ischemic attacks
    - diabetes
    - mental health disorders such as depression and anxiety, often severe
    - impaired immunity, (elevated cortisol being one component) leading to increased acute and chronic infections, delayed healing, and in the longer term malignancies (cancers). Chronic sinusitis is commonly reported by some residents with longer term exposure, either as a new condition or a worsening of preexisting sinusitis.
    - disrupted human fertility and hormonal cycles
    - exacerbation of pre existing inflammatory disorders, including arthritis, asthma, inflammatory bowel disease, SLE (Lupus), or the development of new inflammatory conditions which coincides with exposure to ILFN & V

**Tissue damage**

The items below have been reported to me from Germany in residents exposed for over 10 years

- Pericardial thickening
- Mitral and tricuspid valve thickening
- Characteristic mouth ulcers described in Vibroacoustic disease

The pathology is identical to that described in workers and others studied by the Portuguese researchers who first described VAD or vibroacoustic disease, (see http://www.wind-watch.org/documents/vibroacoustic-disease-biological-effects-of-infrasound-and-low-frequency-noise-explained-by-mechanotransduction-cellular-

signalling/ ) now being diagnosed in others including most recently Taiwanese aviation workers (Chao et al, http://docs.wind-watch.org/chao.html ).

Finally, there are growing concerns about the potential for fetal abnormalities with increasing exposures to larger wind turbines and therefore more ILFN and V. These fetal abnormalities are being reported by some farmers in their stock (cattle, sheep) at rates which are noticeably increased for them since wind turbines commenced operating. The farmers who disclosed this keep accurate records of their stock numbers and problems, and were clear in their reports. The aetiological agent is not clear, and no one is systematically collecting this data, as with human health.

There is research evidence indicating concerns about the impact of vibration on embryos (referred to previously). Vibration is being reported by some of the residents, living near wind turbines and living near coal mines in the Upper Hunter. The vibration from wind turbines is also reported by institutions with seismic arrays, which are part of a worldwide network to detect nuclear explosions. The characteristic acoustic signature is being detected significant distances away from such institutions in Scotland and Germany. Links to those pieces of research are at: http://www.wind-watch.org/documents/inaudible-noise-of-wind-turbines/ , http://www.wind-watch.org/documents/microseismic-and-infrasound-monitoring-of-low-frequency-noise-and-vibrations-from-windfarms/ , and there is research done in New Zealand by Dr Bob Thorne and colleagues measuring seismic energy from larger 3MW V90 VESTAS wind turbines reported to be disturbing residents, at http://www.wind-watch.org/documents/seismic-effect-on-residents-from-3-mw-wind-turbines/ .

The long term impact of chronic exposure to such low "dose" of vibration is unknown. It is my impression, however, that where a resident is reporting the perception of vibration, the resident's health appears to be negatively impacted more rapidly, even when compared to others living in the same home.

**All of the above problems listed have the characteristic pattern of improving partially or completely when the turbines are off, or when the residents are away from their homes. Some residents also report subsequently being affected by other sources of ILFN, such as when flying, or when exposed to LFN from heating and cooling (air conditioning) compressors, which is to be expected, as they have become "sensitized" to LFN. This phenomena of "sensitization" was noted by Professor Leventhall in 2003, where he also made it clear that if people moved away from the sources of the LFN their condition improved. What is being observed is that many sick people who do not or cannot move away, deteriorate with cumulative exposure.**

Finally, in response to a direct question in the senate inquiry from Senator Cameron as to whether or not I had ever claimed there have been deaths as a result of exposure to operating wind turbines, I answered I have not made such claims, which is true.

**However, it is clear that some of the conditions being reported are potentially life threatening, in particular the acute cardiovascular pathology, and the serious mental health problems. I am aware of emerging concerns from Ontario about identical issues.**

I have had phone calls and emails from desperately sick people, who are being ignored by all the relevant responsible health and noise regulatory authorities, and who are or have been acutely suicidal or who tell me they have made suicide pacts if things do not change for them, particularly if they cannot "get away from the noise and vibration, and get a decent night's sleep". Country people are resilient, stoic, and used to dealing with all manner of hardship. They are not complainers. They describe what is going on as "torture".

**Please do not ignore the suffering of these people.**

**Dr Sarah Laurie, CEO Waubra Foundation**

Attachments:

1. Affadavit of Dr Owen Black, MD, May 2009, De Kalb County, Illinois
2. Letter to Professor Chapman http://www.wind-watch.org/documents/letter-from-sarah-laurie-to-simon-chapman/
3. Table on page 49 of Leventhall DEFRA Literature Review 2003 (reproduced from http://www.wind-watch.org/documents/review-of-published-research-on-low-frequency-noise-and-its-effects/ )
4. Leventhall et al, DEFRA Literature Review, 2003 http://www.wind-watch.org/documents/review-of-published-research-on-low-frequency-noise-and-its-effects/
5. NIEHS Literature Review, 2001 (http://www.wind-watch.org/documents/infrasound-brief-review-of-toxicological-literature/ )
6. Capuccio, F et al, "Sleep Duration predicts cardiovascular outcomes: a systemic review and meta-analysis of prospective studies" European Heart Journal (2011) 32, 1484-1492
7. McEwen,B "Protective and Damaging Effects of Stress Mediators" New England Journal of Medicine, 1998, 338 171 - 179
8. Shannon et al, October 1994 "Effect of Vibration and Frequency Amplitude on developing chicken Embryos" US Army Aeromedical Research Laboratory, Fort Rucker, Alabama
9. Alves Pereira et al, 2007 http://www.wind-watch.org/documents/vibroacoustic-disease-biological-effects-of-infrasound-and-low-frequency-noise-explained-by-mechanotransduction-cellular-signalling/