

## **Gas Pipeline Syndrome (GPSH)**

### **A Chronicle of Research and Experiences- Unravelling the Hum**

*It is Said, If You Can't See It, You Can't Beat It. But, This Is the Way I See It!*

**Stephen Kohlhasse**

October 11 2023

In memory of our dog Madaket who suffered immensely

(Embedded videos will not play in pdf format, visit the active discussion in the FB group [The Real World Hum](#) (5)

[The Real World Hum | Facebook](#) or <https://www.fireforged.ca/>

**There are two main reasons the Hum is still a mystery for over 40 years. The failures of notable researcher projects to find the root cause and the maladministration of the addressing the problem by those who are responsible to protect humans and nature. As much as people want to figure out why they are hearing and feeling the condition, my work does not consider this as I believe my energy needs to focus on the root cause and addressing it!**

### **What is causing the conditions of a Mystery Infrasonic/ Low**

Before reading this paper it is suggested that the reader watch a deco video of my efforts to uncover this source and what actions have been taken to bring attention to the matter covered in section 13. "Doom Vibrations" produced by Garret Harkawik and on the Atlantic as "The Hum, The Unexplained Noise 2% of People Can Hear".

<https://www.theatlantic.com/video/index/593992/doom-vibrations/>



This paper is a collection of how I started to get resolution of what is causing my Mystery Low frequency Sound, Vibrations and Ear/ Body Pressures in Western CT and found to be applicable Globally in explaining what is the Global Hum. This paper is prepared to memorialize my works and to share what was learned, the conclusions and the concerns about the revelation of **Gas Pipeline Syndrome**. For many hearers this is just a novelty. But for many others it is impacting their health and quality of life. For many the sound is manageable, but the other conditions like vibrotactical sensations and barometric type pressures to the ears and chest cannot be managed. Not many people know what direction to turn for help, as they are denied any help from the regulators to investigate their situation. And the sonic impact of the Infrasound and low frequency conditions on nature's creatures appears to be very suspicious.

This work is a first of its kind and disputes so many baseless claims what this is. This paper serves as a reference as a stepping stone for others to planning to do research and for those needing a substantive argument in confronting their local/ state/ national leaders.

I have strived to avoid Confirmation Bias continuously second-guessing research and field data. Certainly, this work requires much more investigation by accredited organizations to be accepted.

**The key conclusion of my research in this paper is that this phenomenon is primarily caused by high pressure natural gas pipeline systems. As the operating conditions of existing systems have been increased and new pipeline systems installed to transport more BTU's, and a willful ignorance of the problem at the Federal Level in the US and other Governing Bodies elsewhere has only exasperated the suffering from it.**

**The work done here focused on a source never considered seriously in the past. The only aspect of the problem solving process is to test the conclusions by operating these systems is different operating conditions. Which without the cooperation of the government and the companies is unlikely to be done.**

Thou most cases fit the GPS model to a "tee", there are other cases that are "Head Scratchers: why the conditions are occurring so far away from these sources that are like veins in the body. These cannot be dismissed; they just require boots on the ground research. Others sources cannot be ruled out for a local problem.

**Unless one understands the problem and applies scientific principles and collects data, the problem will never be fixed. A solution might be very simple, it may be complex. But there is a fix!**

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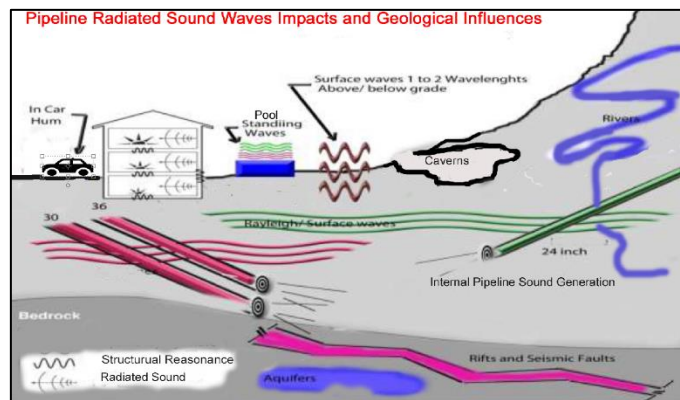
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**The sections marked with an asterisk (\*) are topics screened for possible association to this Syndrome and chronic exposure to ILFN. They require quite a bit more research to determine if there is any basis. The reason they are included is if no one raises these type issues, they may not be ever considered.**

## **The Gas Pipeline Syndrome Model**

Over the past couple decades; there has been a proliferation of complaints about bewildering vibrations and low frequency sound around the globe known as “**The Hum**”. Hundreds of thousands, if not millions wonder about its source. For most its lip service about the source and from the media just beats it around the bush. But their experiences and symptoms are real. It is thought that only 2-5 % are “hearers” and probably even more “feelers” called Hummers in active locations of varying degrees of intensities. This has led to all sorts of speculations, even some experts postulating that the source of this type hum may never be found. And what I suspected to be the cause turned out to be correct, except in a different way.

Since 2010, I have tirelessly engaged in study and discussion with Town, State and Federal governmental agencies and representatives asking for an investigation into the cause of this low frequency sound that I began experiencing in my home in late summer 2009. I was forced to go it on my own to solve. Using typical problem



solving I came to conclude my source as well as the majority of the Hum complaints around the globe, are a result of huge additions and operational changes the caused shift in the **Acoustic Dynamics** of the system from the past decades of moving natural gas here. To this **Gas Pipeline Syndrome (hum)** has taken root. My occurrence of this started in 2009 as a result of huge changes made to 3 pipeline systems in our area of the Northeast between 2005 and 2009! This is what a Mr. Hugh Witherington from the UK

caused by the expansion of the National Grid Gas Pipeline System in the UK.

My original effort was to figure out what was the source of **my** low frequency **annoyance** to be able to approach the responsible party and town. state authorities with facts and evidences to address the problem. Then as the conditions worsened and I learned about the harm of chronic ILFN exposure I became concerned about its **health effects**. After unsuccessful efforts with the State and FERC I realized that no one would listen to a single individual, so I broadened the scope of my work by doing desktop research to see if this problem was larger than just my area. What I learned is this problem is quite extensive, but even armed with those facts the State and Federal Agencies refuse to address it.

**I committed to myself to prove this out beyond a reasonable doubt in order to stand up to the rigors of facing up to State and Federal Regulators and dubious other theories. I welcome conversations based knowledge and fact to what is being claimed by those. For far too long research into this has been diluted and diverged from true research.**

My resolve in figuring this all out stems out of not being listened to, trespassed and tread upon of an environmental stressor that it appears the government doesn't know how to deal with. It infuriates me that the Federal Government continually has side stepped the issue as a mystery in face of the facts provided them. But the refusing to do a proper investigation as I've asked for many times may actually be a blessing in disguise. I am very critical about the lack of support by the authorities and say so. I am not sure the Government would have been capable of reaching these conclusions and if they did would have sequestered the information from the public. In the beginning, I could not have imagined where my journey would find answers to my problem as well as being of **Global Significance**.

My basic research is complete to convince myself of the proof of a source. At this point my interest is to **Proof Test** the findings and conclusions derived from my research. One important test of the GPSH findings occurs every time there is a major regional electric power grid black out. Every time this happens, regardless of emergency diesel / natural gas-powered electric generators running the hum is as usual. Whilst the entire part of the area, country or affected expanses of the northeast proof the theory. is I am also **sharing** what I've

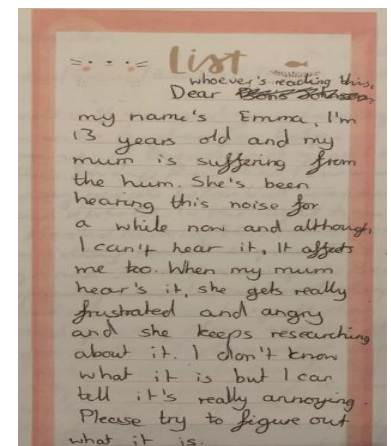


discovered with others to help them with understanding something that is very complicated that they would have never considered! In this way I hope a committed GPSH critical mass of informed people will have more success getting the **attention of the authorities** to further this work who at this time **don't CARE**. The many diverge groups and forums get nowhere and most of the groups are just sounding boards to share experiences, no true research is going on. Truly, this environmental stressor is affecting the sonic balance in nature affecting the **greater good**, not just a few complainers as the companies and the authorities to portray. Even if the numbers of severe cases are small, how can their lives just be thrown out by a few lawmakers! I am confident that this work solves the mystery of most of these type conditions throughout the US and elsewhere

What people need to realize is that both hearers, feelers who realize the problem and non-hearers who may be feelers are affected. I am sure there are far more non-hearers that do not realize their situation that exhibit the same non-auditory health and environmental conditions as a hearer who realizes something is out of sort. And unless the Hum is one's problem, most everyone else feel it's "not their" problem. What we'll see in later sections is how even these people are impacted even by the **actions of others** caused by the harm of GPSH and how their action **domino** to affect society as a whole. Interest has been increasing in the effects of these type ILFN conditions in residential settings which may be the **root cause or a contributing factor** into many modern societies unexplained human health, mental health and weird happenings in Mother Nature. These questions certainly need better answers than the excuses of being a mystery by the experts!

Anyone who has tried to reach out about this feels an injustice from either an intentional or unintentional cover up of the problem! We know when there is a Hum report that the dwellings people live in or work at are being saturated by ILFN typically manifesting as low frequency sound and rumble, vibration, sound pressures and other environmental anomalies. To which many attribute to their onset of physical and mental health problems.

We also know that over the last few decades tens of thousands have reached out to the media, forums and other ways reporting the occurrence, its annoyance and looking for answers. To which unsubstantiated explanations manufactured. In addition, we know that where there is one hum reported that entire communities are affected. In addition, we know that almost everyone is very unaware of where and what capacity high-pressure natural gas pipelines have to be the source of this problem. The conditions can be random or chronic. Chronic is anything over a few hours, and when that occurs people get physically and mentally sick, not to say least how it affects their pets and nature! This is a very moving note from the 13-year-old daughter of a mother suffering from periods of exposure in the home from the Bristol UK, who I visited in July 2022 and experienced a low level condition that day inside the home. It is addressed to Prime Minister Boris Johnson pleading for help in June 2021.



**If anything comes out of this work is that:**

- Get the attention of the authorities that this problem must be investigated
- It should help those needing a plausible reason behind a problem that takes over their lives that from all they read about are other people plights and the spin of the media of misguided theories

- Open the eyes of health and mental health professionals and environmentalists about an environmental stressor they are likely unaware of.
- Write a screen play

## My Bio

I have a BS in Mechanical Engineering. The majority of my 47-year professional career has been involved with planning, engineering and construction of facilities in the process and refining industries. As such, I have seen many things that most interested parties involved with this ILFN situation are unfamiliar with. Much of the same type equipment and problems we see are also part of the gas transmission industry. Most Hum investigators and sufferers do not have this experience which is critical to understanding GPS.

One thing I've learned is that most people could care less about this problem unless it bothers them. Furthermore, they do not appreciate the potential consequences it has on them and their families lurking behind the "quiet".

To clarify what my goals are and aren't. Since the US Government has refused to take action, and this problem has tortured me for years someone had to figure this out and use that to campaign for a full investigation and study to understand the phenomena so mitigation measures can be implemented to eliminate this pollution that a large part of the population is forced to struggle with and to answer the questions of long term health consequences. It is not meant to **demonize** energy development which I believe is a critical part of our national security and necessary. As I always say, I am supportive of energy development and nuclear power, but when an industry doesn't even want to understand a problem, it is accused of owning and make every effort to avoid understanding it, then voices must be raised to the highest levels!

I've gotten in front of the companies, town/ state/ federal legislators, state/federal agencies, contacted SMEs at Universities and participated in numerous Hum forums to collect data and experiences. After all this, little progress has been made for the basic need of an investigation. As such, I have tried to bring attention to this by contacting news outlets and other journalist to cover the story. In addition, usually that turns into just more sensationalizing of the problem. My only comfort that keeps me going for this is having the satisfaction that the people who contact me begin to understand the situation and the few tips I can give them to cope. This compassion has cost me well over \$20k and into the six digits \$\$\$\$\$\$ worth of my time.

What is sad is that for so many I talk with there is no suggestions I can offer to help them other than them getting some relief of the mental angst of not knowing why they are being tortured.

## Overview

This mysterious phenomenon and its impacts on people began being reported in the UK in the mid 1970's. My hum started in late 2009. Most recently, even the so-claimed Sonic Attacks known as the Havana Syndrome can be linked to GPS, in every location reported including Havana, Moscow, Beijing, Guangzhou, Washington DC, London, Vienna and other locations throughout the US and globe. Why is it the few affected government employees gotten so much attention to a problem that affects tens of thousands if not millions of US citizens by the Academy of Sciences and US Intelligence Community thinking its microwaves. As has been the course of history regarding the Hum it is diluted into a non-issue, for reasons unbeknownst to me!

**Most of my independent work has been dedicated studying the 2 interstate natural gas transmission systems having a total of 3 high pressure pipelines that pass through my area. Other types of energy production/ development and transmission systems such as low-pressure NG distribution, hazardous liquid pipeline systems, gas/ oil field gathering systems were not part of this study as they are not found in my area and are**

**not a concern as my source. However, if it were determined they are a potential source to the greater global Hum – ILFN problem then they too would fall in the GPSH classification.** Using those findings, I have done enough study work to conclude that GPSH most of these type hums reported around the Globe can be linked to a common type source. What I found in talking with FERC and my own work, that there is little to no work ever done to link natural gas pipeline systems and in particular the role of the pipelines, being a source of wide spread ILFN and vibration.

My work is just the “Tip of an Iceberg”. I’ve leaned on research from science, various fields of acoustics, neuroscience, Infrasound research, health and mental health, natural science, etc. of and drawn out the experiences of countless numbers of Subject Matter Experts (SME) and the Hum community to come the conclusions and concerns discussed in this paper. My role is a Facilitator and Visionary where no others have attempted to go before. It does step outside the “box” of conventional thinking, but to solve this problem that is what is required to understand this little known about environmental stressor.

As with any problem needing a solution, it requires a problem-solving methodology with a reasonable hypothesis to collecting data, analysis with conclusions that require implementation of the fix to test the theory. This would require far more investigation and cooperation from the companies and the government before that could ever happen not likely to happen. **At this point**, there is little more research I can do in the problem solving process, so the focus of my efforts now is to share the learning with those that may be more successful in getting a high level investigation done, consulting others about this truth and real time proofing of the GPSH model. To which I can say is 99% accurate. As there are far too many consultations the collection of additional database locations has ceased as too much time is needed to maintain it.

Before reading on, consider this, if ILFN sound waves are strong enough to make dwellings resonate, make my pool water have standing surface waves, then what is all this ILFN sound and vibratory pressure doing to our well-being! And if only 50% of my findings are on the mark, or even 20%, should we be accepting that nothing is being done about GPS? Listen to those suffering from it!

References that support the basis of the topic discussed are included throughout this paper. They should be accessible using the [Hyperlinks](#). If not, either the site is gone or the link isn’t working from the paper, either way a fresh search usually turns up the article. Some are only the abstract of the paper, but due to the cost to purchase the full document, that is what we have for now.

### **Infrasound and Low Frequency Noise (ILFN) Why both hearers, feelers and non-hearers should be concerned about this Agent of Disease of mass proportion**

Having found a direct correlation between the sound, vibration and other physical malaises being experienced to ILFN the more I researched about ILFN, it became apparent it is well known about and our government is well aware of the hazards of chronic exposure to ILFN. This was brought forth 2001 about the Kokomo Hum by the National Institute of Environmental Health Sciences (NIEHS). They recommended toxicological studies be done, which I can’t find ever done or at least not released to the public!

There are many works that cover the effects of ILFN. Besides the obvious conditions it impacts on humans and animals there is absolute proof of certain frequency that cause human stress and fear. The Fear Frequency <https://www.youtube.com/watch?v=7ZAmq7Fd1Dg>

Dr. Malcolm Swanbank’s presented his experiences of ILFN and wind turbines. His involvement began in 1974 when “asked to address a low-frequency noise problem from a 15,000SHP ground-based gas-turbine compressor installation, having a 40-foot high, 10-foot diameter exhaust stack”. In many cases, GPSH could

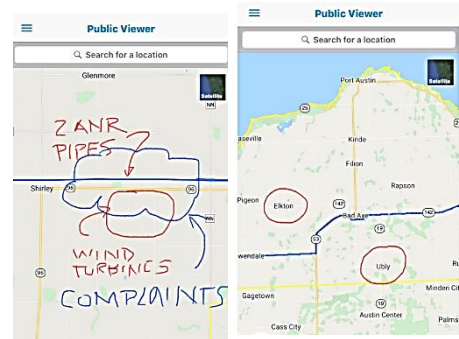
replace wind turbine in almost every case. Finding this article in 2021 has equivalent arguments on many fronts as my work since 2010! (Additional ref listed later) <https://stopthesethings.com/2015/05/11/top-acoustic-engineer-malcolm-swinbanks-experiences-wind-farm-infrasound-impacts-first-hand/amp/>. In his literature he mentions that sensitivity to LF noise increases over time in exposure that some authors call a “learned aversion

- Infrasound- a Brief review of Toxicological Literature In regard to the Kokomo IN Hum [https://ntp.niehs.nih.gov/ntp/htdocs/chem\\_background/exsumpdf/infrasound\\_508.pdf](https://ntp.niehs.nih.gov/ntp/htdocs/chem_background/exsumpdf/infrasound_508.pdf).
- Effects and sources of LF Noise Berglund, Hasseim, Job -1996 The Journal of Acoustics Society America: [\(PDF\) Sources and effects of low-frequency noise \(researchgate.net\)](#)
- Health Effects of Exposure to Ultra Sound and Infrasound. UL Health Protection Agency 2010: [Microsoft Word - RCE-14 Main text and prelims.doc \(publishing.service.gov.uk\)](#)
- [Low Frequency Noise - an overview | ScienceDirect Topics](#)
- Noise a Modern Plague [Noise Pollution: A Modern Plague \(nonoise.org\)](#)
- Vibro Acoustic disease (VAD) by Col. Nuno A.A. Castelo Branco, MD, M Pereira presented as part of study work done about Military Problems due to chronic ILFN exposure. LFN exposures on Military Operations: <https://apps.dtic.mil/dtic/tr/fulltext/u2/p014113.pdf>
- Maschke C. - Introduction to the special issue on low frequency noise. Noise Health 2004; 6:1-2: <https://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=1;epage=2;aulast=Maschke>
- Findeis H, Peters E. the disturbing effects of low frequency sound emissions and vibrations in residential buildings. Noise Health 2004; 6:29-35 <https://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=29;epage=35;aulast=findeis>

#### **Applicable Research from WTS (Wind Turbine Syndrome) Interest**

- Wolcott –Breathing and Sleep Research: Community-based study of health effects of infrasound: [http://www.anzctr.org.au/Steps11and12/374136-\(Uploaded-23-11-2018-15-26-50\)-Study-related%20document.pdf](http://www.anzctr.org.au/Steps11and12/374136-(Uploaded-23-11-2018-15-26-50)-Study-related%20document.pdf)
- A good over view of about infrasound from the 1970’s to the end of the 1990’s relating to Wind Turbines and other “established” sources.  
Richard R James- SAGE – Wind turbine infra and Low frequency Sound; Warning Signs that were not Heard (2012) - <https://docs.wind-watch.org/James-wind-turbine-infrasound-low-frequency-warning-signs-not%20heard.pdf>

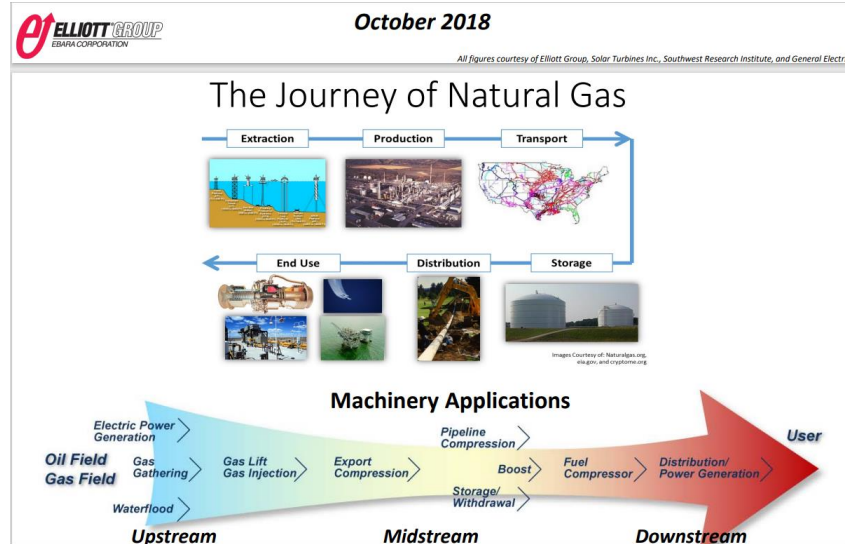
But just as applicable if not more to GPS. I suspect that in many cases where WT are co-located to natural gas transmission systems this is missed by investigators studying Wind Turbine ILFN. This case of **mistaken identity** could be a case of misdiagnose of the complete condition. If GPSH is not the primary source, then it is likely an important contributor to the low frequency health issues and complaints near certain WT farm locations. Cases like Dr. Malcolm Swimbanks in Elkton and Uby MI and complaints from Shirley WS indicate this a likely position.



### **Other ILFN & Vibration Conditions Tied to Natural Gas Transmission**

**It is worth understanding the history and use of pipelines to transport natural gas.**

The US Natural Gas Compression Infrastructure: Opportunities for Efficiency Improvements Klaus Brun, Ph.D.  
Director R&D, Elliott Group University Turbine Systems Research Symposium October 2018



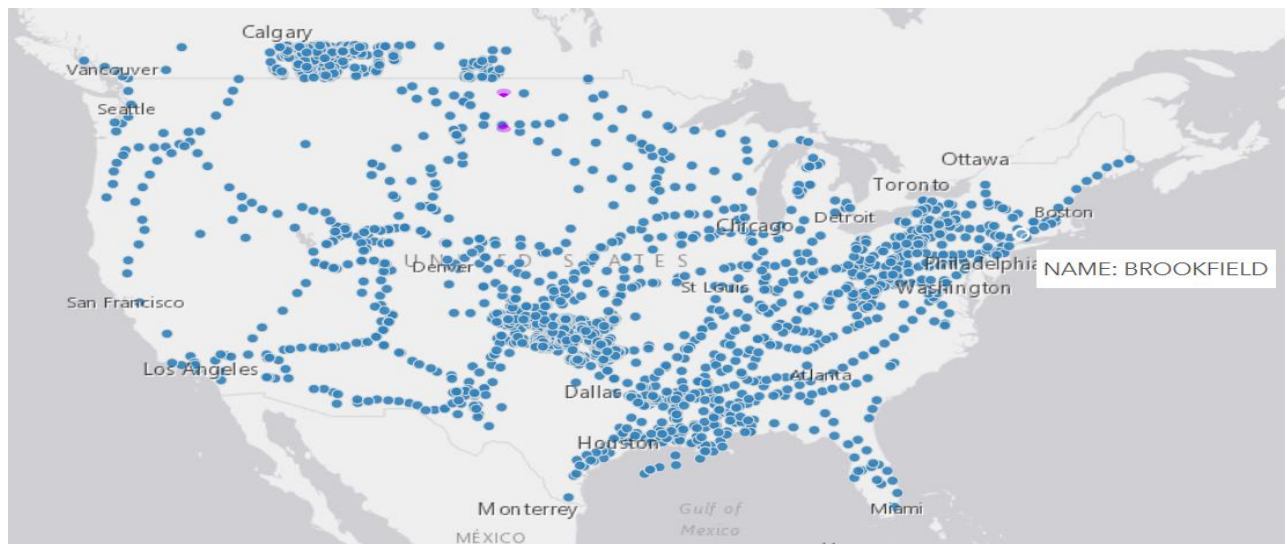
[The US Natural Gas Compression Infrastructure: Opportunities for Efficiency Improvements \(doe.gov\)](https://www.doe.gov)



## Interactive Map of Inter/ IntraState Natural Gas System Compressors

Not shown are gas field gathering high pressure compressors and other ancillary units.

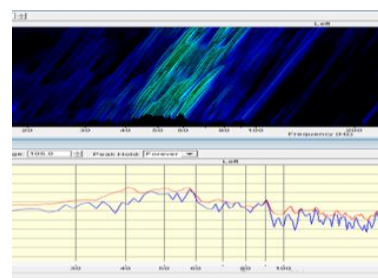
[Natural Gas Compressor Stations](#) | [Natural Gas Compressor Stations](#) | [HIFLD Open Data \(arcgis.com\)](#)



## Flutter

This is worth noting in this paper because it is another localized ILFN problem that communities are faced with. The lack of resolution by the companies sets the tone of their willingness to avoid doing the right thing when it costs money and time. In retrospect, this was an unfounded position taken in their 444 pages refute. In 2023 they will correct the problems as a requirement of their construction permit to add new in line compression at the Brookfield station as part of the ExC project.

“Flutter” is the result of the casting off of low frequency airborne pressure waves caused by unstable exhaust discharge from the 2 IGTS turbine exhaust and possibly from the air coolers there. These do not continue as far as ILFN, but for residents nearby are a problem. FERC engineers witnessed these conditions in 2010. FERC cowered to the refusal of IGTS to fix a problem they are well aware of. IGTS’s comments in 2012 that because it only affects a very few families the cost to correct and the units taken out of service do not justify them to spend the money as doing this does not serve the **Greater Good**. The 3D Spectrograph above shows the pressure effects.



Flutter is a persistent atmospheric barometric pressure disturbance. Turbulence from vortex shedding of the exhaust system and possibly the pipeline air cooler fans radiate away into the community and **sensible to everyone** like heavy thunder, Inter Noise 2000: [COMBUSTION TURBINE EXHAUST SYSTEMS- LOW FREQUENCY NOISE REDUCTION \(conforg.fr\)](#)

Power Plants Cause Acoustical Pains

[Noise & Vibration in Gas Turbine & CHP Power Plants](#) | [Aeroustics](#)

Mostly felt outdoors, but manifesting in structures as a vibration. FERC knowingly allows the conditions to be unaddressed by the gas company.

The vortex shedding is evident in the video below taken from Jun's home.



My home is less than 2000 feet from these stacks. Incidentally this home was saturated with LF sound and vibration forcing the homeowner to regularly leave and subsequent to our interactions sold the home for far less than market value. Recently, that house and another one nearby sold to IGTS for the ExC project for over 4 times the price paid a few years earlier.

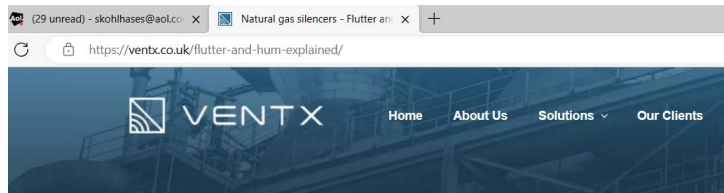
[Noise & Vibration in Gas Turbine & CHP Power Plants | Aercoustics](#)



## Industrial Problem Solvers are Starting to catch Wind of GPS and Flutter

This is an article from an equipment supplier to the gas industry that deals with noise and vibration solutions. It is dated April 2022, 12 years after I identified the source of my Hum and Flutter that roll up into GPSH.

<https://ventx.co.uk/flutter-and-hum-explained/>



29/04/2022 BY VISIBILITY

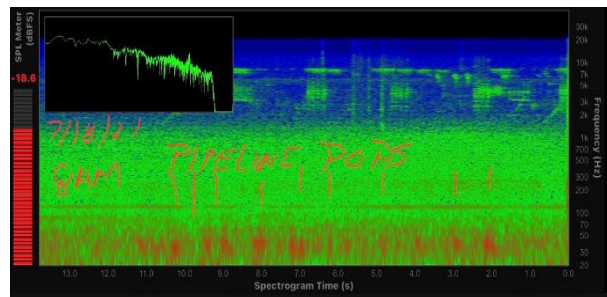
### Flutter and hum explained

Industrial noise comes from a huge variety of sources. This includes things like generators and compressors. In addition, some forms of gas can get noisy when you transport or vent them. That is why we design and supply first class natural gas silencers. To do so, we use special software to ensure our models can [incorporate into your systems](#).

One thing you might not be aware of is that pipelines produce noises that can negatively impact your health. Gas lines in particular produce a phenomenon of low and extra-low frequency sound waves. They occur due to the transmission of high pressure natural gas through the set ups. These noises are referred to as flutter and hum.

## Pipeline Rumbles and Thumping

On my covered front porch, facing the 2 Algonquin lines there is a randomly occurring rumble like thunder and thumping sound that does not correlate to any other things like rough highway surfaces, construction, etc. These conditions are seen in the spectrograph screenshot. Again, worth noting here, as I believe another instance of a problem occurring from these systems resulting from change. This likely explains other occurrences around the country similar to this. **In this app the red color indicates intense SPL's (Sound Pressure Levels) that are occurring normal range hearing capabilities do not perceive**





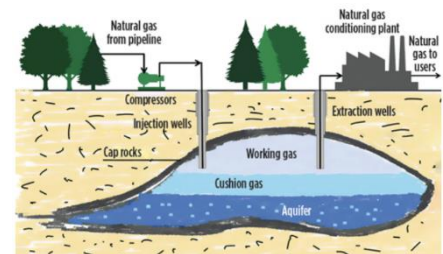


## What is Gas Pipeline Syndrome (GPSH)



Gas Pipeline Syndrome (GPS) is a complete life cycle of an environmental stressor phenomenon from an identified epicenter source of

Infrasound & Low Frequency (ILF) sound waves to its consequences of inanimate mechanical forces on humans, animals, insects and other parts of nature. Most people do not realize the size, the extent and the **massive amount of Sound Power capability to cause intense Sound Pressure Levels** far away from these pipelines and compressor installations. That source is the many High Pressure Natural Gas Pipeline Systems and Compressor Stations that crisscross the US and many other countries. Mainline pipelines can be up to 42 inches in diameter, operating at over 1450 psig (100 bar) with parallel multiple lines in the same right of ways and compressor stations from 1 compressor to dozens of units having dozens of tens of thousands of horsepower capable of extreme sound pressures generation as well as ancillary equipment that can cause radiated airborne vibrations. They are used to compress natural gas/ vaporized LNG and other gases such as the developing reclaiming of CO<sub>2</sub> for trunk line gas transmission systems, collection systems in gas fields and injection systems for underground gas storage.



My work did not study Low Pressure distribution systems in towns that distribute gas to homes and businesses, nor were other type product pipelines studied (gaseous and liquid). The reason is these other systems do not exist in my area of investigation. Most people do realize when they say we have no gas pipelines based on their only familiarity with it based on having gas in their homes is a misnomer that what may be right below their feet are these huge systems supplying gas to elsewhere thousands of miles away. These are buried and out of sight, unlike wind turbine farms, factories, cell towers, etc.

A specific focus of the study is to identify its consequence on humans and nature as ILFN is the suspected cause of the mounting numbers and complaints of The Global Hum. There are so many published works on this for reference of which one is: 1996 Berglund/ Hasseman/ Job: [Sources and effects of low-frequency noise - PubMed \(nih.gov\)](#).

I believe as many others also do, the GPSH model fits most cases and factually substantiated. It is based on science, engineering, data, facts, SME study works, personal observation, interview, field-testing, desktop research and analysis publicly available information. Current activity is proofing the conclusions with new cases for "Fit, Could Fit or Unlikely to Fit based on information at hand" status into the GPSH model. Certainly, peer review is appropriate at this point. GPSH is far more expansive than just The Hum, thereby more selectively should be called GPS.

People perceive the conditions in many ways and most do not appreciate its consequence for what it is. The sound is more often “noticed” in quiet, rural/ suburban settings. Described as an idling diesel engine located somewhere outside their home many with accompanying tactical vibrations and body pressures from the air. Many say the sound is coming from underneath them or from a certain direction. Some experience a pounding condition like a drum. Some say they hear a buzzing or ringing like tinnitus. Some compare the physical feelings like being exposed to electricity (possibly a piezoelectric phenomenon feeling like static electricity, as other feeling of electricity I am aware of is shock). Estimates of the frequency vary in the LF range (30- 70 hz).

An answered question is if people become sensitized to the Hum in their homes does it make them more prone to sense the conditions everywhere they go that has any types of ILFN conditions.

And a small group of us working together from CT, WI, CA, PA, Alberta Canada and the UK believe the conditions reported globally are very similar. But due to the glossary of terms used to describe them are not the same leaves many to suspect other sources. But this small working work has taken what I started and since 2019 further developed the phenomena’s cause and consequences. People’s physiology, affects the way they perceive this onslaught.

Some people associate the conditions with causing them to have chest pounding, overall body vibration, arrhythmias, etc.

As with anything, people reach out for help and comfort for bad things happening to them. As an example, I was contacted in early 2021 from an informed sufferer from Alberta Canada who is in accord with GPS. He convincingly feels the rash of natural gas compressors throughout his area in Alberta are the source of the conditions of GPSH that have ruined his quality of life. To a degree, we have combined efforts. His journey and a copy of my Chronicle are in his website [www.fireforged.ca](http://www.fireforged.ca)

## How I and others sense the conditions

Since 2009 since I began sensing the conditions, my description and quality of life issues are the same as most. The diesel sound has a **dysrhythmic nature** with occasional under and overtones from something changing (like a valve opening or closing). The intensity changes predictably and randomly from day to day, hour to hour. Occasionally I notice a beat frequency

Beat Frequency demos:

<https://www.youtube.com/watch?v=pRpN9uLioul>.

<https://www.youtube.com/watch?v=5hxQDAmdNWE>

I originally described the sound as a droning, pure tone. It is not a pure tone. In fact, it has **very active** narrow frequency band(s). In dwellings and vehicles, it seems the audible band is around 40 Hz or 35 Hz depending on the type structure its being heard in. Acoustic testing by consultants indicates an infrasonic band around 18Hz (there may be others). Outdoors, the frequency band is far wider, and it is mostly inaudible and indiscernible. Snow cover seems to muffle the higher frequencies so the Hum seems even worse then

Besides the sleep impact and annoyance of this **constant tonal type sound, vibrotactical and percussive vibration sensations** there is unexplainable **ear pressure** intense enough to cause brain fog, mild headache and

nausea. Many sense **outer body pressure** and **pulsing forces on chests** inside impacted spaces, supposedly like those having paranormal experiences. My ears ring in locations where the conditions are occurring. On the bottom of my feet, I 'll feel vibrotactical sensations and observe water surfaces vibrations in cups and bottles as well as dramatic standing waves on my pool surface. Interesting some of these sensations are noticeable in a parked vehicle. At times I do feel vibrotactical sensations in bed, likely from the bed springs. All these are common symptoms of people reporting the Hum! How bass sound is sensed : [Bass: the Physical Sensation of Sound | Audiophilic](#)

### How GPSH has Affected Me

Depending on the intensity and pitch, I cannot sleep. My sleep pattern has been destroyed, like what I believe so many other unsuspecting others are experiencing who are unaware about ILFN in their environment. This insomnia has caused an energy depletion. My blood pressure has increased since this started. Ear ringing is common and staying in elevated space brings on mild nausea and accompanying headache. My demeanor has changed and possibly affected my cognitive capabilities. In addition, I have an obsession to get to get this problem addressed by the Government!

### Common Symptoms Resulting from Chronic Exposure

Sleep interruption is most common. In addition, the increasing prevalence of this in modern day society can be attributed to the far-reaching GPSH issues. Chronic exposure to ILFN saturated environments is be harmful to our wellbeing. Increasingly malaises of the unexplainable onset of vertigo, nausea and migraines can be associated to GPS. Some claim they are losing their minds, while others claim it is affecting their **cognitive processes**! The 64-million-dollar question, is this in some way contributing to the unexplained surge in society of the epidemic of psychological and health problems happening? Could GPSH be the root cause of mass casualty of harm and no one wants to address it?

ILFN is reported to affect adrenal gland production of cortisol. Cortisol disruption was found to be a problem found by VAD researchers in studies about aviators in the 70's that were experiencing greater levels of health issues than the general public. It has also been found to affect the Respiratory System. Others seem to experience arrhythmia and heart palpitations.

I had an eye-opening parental situation that warrants consideration of something not usually discussed. I suspect this may have some credence as both my elderly parents around 90 years old both passed away of swallowing inability. I've read where ILFN may have an effect on swallowing. To which I remember starting to sense an intense low frequency Hum in their home where I grew up in northern NJ, in 2010. Since growing up there with RT 208 behind it I never heard it there before. They passed in 2011. A number of natural gas pipelines are just over 1 mile from the house!

I have collected **thousands of first-hand reports** of people's experiences and communicated with many people experiencing the conditions. The stay-at-home requirements of COVID has exasperated the problem, like a person from Rye NY who began experiencing this while working from home. The worst stories are those who have had thoughts of committing suicide! Medical and mental health professionals are unaware of this burgeoning phenomenon in their communities. This makes those professionals skeptics when their patients

come to them with symptoms having no “known about” diagnosable cause. When in fact these conditions must be considered in any medical evaluation of these type symptoms, for hearers of the Hum as well as non-hearers.

Information about the effects of ILFN litter the internet. Search on subjects such as “Physiological Effects of Low Frequency Noise”

### How can non hearers get a sense of the Hum Sound and its effect on them “the perception of sound”?

Many non-hearers ask what does the low frequency hum sound like and feel like. Some say they when they walk into a building the feel something strange. Perception of Sound” and many other questions are covered by researchers at the University of Salford. This is a link to the Psychoacoustics/ Low Frequency section of their work to “Frequently Asked Questions”; [Frequently asked questions | Acoustics | University of Salford](#).

The human determines the direction of normal frequency noise by Sound Localization using interaural time difference and interaural intensity differences (sound power) between each ear and spectral shape. Just the width of the head is enough to allow the brain to triangulate a direction. Infrasound and low frequency don’t work that way. Far greater distances measuring the difference (attenuation) is required. This method is covered in subsequent sections.

The sound is real and not just some condition inside the brain. If it wasn’t an environmental condition, it would not be measurable by acoustic testing equipment. I can’t say if anyone has successfully recorded the sound and able to play it back for demonstration, I’ve never tried to record the sound, I’ve only used analyzers to visualize it, document intensity and frequencies and to do sonic mapping in my area to pin point source epicenters. And because of the differences in Human Physiologies these tools are critical to understanding the problem for anyone who does not have the facility to hear and sense the conditions.

The Taos Hum got allot of notoriety in the US. There are some decent sound tracks on the internet that are probably synthesized, but provide an idea of what the Hum sounds like. But it does not ensue the full body experience of the space condition. Any of the tracks need to be played on a **good speaker system with low frequency woofer capability**. I think Samil Baseyev claims to have captured the sound in Taos in 2006, but an analysis of the sound profile doesn’t come near the lower frequencies I’ve measured; <https://www.youtube.com/watch?v=EuRBM0i8mbI>.

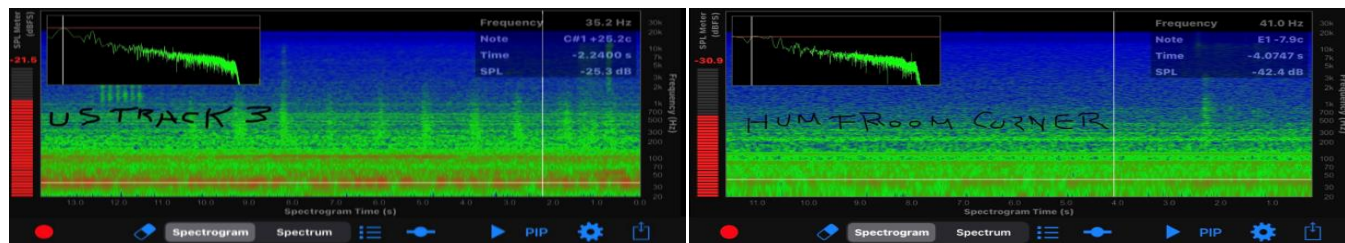


03.mp3

In my opinion the **gold standard** recording/ rendition is from the University of Salford- Psychoacoustic/ Low Frequency Noise research. [http://hub.salford.ac.uk/sirc-](http://hub.salford.ac.uk/sirc-acoustics/psychoacoustics/low-frequency-noise/sound-files/)

[acoustics/psychoacoustics/low-frequency-noise/sound-files/](http://hub.salford.ac.uk/sirc-acoustics/psychoacoustics/low-frequency-noise/sound-files/) . It’s mentioned that these are sounds sampled from a home where there were low frequency complaints and used to the assessment of LF noise, which indicates that they were successful in recording the sound. I find that Track 3& 4 very much like my sound (thou a bit more “pulsed”) and a reasonable volume level produces the other sensed conditions and malaise.

Using audio analyzer on my iPhone to analyze US Track 3 played back on my SONY sound bar/ woofer at a volume that **any person can hear** shows a very similar sound profile around 40 Hz as does the hum measured in



my Room Corner. **In this app the red color indicates intense SPL's (Sound Pressure Levels) that are occurring normal range hearing capabilities do not perceive.** The intensity of my hum at the time was a 5 out of 10 (mid-level). In both cases there is a distinct band of an active narrow band activity. It is possible there are other bands below 20Hz that my iPhone is questionable measuring for.



In this app there is a number in the upper left-hand corner. It is called the **dbfs** reading. It means Decibels Relative to Full Scale. The importance of this data to measure and assess the real time conditions and useful to visualize relative sound pressure differences in space and locations. The lower the (-) negative reading means it is less off set from Full Scale of the tool (0 is full scale of highest measurable sound pressure for the tool). That means a lower negative number is a louder more powerful sound environment.

### **Inadequate -Antiquated Noise Regulations Regarding ILFN Contributions into the Environment**

The source of GPSH is essentially unregulated. This issue has been well published about for decades. Noise Solutions and the Energy Resources Conservation Board in Alberta, Canada addresses this in 2007:

“Incorporating Low Frequency Noise Legislation for the Energy Industry in Alberta, Canada”

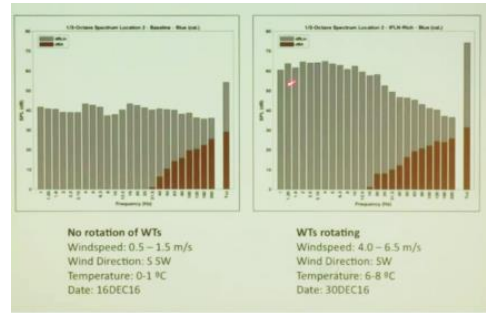
<https://www.noisesolutions.com/wp-content/uploads/2015/11/016-Noise-Legislation.pdf>. **To which the report says would be a nightmare for the regulators**

We know the Federal Government is aware of this problem so why haven't they followed through to do a study or investigation? The answer is complicated. But their veil excuse is there is no regulation to enforce ILFN and vibration. The reason is antiquated regulations are based on the “dba” weighed scale. Where the contribution of ILFN is almost totally discounted. Antiquated regulations were put in place for community noise and hearing protection, not for this problem affecting modern day society from energy use. Though we learned there is one vibration standard in the US Federal Register they fail to ever enforce! And they also claim there is no precedent of this problem before and maybe even suggesting I am making all this up! It is true, there is little to nothing published about this problem, but that shouldn't give them the credence to ignore such a huge problem.

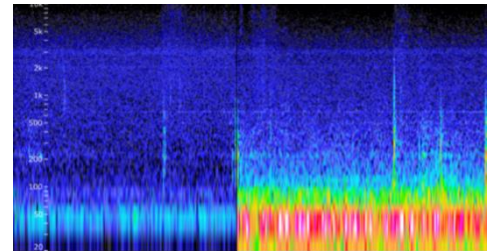
As I was pursued my own investigation with another neighbor, I soon learned that Federal and State regulations do not address LF noise, The regulations probably haven't changed regarding this since this paper from 1991. Gas Industry Noise Handbook INGAA - <https://www.ingaa.org/File.aspx?id=30083> Individual state regulations are included in the paper.



**New regulations** are needed to address this. Due to the rise and expanse of low frequency occurrences and distress from it, Federal Regulations for energy development and transport must be retroactive as well as required to be met by new facilities and operations of those facilities. They must address sound with no disregard of low and infrasound. This would require standards based on “dbc” or linear scale (being known as “dbz”). As the image here shows the dba scale all but discounts the sound of frequencies in the range of the Hum. This is a very good graphic presented in a seminar by Mariana Alves Pereira in Nov 2019 at the University of Waterloo about ILFN and how regulations totally dismiss the contribution of the lower frequencies the wind turbine industry. <https://livestream.com/itmsstudio/events/8781285/videos/196181579> [\[livestream.com\]](https://livestream.com) An example of Wind Turbines shows how obvious current regulations are missing an entire range of sound and sound conditions that are what GPSH is all about. Current events do show that wind turbine ILFN is responsible for health issues where they are miss located amongst residential neighborhoods: <https://uk.news.yahoo.com/turbine-syndrome-wind-farm-154644902.html?guccounter=1>



This image is from an iPhone app that is switched between a dba (left) and dbc (right) weighing. This image shows how there is an erroneous perception on the left side that the sonic conditions due to the LF contribution is nil to which almost all regulations are based. At the time the hum was about a 7 out of 10, and is shown on the right side of the image. Certainly, using the dba scale is misapplied, inadequate and deceiving in address any assessment of low frequency complaints!



And because all regulations in the oil and gas industry are “dba” weighed the conditions never break any regulation. In 2004 Hessler Associates published this article: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.500.4469&rep=rep1&type=pdf>

Interesting enough this was addressed in Alberta Canada as far back as 2007, and I truly doubt anything came out the ERCB’s work

Title I of **NEPA contains a Declaration of National Environmental Policy**. Here in the US this policy requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

Section 102 in Title I of the Act requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment. These statements are commonly referred to as Environmental Impact Statements (EIS) and Environmental Assessments (EA).

Title II of NEPA established the President's Council on Environmental Quality (CEQ) to oversee NEPA implementation. The duties of CEQ include:

- Ensuring that federal agencies meet their obligations under NEPA
- Overseeing federal agency implementation of the environmental impact assessment process
- Issuing regulations and other guidance to federal agencies regarding NEPA compliance.

There is no consideration by NEPA in any of this regarding GPS!

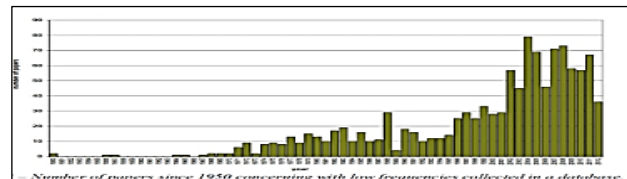
### Hummers are Like Mine Canaries



There are many unanswered questions about the effects of chronic exposure to Infrasound Low Frequency Noise. The issue, is ILFN more than just an annoyance? Is it a threat to human health that the Hum is warning us of? Some light can be shed by researching the “effects of sound on brain activity” and “vibro acoustic disease”. This should answer those questions, that the surreptitious LF vibration and sound conditions trespassing into the lives of millions should be concerning to all!

The problem is wide spread and global, not just a few complainers. More people are likely experiencing than not, but unwilling or unable to reach out and be heard. Some don’t want to be tagged nuts and others worried about their property value if they speak out. People need to understand it is harming them in some way. It is so huge a problem that there is an international Hum community from Germany, Britain, The Netherlands and elsewhere, to which I regularly have reached out to and draw on their experiences to support GPS. And interestingly their experiences are eerily the same as mine. Where in Steinhoring operations it is being considered to pay reparations to the citizens for the Hum problem from the storage of natural gas in caverns below the area.

Articles and research into the effects of chronic exposure to ILFN increase yearly as the bar chart of published papers from 1950 thru 2012. Effect of infrasound and low-frequency noise with regard to loudness estimate: InterNoise 2015 Meeting.



[https://communitynewsvictoria.files.wordpress.com/2015/10/internoise-2015\\_294.pdf](https://communitynewsvictoria.files.wordpress.com/2015/10/internoise-2015_294.pdf).

The German Federal Environmental Agency “Umweltbundesamt” calls the Hum the Brummtom Effekt, which I believe is worsening there as a result of that countries dependency on natural gas with the demise of Nuclear Energy in Germany

**But until there is a mass public outcry by Sufferers to the Authorities and their Representatives, will this get any attention.**

Hum- Hearers are preverbal “mine canaries”. This is thought to be about **2%- 5% of the population in areas experiencing this type Low Frequency Hum and vibrations**. Our symptoms and observances are a precursor of an **agent of harm**. There is so much research and support behind the harm these conditions cause but there is an under appreciation of it in most fields of science and medicine. The path this problem is following is just repeating the missteps like other seemingly innocuous harms that turned out to be major agents of harm similar to situations like radiation bombarding Madame **Curie** and millions of others, the overuse of DDT found to affect

wildlife campaigned to restrict use of by **Raphael Carson** and to presence of high levels of harmful hexavalent chrome from PG&E compressor cooling tower water that made it into communities well water brought to the public by **Erin Brokovic**. Only with persistence did these problems get attention. More recently we were reminded of the government's lack of vision in the intentional dumping of wastes into the river from the manufacturing of the chemical C8 for Teflon in WV in the documentary **"The Devil We Know"** (the big screen version is called **Dark Waters**) and the cover up of the hazards of inappropriate disposal of radioactive waste at Water Creek in North St Louis from World War II processing of Uranium in the documentary **"Atomic Home Front"**. The is what seeming is occurring regarding GPS!

GPSH is analogous to Radon in Drinking Water concerns. Where some unknown reason people had a higher cancer rate in certain areas. With all sorts of efforts to find a source, it turned out like GPSH, that radon was an unknown and unseen agent of diseases. GPSH has the same if not more research into why we should be concerned about chronic exposure to high levels of ILFN, and nothing is done to research it and "The Hum". Why, because it will open a pandoras box that can be associated with \$\$\$\$\$. Since radon is naturally occurring only mother nature can be blamed and there are companies out there to make \$\$\$\$!

### **The Purpose of My Investigation**

- To do enough data collecting and research to convey to FERC and the Companies the need to do an investigation into the Hum
  - Prove that the Hum is not an internal personal issue and is from external sources
  - Use data and other methods to hone in on the source of my Hum causing conditions
  - Figure out a reasonable explanation what causes the phenomenon
  - What else besides annoyance could chronic exposure to this cause?
  - Share the findings with others who most are untrained and lack the experience required to comprehend such a complex problem, hoping they would suggest to experts to investigate and proof out my claims.
- It is not important** to me to convince those that refuse to consider my findings.

***The old adage is if you are not part of the fix, you are part of the problem!***



## **Section 1- Journey of Learning**

**I feel it is important that people understand how I feel about the Hum and the obstacles to solutions and the environmental consequence of chronic exposure to high levels of ILFN (to which Hum is one aspect). Before discussing my Investigation into Gas Pipeline Syndrome in later sections**

So why did I do my own investigation? Initially when this started in September 2009 in bed as an annoyance to a constant trespass that worsened making our dog sick and affecting my well-being I was determined to get answers. All the time other than the help of another neighbor, no one else said they were aware of the conditions. I knew nothing about something called The Hum so I decided to do my own search.

At that time the authorities, the electric company CL&P, the 2 gas transmission systems in the area Iroquois / Algonquin Gas Transmission “lent” an ear to doing an investigation into the problem, after which I realized if I wanted something done to prove out the problem.

So why do I still continue to get the problem investigated? At this point using masking tools, lesser attention to it since my research phase is concluded and the possibility that the problem has somewhat lessened, I found the findings of this exposure and its potential consequences from chronic exposure to be unacceptable without answers. And why this problem seems to getting covered up even though tens of thousands are documented over 4 decades of being ignored. My belief is sharing the information learned will help each person decide how bad the situation is for themselves and how they may argue their case with facts versus just popular opinion and outlandish theories.

Notable quote of John Wesley;

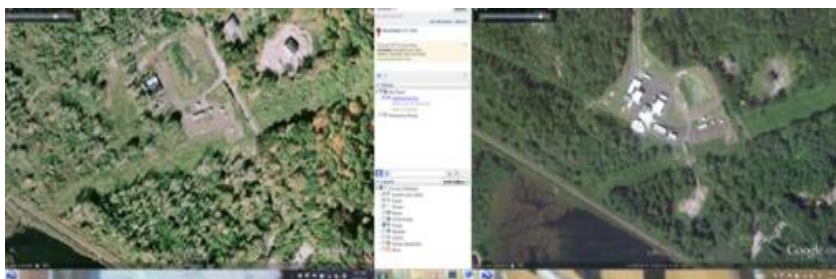
*“Do all the good you can, By all the means you can, In all the ways you can, In all the places you can, At all the times you can, To all the people you can, as long as ever you can.”*

### **A short Chronology of the only reasonable changes in the area at the time my Hum became sensed**

- Prior to Nov 2008 no sensible HUM or Vibration in Brookfield CT home
- Nov 2008- Algonquin Gas (AGTS) puts in service;
  - 18,010 HP additional Mainline compression in Southeast (Brewster) NY
  - 37,700 HP New Compressor mainline stations put in service Oxford CT at Airport
- Nov 2008- Iroquois Gas (IGTS) commissions 1<sup>st</sup> Brookfield Transfer Compressor with 7500 HP & Newtown Loop
- Jan 2009- IGTS commissions two 10,300 HP Mainline Compressors Milford CT
- Early 2009 it is appropriate to assume that the systems were operationally changing
- **Late Aug 2009- Hum and Vibration became noticed IGTS contacted**
- Nov 2009- IGTS commissions 2<sup>nd</sup> Brookfield Transfer Compressor with 10,000 HP
- **Late 2009- Hum and vibrations worsened and become constant**

**During this period of time many others have joined ranks with me to get this problem addressed.**

Between Nov 2008 and Nov 2009, approx. 93,000 HP of compression was added to existing compression HP to push gas through three (3) lines that pass through Northern Fairfield County. This compression was added at a new location by IGTS in Brookfield CT and their existing



-Reference 12 Brookfield IGTS Pic dates Sept 2006- July 2008- August 2010

facilities in Dover NY and Milford CT. At that time, they also installed underground pipeline storage loop in Newtown CT. AGT built a new compressor station in Oxford CT and added additional compression at their existing Southeast NY facility. In 2020 IGTS announced plans to install another 48,000 HP and ancillary equipment between their Athens, Dover and Brookfield facilities by 2023 under the ExC Project.

## At the Start

My first inkling of something wrong was an annoying, low frequency diesel like sound keeping me awake in August 2009. I initially described the sound as a DRONE. Soon I began referring to all the sound, vibration and head pressure conditions as a **Hum** to distinguish it from two other problems occurring from the compressor systems built here called Flutter and Hiss. Originally, I thought the annoyance might just be an increased sensitivity to the vigilance of how the new gas compressor station fit into the neighborhood, but over time that proved out to be incorrect.

Late 2009 I started searching our neighborhood and looking for answers without knowing at the time that SO MANY OTHERS had, were and would be doing the same. I also began collecting data:

- Logging the dates of occurrences
- Commenting on my observation
- Setting up a ranking of intensity of 1- 10, being 10 the highest

I contacted the local Police Department in late 2009 who came to the house. The officer inside the house did but I was told that his Sargent heard a hum sitting in the patrol car outside in my driveway waiting for the investigating officer. Which was my first inkling that a vehicle can serve as a resonator.

Looking back, the first evidence of an ILFN problem was apparent habitat abandonment of coyotes behind our home. In mid-August 2009, we had no explanation why a young coyote was prancing up and down the street and an adult attacking it right in front of our home in day light to which I can reasonably conclude was a disturbance to their environment, possibly ILFN.

Then in early fall 2009 our dog started having constant fear symptoms with tremors and constant shaking and withdrawal demeanor that we had no idea why. She had to be carried outside to do her business. After our veterinarian examined her twice and found no physical reason for these "*fight or flight*" symptoms I began to suspect the ILFN conditions, like thunder to her, to be the possible cause. Therefore, we put Madaket on Doggy Prozac (fluoxetine) for a few months that did calm her down. There were additional relapses over time, to which one episode I



video recorded for the record and shown in the documentary. Fast forwarding to Nov 2021 an article about San Francisco hums interviewed an audiologist how people “lose” their consequence of the external stimuli called “**Brain Habituation**”. Which could explain Madaket losing the extreme fear symptoms she had. [The Hum, a worldwide mystery sound explained | KALW](#)

When we covered the 24 ft. Diameter above ground pool for winter with a dark pool cover, I began noticing vibration patterns on the water surface like water spiders moving in and out of unison as the cadence of the sound and vibrotactical sensations changed inside the house. A neighbor, Bruno, and I started to take acoustic measurements around the IGTS locations thinking at that time the compressors were the source of the hum at my home (later to be reconsidered with the pipelines to be found the primary source).



Fortunately, the Electric Company agreed to do electric power quality and acoustic testing at my home in Jan 2010. CL&P contracted TRC to do acoustic testing in and outside my home to disprove that their high-tension electric lines behind my home were not the source of the Hum I was adamant accusing of. The testing showed the power lines were not the source of this type hum. But the data showed an acoustic environment of ILFN conditions similar to the characteristics of a diesel engine and was proof that the low frequency conditions I sensed is **not of my imagination and external sourced!**

## Going It Alone

After trying to figure out what the source of my problem was, it was suggested I contact the Federal Energy Regulatory Commission (FERC). I did so in early 2010 once the gas systems were becoming the leading suspect. IGTS and I were discussing the problem all the while the conditions continued to worsen. The environmental manager handling the IGTS expansion project said he didn't understand how this problem could be and could not find any study work about these systems causing such conditions where vibration and Hum occur in dwellings from radiated ILFN from large diameter high pressure natural gas pipelines, so this was almost a none starter at FERC. At that point I began realizing that I might have to go it alone sorting this out like I've been involved with in my professional life. As such past experiences and solutions, I believed the right way to handle this once the facts were presented would be better than making it a media event, if anyone would even listen to the plight of one person in Brookfield CT. I felt I would be righted; **BOY WAS I WRONG!**

Contributing to the need for me to get this solved was the unusual onset of mild headaches for no reason, queasiness and disruption of sleep. This was very concerning to me! Searching the internet, I came across research work about the health risks found with aviators and their illnesses associated with chronic exposure to ILFN. Turns out that was Vibro Acoustic Disease (VAD) and identified as an Agent of Disease having stages of health issues identified by a team of researchers in Portugal. There was so much other research and white papers that I was over whelmed with reading and evermore concerned!

Initially I thought that my issue was a neighborhood centric problem, but I soon began to become aware that it is a far greater reaching problem than just my neighborhood when I started to notice the Hum in my parked car at my office in Middlebury CT, some 15 miles from my home.

During the early 2010's I did a lot of desk top research, wastefully reaching out for assistance. I did extensive field data collection and constantly doing observations and logging of the conditions and documenting physical evidences of it such as the pool water surface vibration. With the support of my neighbors, I did get some support from local and state representatives as well as CT's Attorney General who wrote "nice" letters asking FERC to look into the problem, which turned out to be waste of time.

In May 2010 IGTS did a study of low frequency noise that the data clearly indicated our area has widespread LF spectral properties

In June 2010, I noticed strange water surface standing waves on my pool that I have an extensive file of many other dates of this, discussed in section 3. At this point the Hum continued to be bad. I started to use sound analysis programs like the experts had used in my home in January 2010 to do begin to understand the source and the effects over and above just observation, which can be skewed. This unequivocally proved the sound and vibrations were occurring at observed Hum locations and not something internal.

In September 2010, I undertook a cursory acoustic survey along the Iroquois and Algonquin pipelines

In October 2010, I engaged the Dispute Resolution Team (DRS) of FERC who were very helpful in pursuing information, but no resolution due to FERC ineptness to address issues such as this.

To further my convictions that this is a far greater problem than just here, I began pulling a database of hum reports from the internet and plotting them against the EIA Pipeline maps. Which showed there is a correlation between inter/ intra state high pressure natural gas lines and reports of this type Hum (discussed in later section). The first mapping was ready in January 2011 and was updated through 2013. It was revelation!!



In February 2011 FERC advised me they would no longer engage the problem. I was floored that I was being swept under the rug in Washington. Iroquois gas portrayed me and other neighbors at FERC as chronic "complainers". They were right, but not for the reasons they accused us of!

In March 2011, I enhanced my study to include a field study of the attenuation pattern away from the postulated epicenter of the ILFN sources, the IGTS and AGT pipelines.

In November 2011, FERC engineers visited another person's home having LF noise issues and confirmed resonance vibration conditions that I had been claiming from the beginning. NYS representative Nan Hayworth visited our homes in support of the Minisink NY coalition to stop a compressor station from being installed there by Millennium Gas. She mentioned she felt the conditions.



In 2012 a local New Haven Paper ran an article about my duress.

In September 2014 I presented in front of a Public Information Meeting including the FERC Project Manager for the project a Spokesperson for PHMSA and a consultant where I presented about the problem and the vibration regulation that has been

ignored for pipeline system projects. My purpose was to require them to do an investigation and the problem be addressed as part of the Algonquin AIM Project Pipeline project before it receives approval. The presentation is filed at FERC as Accession No.: 201409165027. I saw no apparent follow through!

In February 2016, I did a legal filing to FERC called a "complaint for relief" that included another neighbor's declaration about the Hum and Flutter problems. It was dismissed in September 2016 on the account of regulation, but the Commissioners did not dispute the facts!

Since that time the majority of my efforts have been follow up efforts and bringing awareness of the problem to others so; 1- help others cope with their situation and 2- try to ultimately stumble across someone in authority to push this whole issue up the ladder to Congress, or someone in a Leadership Position.

**With all the time and effort put forth by many experts and government paid investigations why haven't they considered these sources? Either there is a concerted cover up or the experts were inadequate in their methods and subject matter expertise's.**

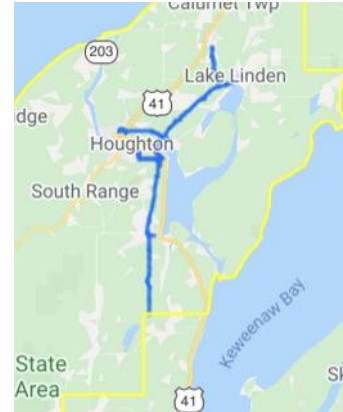


## **Section 2-Videos and Articles about The Global Hum (pre-GPSh)**



Interestingly, I came across an episode about the Hum on “Unsolved Mysteries” from 1995 called the “Mystery Hum”, hosted by Robert Stack (a.k.a. the Taos Hum episode). One of the guests Hal Naumann lives near Houghton MI on the map. During my investigation I made a correlation check of his location to pipeline locations shown on the EIA map image. There is at least one HP natural gas pipeline through his area. We see in the show he visits a mine

(shallow or deep is not known) and the hum is as bad if not worse than above ground. The show can be viewed on **Amazon Prime, season 7, episode 20.**



It is also interesting how this phenomenon which is so baffling to anyone investigating it presented the same problem filming the show. The producer of this episode comments on how difficult it was to film

this episode because there weren't many visual elements and the inability to bring the hum to the audience. This shows how difficult my work has been trying to explain the problem to non-hearers. Fortunately, I learned to use sound analyzers and have many instances of the evidencing of the dynamic conditions of the sound in video footage of vibration/ standing waves of water and other useful science demonstrations in physics.

### **17. ONE OF THE SHOW'S MOST POPULAR SEGMENTS WAS ALSO TOUGH TO SHOOT.**

It was called “Mystery Hum,” about the Taos Hum, so named because the low-frequency sound began to be reported in Taos, New Mexico, in 1992. (In other parts of the world, it's called the Bristol Hum, the Bondi Hum, or just “The Hum.”) Director Bob Wise said the segment was particularly difficult to film because there weren't many visual elements for the audience—and the hum's low frequencies didn't come through televisions well. Still, he said, “we got a lot of response to this, because a lot of people around the country and the world are hearing this same thing, and there's a whole network of people who hear this thing.”

One of the first video news coverage of the Hum from UK from 1975. Nothing has changed in the descriptions and thoughts of it since 1975. The only difference in 2011 GPS was identified affirmatively.

<https://fb.watch/moqHke5wsg/?mibextid=BKVZaU>

### **Links to Other Coverages**

<https://www.youtube.com/watch?v=e1LzNtEXFvI&feature=related>. (Very informative)

[http://nf-hrup.si/pdf\\_files/EARTHWORKS\\_NoiseResource.pdf](http://nf-hrup.si/pdf_files/EARTHWORKS_NoiseResource.pdf) (a good guide to type of LF noise/ regulations)

<http://mic.com/articles/91091/a-mysterious-sound-is-driving-people-insane-and-nobody-knows-what-s-causing-it>

[https://borderlandsciences.org/journal/vol/52/n04/Vassilatos\\_on\\_the\\_Infrasonic\\_HUM.html](https://borderlandsciences.org/journal/vol/52/n04/Vassilatos_on_the_Infrasonic_HUM.html)

<http://aetherforce.com/audible-and-invasive-low-frequency-humming-sounds-their-detection-measurement-and-possible-causes-by-michael-theroux/>

<http://www.stuffyoushouldknow.com/podcasts/how-the-hum-works/>

<https://www.youtube.com/watch?v=PZSFI3vRabo&t=44s> ( I don't believe the sound is truly recorded)

### **Section 3- Obstacles to Resolution**

Once I realized my dilemma and how wide spread this problem is, I began wondering why such a huge problem hadn't been investigated and resolved years ago. Obviously from what we see in this paper there's enough published about it and complaints of it run rampant on the internet. And it's obvious that the authorities know, even far more than my cases with FERC and our Senators. So why nothing is "known" about this puzzle's me to a degree. After all the government will study anything to spend tax payer money.

I suspect the reason is the stage is set that provides them a veil to hide behind because there is no critical mass of public outcry. When approached they say the issue is not under their purview and regulations do not exist or are not enforced for ILFN.

What leads to no critical mass of public outcry? One reason is there are so many fragmented and outlandish theories out there that the problem can reasonably be excused away as hysteria and the health and other problems being pleaded out for help don't raise themselves to a level like COVID, even though the outcomes may raise to the level in time. Claimed sources like HARRP (weather research), GWEN System (emergency LF communications), cell tower transmitters (masts), a LF submarine communication system, smart electric meters, etc. These just cloudy the water and confuse the matter, which serves their purpose of dividing and concurring. The only government conspiracy here is a cover up! It is not intentional mind control, Midshipman fish in Seattle, toads in California, ocean waves, Shuman waves, etc. that have been around forever, which further makes the whole issue of a widespread ILFN problem even sound more irrational.

Good intention support groups seem to suffice as support, but few ever get people to take action. And if they do, they put on the blinders to any ideas that don't support their own, even thou the science says their theory is not supportable. After time these groups lose focus to achieving any measurable results.

Some Self-Anointed experts seem to deliberately exclude ever mentioning gas pipelines as a potential source in the media, maybe because there is not much peer review published or some sinister reason! And if GPSH does get a mention in the media, it is mindlessly lambasted.

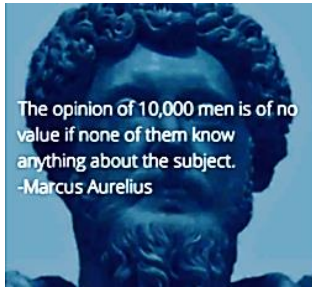
Most Hummers are totally unaware of how close they live to buried high pressure natural gas pipelines. The data shows that the majority of hums are within proximity (10-15 miles minimum) of these systems! Most people can't fathom the sound power that high-pressure gas transmission systems have

As human nature is, if it's out of sight, it's out of mind! The old saying "most people can't see the forest for the trees"- **To discern an overall pattern from a mass of detail; to see the big picture.** People can see cell towers, transformers, compressors, etc. and easily relate to them as a source of sound. Some do have their own localized hums, but it isn't the "type hum" that is my issue and most others cases that people are reaching out by the tens of thousands, year after year and mounting to an uncountable figure.





## Obstacles Getting in the Way to Answers



- Lack of a consolidated data of locations and conditions/ symptoms and no funding to do so.
  - People believing Windbags who repeat a preponderance of misleading theories like something out of Buck Rogers that have no substantive research to support, rather than one that has solid factual based but unpopular conclusion.
  - A belief by many that most of these hums are internal, even though they are measurable and manifests itself in the environment.
- A general lack of Awareness and Appreciation by the public of Industrial Operations such as Natural Gas Transmission systems.
  - An attitude that not sensing the conditions means it will not affect them or other creatures
  - Inadequate investigations or cover ups when one is done.
  - Willful Ignorance of the Industry, Authorities and Academia.
  - Hesitance of people willing to reach out for fear of ridicule, repercussions and impacts to property values

## **Section 4- The Effects of Chronic Exposure to Infrasound & Low Frequency Noise**

### **Annoyance**

The role of exposure to low frequency tones is an emerging science. There has been work done in this filed, but there is little making its way into Regulations and Mitigation measures. ([PDF\) The Effects of Tones in Noise on Human Annoyance and Performance \(researchgate.net\)](#))

University of Nebraska - Lincoln  
DigitalCommons@University of Nebraska - Lincoln

Architectural Engineering -- Dissertations and  
Student Research

Architectural Engineering

Spring 4-22-2016

The Effects of Tones in Noise on Human  
Annoyance and Performance

Joonhee Lee  
University of Nebraska - Lincoln, joonhee.lee@huskers.unl.edu

### **Beyond Annoyance- The Effects of Chronic Exposure to ILFN on our Well Being**

Before going into my research and work in later sections, it is important to establish why this problem warrants an investigation needed to mitigate chronic exposure to abnormal levels of infrasound and how nature may be affected by the changing sonic environment on earth. Which appears to be leading to an epidemic of abnormal health and mental health issues. Over 30 years ago researchers began studying the effects of ILFN on humans suspecting a cause and-effect of ILFN with human health problems. One research group in Portugal established the basis of Vibro Acoustic Disease.

This whole issue needs to be taken seriously by Government and Health professionals. Sufferers I have conversed with say in visiting their medical and mental health practitioners they are those practitioners have no idea about this and typically misdiagnose their symptoms to traditional ailments.

The University of Salford in England has taken a leading role in LFN research and investigation. <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=12621>. Broner in Australia and Britta Berglund and Peter Hasmen from University of Stockholm and Geoff Leventhal are a few who have studied the effects of ILFN since 1978 whose works are worth searching for on the internet.

There are typical stages that people go through when being chronically exposed to ILFN conditions, regardless if they know the source or not. The first stage of chronic exposure is usually an annoyance that begins to bewilder them. Overtime they search out a source of their predicament and only become even more agitated when they can't find it. They get frustrated, making matters worse when those around them don't hear the sound and can't understand what their problem is, though many say "boy if I had the going on it would drive me crazy". They start believing they are ill or have a mental condition, become fearful of ridicule so they decide not to talk

about it. This leads to all sorts of health issues including Sleep Disorders, Sleep Deprivation, a disruption of their Circadian rhythm, migraines, headaches, vertigo, ear ringing and on and on.

One of the first technical discussions I ran across back around 2010 is the Casella Stanger published Technical Program to assist DEFRA in 2001 [http://nf-hrup.si/pdf\\_files/LFN\\_scotland.pdf](http://nf-hrup.si/pdf_files/LFN_scotland.pdf).

Subsequent to that publication DEFRA published in 2003 a “Review of Published Research on Low frequency Noise and its affects”. It as well as the WHO summarize that **“The evidence on Low frequency noise is sufficiently strong to warrant immediate concern”!**

[https://www.researchgate.net/publication/237245317\\_A\\_Review\\_of\\_Published\\_Research\\_on\\_Low\\_Frequency\\_Noise\\_and\\_its\\_Effects](https://www.researchgate.net/publication/237245317_A_Review_of_Published_Research_on_Low_Frequency_Noise_and_its_Effects) To which much of my initial work was predicted around that raised many of my concerns expressed in this paper. DEFRA, suggests that “no serious consequences from exposure to ILFN, if further exposures are eliminated” which is NOT the case with The Hum, GPS, it is 24/7 in many people’s environments!

Research published in 2017 suggests that ILFN affects the neural activity of the brain. Altered cortical and subcortical connectivity due to infrasound administered near the hearing threshold – Evidence from fMRI : <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5389622/> . Worth paraphrasing from the paper “*To our knowledge, this study is the first to demonstrate that near-threshold IS does not only produces physiological effects, but that the neural response involves the activation of brain areas, which are important for auditory processing but also for emotional and autonomic control. These findings thus allow us to reflect on how (sub)-liminal IS could give rise to a number of physiological as well as psychological health issues, which until now have only been loosely attributed to noise exposure in the low- and very low-frequency spectrum*”.

Unlike WTS and SAD (light deprivation) where there is a Clinical Diagnosis, there currently is nothing been done to address GPSH as a new entry into the realm of harmful environmental stress! But for the conditions of GPSH it is studied how annoyance is a component of ILFN exposure. Annoyance of Low Frequency Tones and Objective Evaluation Methods- Subedi et. al.

<https://journals.sagepub.com/doi/pdf/10.1260/0263092054531000>. Experts are also considering other paths of harm to the human, especially needed due to the proliferation of ILFN.



The ruffling effect of rumble - LMU Mu...  
en.uni-muenchen.de

LF sound does have an auditory effect on the inner ear and cochlea. [Auditory system: The ruffling effect of rumble -- ScienceDaily](#) Movies and theaters use infrasound to evoke different controlled mood effects in the audience. Experiments have been done to test human exposure to ILFN where the results are detrimental, mind altering and can have a manipulative effect.

As discussed later and is my opinion that the “dysrhythmic nature” (rumbling frequency modulation) of the ILFN spectral profile plays a role in how the brain interprets these conditions that triggers unusual brain activity. Leading to the complaints and malaises we see occurring. Whilst the pressure sensations on the body are from the external body effects of standing acoustic sound waves in the space.

The extent of this problem is wide. There are other interested citizen around the globe like me trying to fulfill a void where our governments seem not to want to address the “complainers”. Since at least 2010 groups in the Netherlands have been chasing the LFN problem and doing community outreach. The publications from them are worth reading (they’re in Dutch).



Foundation Low Frequency Sound: - <https://laagfrequentgeluid.nl/html/ontwikkelingen/ontw.html> . Thanks to Dirk at LFG and Betteke for their efforts in this.

There is plenty of information about the effects of ILFN concerning Wind Turbine Syndrome where neighbors of wind turbines have similar malaises that Hummers claim. Interesting those doing WTS research seem not to be interested in GPSH and why it may be a co-located problem in locations. But regardless, it is useful to clone work from WTS studies and apply those learnings to the Hum.

A couple of articles that seem surprisingly similar to GPS:

- Diagnostic criteria for adverse health effects in the environs of wind turbines-Royal Society of Medicine: <http://journals.sagepub.com/doi/full/10.1177/2054270414554048>
- List of ILFN Exposure Symptoms- Sources of ILFN reported to the Waubra Foundation include wind turbines, coal seam gas field compressors, coal mining activities, gas fired power stations: <https://waubrafoundation.org.au/health/symptoms/> ,
- Letter about Symptoms and Medical Problems from WTS: <https://docs.wind-watch.org/Laurie-List-of-symptoms.pdf>

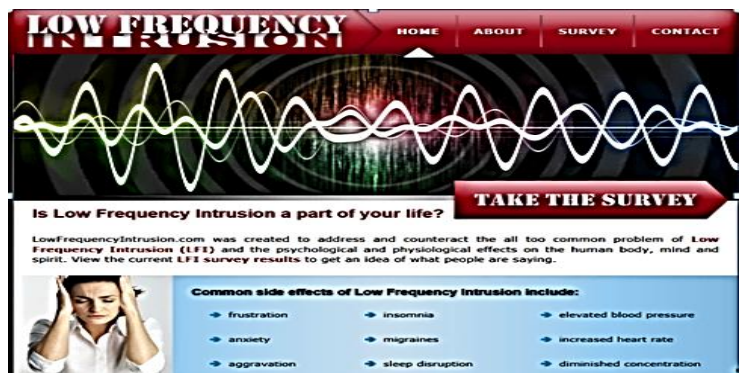
### Can ILFN sound make you sick?

So many people have reported that they have lived in homes and someone in the family says that there is something wrong and harmful with the environment which they believe has made them sick. An interesting opener to watch on the subject:

<https://www.youtube.com/watch?v=z9yHKhwc2xc&app=desktop> .

The conventional wisdom is that Infrasound is not heard and as such has no affect minimal effect on humans: - Scientist Challenges the Conventional Wisdom That What You Can't Hear Won't Hurt You, Jul 28, 2010:

<https://www.hearingreview.com/hearing-products/hearing-aids/ite/scientist-challenges-the-conventional-wisdom-that-what-you-cant-hear-wont-hurt-you-2>



Vibroacoustic Disease (VAD) is a clinically identified result of chronic exposure to ILFN researched by N Castelo Branco and M Alves Pereira affecting the inner ear, adrenal glands/ cortisol levels in humans, mental health effects and chromosomal damage in Windstar rats exposed to ILFN

<https://www.ncbi.nlm.nih.gov/pubmed/15273020>. In 1980 they determined that high levels of ILFN were

affecting aviators: <http://www.ainonline.com/aviation-news/aviation-international-news/2007-03-16/vibroacoustic-disease-taking-toll-aviators>. Which raises the question was the German Wings Pilot who intentionally crashed his plane killing everyone on board affected in some way?

Vibroacoustic Disease: More Than a Hearing Problem : The Hearing Journal- Billings, Bart P. PhD, COL (Ret) 2019 [https://journals.lww.com/thehearingjournal/Fulltext/2019/08000/Vibroacoustic\\_Disease\\_More\\_Than\\_a\\_Hearing\\_Problem.2.aspx](https://journals.lww.com/thehearingjournal/Fulltext/2019/08000/Vibroacoustic_Disease_More_Than_a_Hearing_Problem.2.aspx)

Sensations of Pounding Vibrations on the Body Inside Impacted Dwellings is a direct result of the standing waves inside spaces that are created by the interaction of the low frequency sound waves and the dimensions of the room and the resonance of the structure. Standing Sound wave nodes and antinodes set up as a result and are noticeable and measurable. These must be suspected to be a direct cause of the symptoms people have of headaches, migraines, nausea, vertigo, etc. while in ILFN saturated spaces. Similar symptoms are associated with changes of Barometric Pressure when the weather changes and the amplification factor of this possibly the reason for hearing the sound inside dwellings more so than outside.

[https://urldefense.proofpoint.com/v2/url?u=https-3A\\_\\_www.healthline.com\\_health\\_headache\\_barometric-2Dpressure-2Dheadache&d=DwICAg&c=G-megwQ-UvwARL-JwyT44A&r=QEC7WQBw-X5P\\_tUPVSexLn-0HAj9f0upeq7DI5C5qWE&m=5tmLqd1loPCoweka-UABkpaaTBEnhbqeh0gA8Z1Pudo&s=oEXsNStCewRBpCiFkiRfcvMFvYdZoK4muRbc9yE3Zys&](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.healthline.com_health_headache_barometric-2Dpressure-2Dheadache&d=DwICAg&c=G-megwQ-UvwARL-JwyT44A&r=QEC7WQBw-X5P_tUPVSexLn-0HAj9f0upeq7DI5C5qWE&m=5tmLqd1loPCoweka-UABkpaaTBEnhbqeh0gA8Z1Pudo&s=oEXsNStCewRBpCiFkiRfcvMFvYdZoK4muRbc9yE3Zys&)

For further reference for the reader here's an extensive list of articles about the Effects of Infrasound and Low-Frequency Noise on Mammalian Physiology: <http://www.aweo.org/infrasound.html>.

Chronic exposure to infrasound from GPSH in residential and other settings is not realized and certainly not thought to be causing a harmful living environment. There are many sources, not just Wind Turbines and Pipelines. Mariana Pereira presented at a seminar about Wind turbines at the University of Waterloo, Ontario, Canada in November 2019. For full disclosure she states her discussion are not only applicable to WTS but to any source where there is chronic exposure to elevated levels of ILFN:

[https://livestream.com/itmsstudio/events/8781285/videos/196181579 \[livestream.com\]](https://livestream.com/itmsstudio/events/8781285/videos/196181579 [livestream.com]).

ILFN exposure is been studied as a contributor to elevated blood pressure (hypertension) Blood pressure changes in man after ILFN exposure- A Danielsson, U Landström <https://pubmed.ncbi.nlm.nih.gov/4025009/>. <https://docs.wind-watch.org/danielsson2009.pdf>. It is quite clear this work was done for a short period of time and longer term effects must be evaluated, interpreting that a short term test may not show a serious change to many, but longer term it could be that increases we hear about from hummers of 20- 30 points may be occurring! ***Significantly increased diastolic and decreased systolic blood pressures were recorded without any rise in pulse rate. The increase in diastolic blood pressure reached a maximal mean of about 8 mmHg after 30 min exposure. The results suggest that acute infrasonic stimulation induces a peripheral vasoconstriction with increased blood pressure, previously shown to occur in conjunction with industrial noise. Chronic long-term exposure to environmental infrasound may be of importance for the development of essential hypertension in predisposed individuals.***

Noise in general is a health problem and known to cause all sorts of health issues if not addressed. The difference between the typical noise and ILFN is that ILFN has not been accepted by the regulators and medical profession for its occurrence in modern society. A good overview about how the brain mechanisms associated with noise sensitivity 2016: <https://www.nature.com/articles/srep39236>.

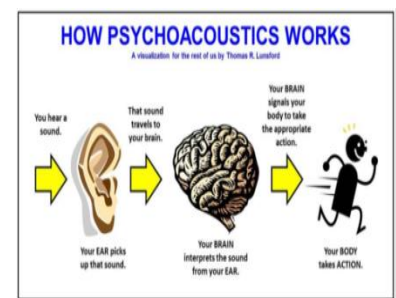
Ryan Littlefield- University of Portsmouth- discusses topics about the intentional uses of ILFN and other spectrums of sound for intended use, not all sound and exposures are negative- <https://littlefield.co/the-psychoacoustic-effect-of-infrasonic-sonic-and-ultrasonic-frequencies-within-non-lethal-cf05e1fd8673>

Broner – University of London – Physics Dept. 1977; did much work that's been published about ILFN and consequences of it: The effects of low frequency noise on people—A review: <https://waubrafoundation.org.au/wp-content/uploads/2015/02/Broner-The-effects-of-low-frequency-noise-on-people.pdf>

NASA studied the effects of ILFN on astronauts in the 60's and 70' in space flight and the effects on the middle and inner ear, The Effects of High-Level Infrasound, 1980- Defense Technical Information Center - Wright Patterson AFB: <https://apps.dtic.mil/docs/citations/ADA081792>

### **Psychoacoustics- The Perception of Sound**

In order to appreciate how people, sense the Hum we need to turn to the people that are involved with Psychoacoustics, which is the study of sound perception and how humans perceive the sound. This is a side issue here, but worth bringing up. Hugo Fastl-Eberhard Zwicker Psycho- Acoustics [http://zhenilo.narod.ru/new\\_main/students/Zwicker\\_Fastl.pdf](http://zhenilo.narod.ru/new_main/students/Zwicker_Fastl.pdf)



### **Annoyance of Low Frequency Noise**

An explanation why narrow band LF noise is far more irritating than loader higher frequencies is discussed in this paper presented to Euro Noise in 2008. And the residential setting is a perfect incubator for this: <http://docs.wind-watch.org/Krahe-low-frequency-noise-annoying.pdf> . ILFN has been found to cause psycho social symptoms and medical conditions from its annoyance and disturbance of sleep. Far more serious than common normal hearing range frequency noise: Journal of Sound and Vibration- The Prevalence of Annoyance and Effects After Long Term Exposure to Low Frequency Noise: <http://www.sciencedirect.com/science/article/pii/S0022460X00932516>



## Research is Needed to Study the effects of ILFN in Residential Settings

Pereira and her group are now studying the effects of ILFN conditions in residential settings and point out the flawed understandings about ILFN in Occupational and residential settings: "Occupational and Residential Exposures to Infrasound and Low Frequency Noise in Aerospace Professionals: Flawed Assumptions, Inappropriate Quantification of Acoustic Environments, and the Inability to Determine Dose-Response Values": <https://puc.sd.gov/commission/dockets/electric/2018/EL18-026/prefiledexhibits/davenport/i3e.pdf>

Considering the exponential surge in Hum complaints around the globe it is not beyond comprehension that it is a major contributing factor behind the **epidemic of vertigo** and other imbalance issues:

<http://paulherschuepidemics.blogspot.com/2012/10/a-vertigo-epidemic-october-2012.html> . It also seems like there is a variant of vertigo that has been identified in humans, could ILFN be playing a role: [New type of vertigo identified -- ScienceDaily](#)

LFN has been found to cause imbalance in mice experiments where they are exposed to chronic moderate levels of LFN analogous to vertigo in humans. Chronic Exposure to Low Frequency Noise at Moderate Levels Causes Impaired Balance in Mice: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3387207/>

It is well published that different frequencies of sound stimulate the brain in different ways known to create changes in demeanor and malaise. The narrow frequency bands listed below all fit into the range of GPSH to which no one has made the link between to the plethora of social issues that seem to fit into this grouping. Some of this has been used in the movie industry to induce emotion and has back fired in some cases by making the audience sick or bring on mental angst. **The question is how the brain reacts to chronic exposure to these frequencies in residential and other non-laboratory environments.**

1Hz Heartbeat Rhythm

1-3Hz Sleep Pattern

3-5Hz Paranoia/Hallucinations/Amnesia/Illusions/Drowsiness 'Absent' Feeling

6-7Hz Depression/Suicidal Feelings/Visual Distortion/Confusion

8-11Hz Cannot Relax/Feeling Unwell/Unhappy

11-13Hz Anger/Manic Behavior

14-18Hz Small Seizures/Disturbed Orientation/Auditory/Visual Hallucinations (Vick Tandy)

18+Hz Inability to make decisions/Sensory problems (sight/touch/sound)

24+Hz Confusion/Flickering/flashing lights/Dizziness

35+Hz Mania/Hyperactivity

40+Hz Anxiety/Sleep disturbance/Reaction time slowed/Unable to make decisions



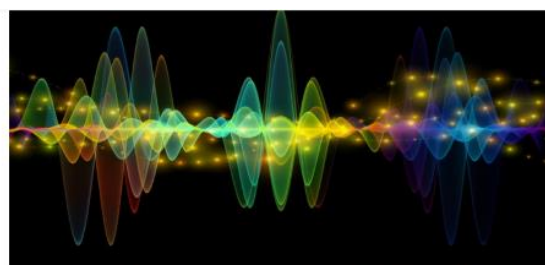
## ILFN and the Human Brain

Can the application of an external ILFN stimuli affect the Brain of humans in Hum occurring settings? Neuroscientists contend that in order to fully understand the implications to the population of ILFN there must be a clear differentiation made between the experience's vs awareness of the conditions. Recent developments in neuroscience indicate that external stimuli can affect the brain without the person's awareness. They concluded that there is a biophysical process from even low-level stimuli energy over time. Could this biophysical change have anything to do with malaises of the brain? Studies at UC San Diego in 2012 found that deficiencies in the neural processing of simple auditory tones can evolve into a cascade of dysfunctional information processing across wide swaths of the brain in patients with schizophrenia : In Schizophrenia Patients, Auditory Cues Sound Bigger Problems; <https://health.ucsd.edu/news/releases/Pages/2012-11-30-schizophrenia-and-auditory-cues.aspx>.

What role do vibrations and resonance have on the brain's activity? An article from University of CA Santa Barbara: <https://earthsky.org/human-world/consciousness-what-is-theory-vibration>

Brain activity patterns of neural activity under the siege of external stimuli (ILFN is an inanimate mechanical force) must be considered to how it effects the brain development of fetuses and children to the

deterioration of older brains. The characteristics of GPSH are a plausible source of these vibrations. Could they be considered as the ghost pathogen maybe even more so than gaming, cell phones, etc.



What do synchronized vibrations add to the mind/body question? Image via agandrew/shutterstock.com.

By Tam Hunt, University of California, Santa Barbara

As early as the 1970's infrasound was considered a disruptor of brain activity. The New Scientist published an article about infrasound making drivers of cars" drunk"

<https://books.google.com/books?id=i145R0bZXMYC&pg=PA415&lpg=PA415&dq=infrasound+drunk&source=bl&ots=EHPGId-NGm&sig=WKD-m4iipIWloApU2uAiHPSXdaE&hl=en&sa=X&ved=0ahUKEwjGubnz8v7LAhVBMSYKHxhJAFMQ6AEIMjAD#v=onepage&q=infrasound%20drunk&f=false>.

Other articles talk about a motor man and ILFN and VAD: <http://waubrafoundation.org.au/wp-content/uploads/2014/05/Arnott-et-al-Vibroacoustic-Disease-Personal-Experience-of-a-Motorman.pdf>

It is known that low frequency sound and whole body vibrotactical conditions such as **dysrhythmic** ones of GPSH are more deleterious than just annoyance. Infrasound is reported to bring on the sensations felt in paranormal situations, to hear voices and causes the eye ball to vibrate explaining some of the paranormal symptoms of being in an ILFN rich space that is considered haunted: [https://www.youtube.com/watch?v=Z\\_Ll3pHtxmQ](https://www.youtube.com/watch?v=Z_Ll3pHtxmQ). It would be interesting to discuss this with a researcher in the UK by the name of Vick Tandy, but he passed.

Very interesting research may explain how ILFN is a noise inducing stressor affecting the microglial cells of the neural system. The author says that these cells don't function properly in their testing. Google search says that microglial cells remove damaged neurons and infections:

<https://www.science.gov/topicpages/i/infrasonic+noise-induced+stress>

## ILFN and the Human Body

I have talked with many people that say the worst symptoms they need to deal with are vibrations, the sound conditions lesser so. They say it vibrates their chests which in turn they claim heart palpitations and mental angst. Making matters even worse there are no masking techniques to mitigate vibration. The body as a whole is said to have a natural frequency around 10Hz, well within the infrasonic capabilities of the ILFN source causing the Hum. Individual organs have their own natural frequencies as shown in the chart from von Gierke and Brammer. This means a body organ can be affected by “shaking” it. This is probably why people complain of feeling nauseated, chest pounding, vibrations etc.!

Table 1. uploaded by Maria Lucia Machado Duarte  
Content may be subject to copyright.

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Organs	Resonance Frequencies (Hz)
Head	20 a 40
Spinal Column	8
Chest Wall	60
Abdominal	4 a 8
Shoulders	4 a 8
Lungs	4 a 8
Hands and arms	20 a 70
Ocular globe	60 a 90
Maxilla	100 a 200

Resonance frequencies of human body organs

Airborne sound of sufficient intensity enters the body by direct absorption and stimulates non-auditory tissue that produces physiological effects essentially similar to whole-body vibrations **Infrasound, human health, and adaptation: an integrative overview of recondite hazards in a complex environment** Ref: Nat Hazards 70:501-525 (2014) - M Persinger: <https://link.springer.com/article/10.1007/s11069-013-0827-3>

Another interesting study was done by Wigram in the 80's on the use of vibro acoustic therapy which goes into how people sense resonant vibration and where in their bodies and used sporadically for health benefits. <https://www.wfmt.info/Musictherapyworld/modules/archive/stuff/papers/Wigram.pdf>

Intercellular changes have been studied at Boston Children hospital called **mechano transduction**. Mechano transduction is the process where cells sense and respond to mechanical stimulation, which I liken to the vibrotactical response of the body to the low frequency vibrations associated with the Hum and discussed by M. Persinger above.



**Cortisol** levels (the same situation found by VAD researchers) are affected by sleep pattern disruption and the “fight or flight” reactions of the body from stressors like the Hum. Apparently, the adrenal glands are affected that secrete the Cortisol which controls body functions such as cardio, thyroid and mental health functions. The effects of Low Frequency Noise up to 100 Hz and its effects on the aural and non-aural (Vascular, respiratory and endocrine effects, balance and visual disturbance) sensory systems- Noise and Health Journal; <http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=73;epage=85;aulast=Schust>

Noise induced brain stress can be a result of adrenal chemicals and body hormones (re: Franklin Institute-Philadelphia <http://www.geroupr.com/stressonthebrain.html>) which can lead to chronic fatigue, changes in demeanor, otologic symptoms like migraines, headaches, nausea, vertigo, imbalance problems and high pitched ringing in the ears that comes and goes with changes of intensity of the Hum and not attributable as tinnitus . The ear does response to Infrasound, just as the VAD researchers discovered years ago.

In 2016 the **International Tinnitus Journal** published a paper reporting that many cases of tinnitus are linked to the LFN heard around the world known as the hum or Taos Hum.

<https://www.tinnitusjournal.com/articles/manifestations-of-a-lowfrequency-sound-of-unknown-origin-perceived-worldwide-also-known-as-the-hum-or-the-taos-hum.pdf>

Tinnitus in Normal-Hearing Participants after Exposure to Intense Low-Frequency Sound and in Meniere's Disease Patients- *Frontiers in Neurology* 2017. Particular attention to the last sentence in the opening paragraph states: "normal-hearing participants after LF-exposure experience alterations in spontaneous otoacoustic emissions, which may contribute to a transient tonal tinnitus"

[Frontiers | Tinnitus in Normal-Hearing Participants after Exposure to Intense Low-Frequency Sound and in Meniere's Disease Patients | Neurology \(frontiersin.org\)](#)

References from WTS research regarding ILFN

- Responses of the ear to ILFN: <https://reteresistenzacrinali.files.wordpress.com/2011/03/salt-and-hullar-2010.pdf>,
- Wind Turbines and VAD: <http://www.windsofjustice.org.uk/2014/08/vibro-acoustic-disease/>

The effects of ILFN (typically HVAC systems are found to be the source of such conditions) are a major part of **Sick Building Disorder**. Recent work by Kevin Allan Dooley regarding WTS and static conditions inside a building should be expanded to consider GPSH in areas where GPSH is present. It has an effect on the central nervous system where the sound pressure waves and tactical sensations of the conditions act as a stimulus of motion in the absence of visual symptoms of motion, which apparently cause the effects of motion sickness, a.k.a. sick building syndrome:

<https://www.youtube.com/watch?v=mCJh03-BpG4>



## Effects of ILFN on the Heart

Research has been done in Germany regarding the effects of ILFN from Wind Turbines on the heart. This may be analogous to GPSH having chronic exposure to the conditions of the pressure variations and resonance of the heart by the sound. [Heart-stopping: German Research Finds Low-Frequency Wind Turbine Noise & Infrasound Cardiac Health Risk – STOP THESE THINGS](#)

## Effects of Low Frequency Noise on Sleep:

This subject was the initial reason I got so passionate about this subject. I was being awoken an hour or two before midnight, a couple of hours after midnight and after that unable to return back to sleep. At work there was a sleep disorder presentation in 2011 that I could not believe how many of the attendees had the same onset of sleep distribution symptoms.

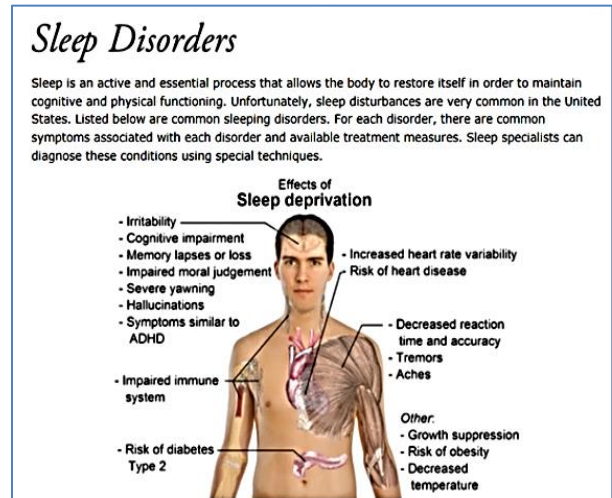
The disturbing effects of low frequency sound emissions in residential dwellings:

<http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=29;epage=35;aulast=Findeis>

Health professionals need to take notice about GPS. It is obvious the escalation of GPSH conditions can be linked to the timing of the increases in much of what is listed below and medical professionals are unwittingly misdiagnosing everything but an ILFN saturated environment. Medical professionals are not aware of this menace happening right in front of them. Such as the case of tinnitus. In 2016 the **International Tinnitus Journal** published a paper reporting that many cases of tinnitus are linked to the LFN heard around the world known as The Hum or Taos Hum. <https://www.tinnitusjournal.com/articles/manifestations-of-a-lowfrequency-sound-of-unknown-origin-perceived-worldwide-also-known-as-the-hum-or-the-taos-hum.pdf>

When confronted by a patient with symptoms that has no other medical reason chronic exposure to ILFN conditions is never discussed and if so, the practitioner doesn't really listen to the patient:

- Sleep deprivation issues leading to health problems
- Stress from constant bombardment of the conditions having various health issues
- Learning disabilities and childhood developmental problems
- Effects on the fetus leading to Birth Defects and other mental health issues and developing sensory processing disorder.
- Later effects on the brain leading to Alzheimer's, Autism, Anxiety, Depression, Empathy, suicide and Sensory Processing Disorders associated with Autism.
- **Triggers PTSD episodes** <https://knops.co/magazine/noise-and-ptsd/>
- Biophysical changes to organs such as pericardial heart lining thickening (VAD)
- Altering **fragile**, susceptible **minds** leading to rage, unprovoked acts of rage and suicide, possibly worse



## Additional Discussion and Resources about the Effects of ILFN

In 2018 I came across a health issue known as Misophonia that has been found to affect the same small percentage of people as those hearing the Hum. Information indicates that people afflicted with the sound issue are more likely to have rage, commit suicide and kill people as a consequence of the anxiety and stress. It is possible that Misophonia is just another part of GPS!

<https://www.health.harvard.edu/blog/misophonia-sounds-really-make-crazy-2017042111534>



**Misophonia: When sounds really do make you "crazy"**

A pre filed a testimony of a Mr. Lipscomb, a PHD in Hearing Science with all sorts of accreditations regarding acoustical and psych acoustical effects of Low Frequency noise. In this case he comments to the DEIS for the Sumas 2 project compressor station in Washington State.

<http://s3.amazonaws.com/windaction/attachments/1384/Lipscomb-June2000.pdf>

An excerpt of by Mr. Lipscomb's testimony:

*Q: Could you describe some of the effects?*

*A: Yes, The effects include loss of sleep, hearing damage, irritability, exacerbation of nervous and cardiovascular disorders, and frustration stemming from the loss of control of one's acoustical environment.*

Berglund and Pearson- Sources and Effects of Low Frequency Sound

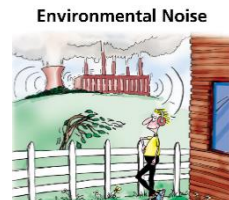
[https://www.researchgate.net/publication/14558678\\_Sources\\_and\\_effects\\_of\\_low-frequency\\_noise](https://www.researchgate.net/publication/14558678_Sources_and_effects_of_low-frequency_noise)

Environmental Noise Book ; Bruel & Kjaer

<https://www.bksv.com/media/doc/br1626.pdf>

The effects of high levels of infrasound-D Johnson (Wright Patterson Air Force Base):

<http://www.dtic.mil/dtic/tr/fulltext/u2/a081792.pdf>



The effects of low frequency noise up to 100 Hz:

<http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=73;epage=85;aulast=Schust.>

The effects of LF noise and vibration on humans and residences near wind turbines-

<https://docs.wind-watch.org/literature-low-frequency-noise-wind-turbines.pdf>

Concerns about ILFN from wind turbines

<http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=15&ved=2ahUKEwjQlYOWhezjAhXkY98KH3yAbEQFjAOegQIBxAC&url=http%3A%2F%2Fdocuments.dps.ny.gov%2Fpublic%2FCommon%2FViewDoc.aspx%3FDocRefId%3D%257BBBAA8008-9DC2-49BB-8D91-E1F95AAFAE96%257D&usg=AOvVaw09VMyHobm6q7QLSoTMniEQ>

The effects of low frequency noise and vibration on people

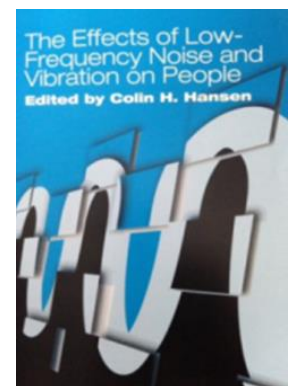
[http://www.multi-science.co.uk/effects\\_low-frequency.htm](http://www.multi-science.co.uk/effects_low-frequency.htm)

The disturbing effects of low frequency sound emissions in residential dwellings:

<http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=29;epage=35;aulast=Findeis>

Low Frequency noise a biophysical phenomenon – M. Oud Netherlands

[http://www.leefmilieu.nl/sites/www3.leefmilieu.nl/files/imported/pdf\\_s/2012\\_OudM\\_Low-frequency%20noise\\_0.pdf](http://www.leefmilieu.nl/sites/www3.leefmilieu.nl/files/imported/pdf_s/2012_OudM_Low-frequency%20noise_0.pdf)



## So Why do People Start Hearing Low Frequency Noise

It is not the intent of my research to do a deep dive into why people hear or start hearing the Hum. I believe whatever the reasons are, that addressing the source is the priority to the problem and guessing about all the diversions of recording the sound or why only a small percentage of people hear it just dilute the issue. But a few thoughts about why seem appropriate.



Study work regarding VAD that was republished by anti Wind Turbine Group but still appropriate got The Hum from what we now know of the ILFN properties of it. - [Microsoft Word - Document1 \(wind-watch.org\)](#)

Recent article about the effects of prior exposure to ILFN and the prevalence of hearing ILFN with age and exposure- <https://www.avbend.com/blog/infrasound-the-noise-you-feel/#:~:text=Hearing%20becomes%20gradually%20less%20sensitive,various%20parts%20of%20the%20body>.

## **Section 5- What “My Hum” Is Not**

Before addressing “What My Hum Is” it is important to understand how potential real sources were considered and how the many dubious ones were discarded. Even though this evaluation focused to my area, I am sufficiently confident that this applies to most other conditions of “this type” fitting the descriptions of The Hum.

In evaluating any problem its necessary to keep the analysis to a size that can be handled and to eliminate unapplicable causes. This required sufficient investigation of all possibilities I could think of or find claimed by others based on what a set as pre requisites I decided on.

### **Pre requisites to Assess Source Viability**

- The conditions must be measurable to confirm the source is external to myself
- Since I believed something had to have changed, what changed before/ at the time my Hum began?
- Is the source(s) happening at the same time the Hum is and vice versa?
- Is the source scientifically explainable to create ILFN sound and vibration?
- Does the Hums pitch and vibrotactical sensations change in synch with the measured source?
- Does the source have the potential to radiate enough power to manifest for over 10 miles?

### **Consideration of Nearby Potentials**

It is important to keep in mind the Law of the Conservation of Energy. “It states that energy is neither created or destroyed, rather it can only be transformed or converted”. To which the low frequency and vibro tactical conditions we feel require ample energy to create. No one would think a 100-watt light bulb could ever do this, and they are right. So as one example of a popular suggestion, how can a 5G transmitter using anywhere from 250 milli watt to 120 Watts to operate cause this? Whereas a single 12,000 horsepower compressor (most systems couple a few of these together) converted to watts of 746 watts / hp would be approx. 8,900,000 watts (8.9 MW) the size of a small power plant. A small nuclear power plant is 500 MW.

In our area there are **electric high-tension lines**, an **electric substation**, **RT 84**, an infrequently used **rail line**, a small electronics **manufacturing** plant and a **cell tower** also about ½ mile away. And since the hum began a newly installed high pressure natural gas system **compressor station**. My first thought were the compressors. But I missed one other huge infrastructure that I would never suspect. 3 high pressure natural gas transmission pipelines, 24-, 30- and 36-inch sizes (put into operation in 1991, 1953 and 1966).

The **Cell Tower** (mast to some) is about ½ mile away and here since we moved in to our home in 1994. It is not reasonable this as a source because the transmitters operate at very high frequency and relatively low power and I don’t believe any major changes were made to add something that would cause a low frequency sound. As a radiation source or other type source behind the many claim’s health concerns is not part of this study. But I will say those issues are 180 degrees from the external hum and vibrations of GPS.

My first inkling were the compressors. But after visiting them and they were not running at the time of Hum, the Gas Company seemed to be off the hook? So, I started to consider all the other potentials that I could

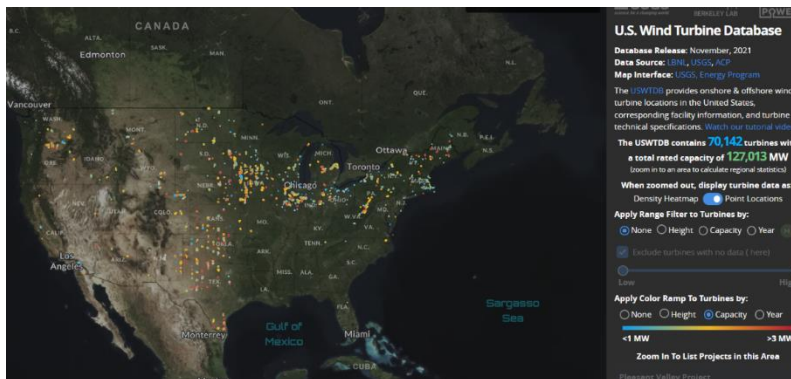
evaluate. All but the high-tension lines based on real time observation, timing of intensity, location and sound producing capability and “what changed” I eliminated most sources in our area. That left the high-tension lines, for which at that time I did suspect the pipelines.

**High Tension Lines and associated substation** 3000 ft away - CL&P (the electric company) obliged at my insistence the drone I was suffering from was the high-tension lines they did an in-home power quality study and did **Acoustic Testing** at my home (discussed later). This effectively eliminated that.

## Sources Not in My Area

Sound Power Capable Industrial Operations over 20 miles away

**Wind Turbines** – akin to health concerns regarding GPS, wind turbine farms have drawn much attention and research to the health effects of chronic ILFN exposure from the operations of wind turbines. Though very popular in the news, WTS is far **Less Sinister** than the vastness of pipeline grids making up GPS. Pipelines are far more a contributor due to their vastness and also from the difference in geometric spreading of sound as a linear source vs that of wind turbine farms which are concentrated and are point sources. There are far fewer areas where it can be correlated that “this type” hum is from Wind Turbine Farms. See map ([Viewer | USWTDB \(usgs.gov\)](https://viewer.uswtodb.usgs.gov/))



There are no wind turbine farms in my area. The closest WTF installation ( 2 units) to me is 38 miles away in Colebrook CT and began operating in 2016. My hum began in 2009, so no correlation! It also makes sense that in locations where WT's and pipelines are colocated, both may be contributing as an ILFN source. An example presented earlier in this paper is wind turbine farm and pipeline along the same road there in Shirley WS

**This all left me bewildered!**

## Dubious Claims

For full disclosure, other than screening the pre requisites, I have not wasted much time on these claims.

EMF emitting type sources have been the de facto “go to” explanation. But I found they lack scientific support and dubious demonstration of the idea to be able to cause This Type Low frequency sound and vibration known as The Hum. Certain ones certainly could be considered for localized electronic noise or other health issues claimed about the health effects of radiation of radiowaves and microwaves.

**HARPP** have been shut down on and off for years, installed in the early 90's and temporarily taken out of service in 2014 and possibly not used since then, all the whilst the Hum continued in CT and everywhere else, 24/7. I am not sure why people suggest **Smart Meters** for this type Hum, maybe they vibrate, haven't read where they do that. If radiation were a culprit to sound, the radiation levels per the HuffPost says at 3 feet away from the meter the radiation level is 1,100 times less than holding a cell phone to your head. I don't believe I have a smart meter but regardless, during power outages the Hum is the same. Smart meters only started being

installed well past the time Hums began being reported. **5G transmitters** are only coming to the market since 2019 and very low power, transmit 1000 feet, and are only being installed recently in our area! The famous **Navy submarine antenna project called ELF** was operated in MI/ WS from 1989 to 2004 VLF and was replaced by alternate technology. **GWEN** (Ground Wave Emergency Network using LF) nuclear disaster communications System designed in the late 1980's was cancelled in 1994. A plethora of followers believe that **EMF's** (electric and magnetic fields) from all sorts of radio signal transmission are to cause. They even suggest that Faraday cages have the ability to block the hum causing sources. But this is dubious and shown to be an incorrect hypothesis. In 2004 a popularized theory in the vacuum of any other explanations was postulated that certain people are susceptible to hearing **radio waves**. This has not been demonstrated at any level to be factual. Even though incorrect it was useful in bringing sufferers worldwide together in forums. <https://oklahoman.com/article/2875333/professor-rattles-on-about-hum-few-hear-brsome-have-headaches-nausea-and-other-pains-along-with-the-sensation/amp> [\[oklahoman.com\]](https://oklahoman.com)



**Tunneling** has been suggested, but there are no tunnels by me and when there is construction sound and vibration it would not last over 10 years in one spot. Tunnels put into water moving service might be considered.

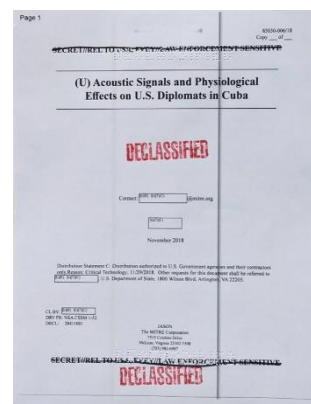
**Conspiracy theories** have claimed since the 90's all sorts of manipulation from governments. This is no conspiracy, other than covering up the facts this is a consequence of modern-day societies need for energy! This is not the Russian "Wood Pecker" radar system for missile detection that is believed to have been shutoff in the late 80's.

Though most this is so available to anyone to research, these dubious theories keep raising their heads and disrupt true research!

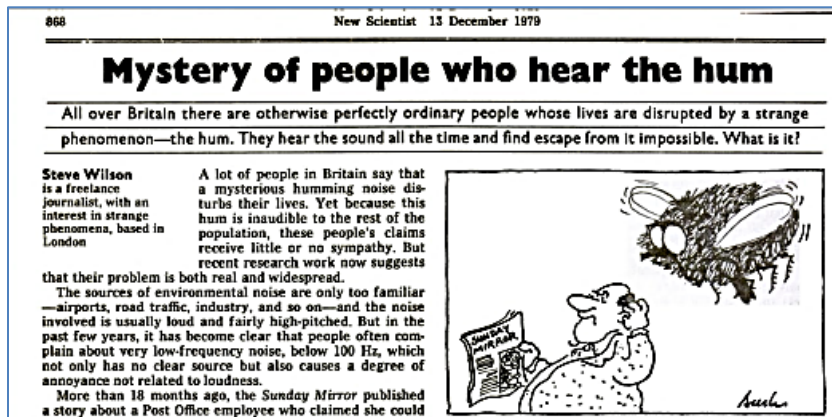
And most recently the accusations that microwaves are being used to cause the Havana Syndrome. It is very obvious the acoustic environment of the "few" government workers that have gained notoriety took precedent over the tens of thousands of Hummers suffering. It is very apparent to anyone thinking practically that these people's environments that brought on their symptoms is not dis similar to the Hum and GPS, globally.

<https://www.buzzfeednews.com/amhtml/danvergano/havana-syndrome-jason-crickets>

<https://foreignpolicy.com/2021/05/10/microwave-attacks-havana-syndrome-scientifically-implausible/>



## Section 6- What “My Hum” Is



Most people are unfamiliar what a Natural Gas Transmission System is. It uses compression and pipelines to move the nations natural gas between points and its use has exponentially expanded over the last two decades.

There is much published about these systems, but nothing about the pipeline as a radiator of ILFN sound waves and how these are distributed through communities and the wild by the

extensive infrastructure that is built. There certainly is nothing published about Gas Pipeline Syndrome and its effect on people and nature.

My study and investigation include observation of the conditions, technical desktop work and boots on the ground data collection, etc. The study area was Fairfield/ New Haven counties in CT so I could manage the size of the work and do area wide observation and data collection. Once I concluded that, I took a look at the rest of the US Hums to see if what I found locally could be correlated to other areas. With this far larger data base what I learned astonished me!

My study is High Pressure Natural Pipeline Systems. I did not include natural gas field feeder collection systems, low pressure gas distribution systems, other product type pipeline systems such as liquids and CO2 recapture systems. There are none in my area so I eliminated them as a source of “My Hum” from the beginning.

The earliest news coverage of this type Hum came out of the UK in the 1970’s. In 1979 a Mr. Hugh Witherington told the News that he suspected the Hum was caused by the UK’s installation of a nationwide natural gas pipeline system. The reason for this was to get away from the use of Town Gas (regionally manufactured gas) by switching over to North Sea Gas and imported LNG through the late 1960’s into the mid 1970’s. [The Great Switch – lessons from when 14 million homes and businesses changed fuel in less than a decade | Rapid Transition Alliance](#)

This caused a change in the acoustic balance there. <https://www.newscientist.com/article/mg12416942-500-science-low-frequency-hum-may-permeate-the-environment/>

Problem solving requires that all reasonably potential sources be considered. From the beginning a key premise of mine why this started for me was that something had to have **changed**. Considering that the only thing that had noticeably changed at that time was a huge change in the transmission of natural gas in the country as evidenced by the construction and installation of 2 compressors at a new Iroquois Gas Transmission compressor station behind us other system (s) changes.



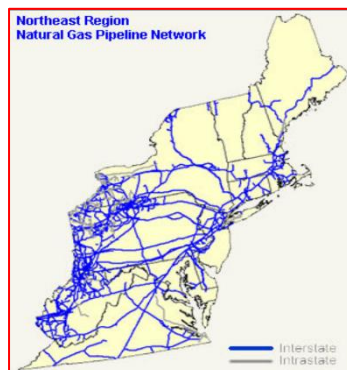
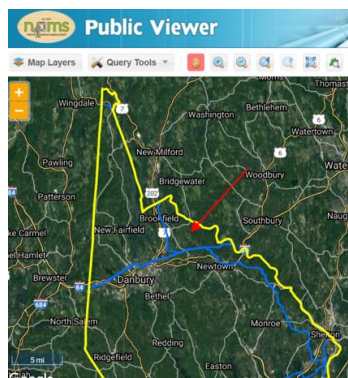


### Execution Progress – Newtown Loop



I visited the station which is about 1300 ft from my home, with IGTS representatives in Sept of 2009 at a time the Hum was mid-level in my home. When I got there, I found the compressors were not operating. So that kind of shot the station hypothesis down. Although I did comment I felt vibro tactical sensations on my feet. The Gas Company suggested I check out other “traditional” sources in the area that communities complain about. In addition to this Iroquois compared their operating logs to my observation log and there was no correlation between the two.

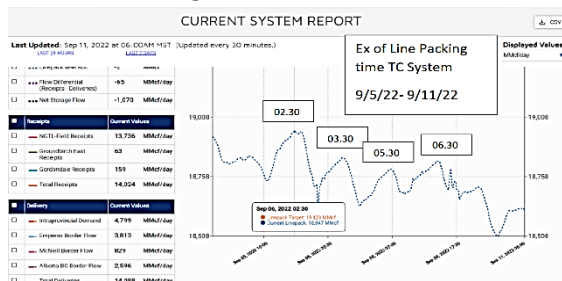
When I came to the conclusion there was no other community type noise sources that fit, I began to reason that the only common factor to where I was experiencing the Hum were the IGTS and AGTS lines. My home and office are at the prefect storm location for GPS!



Natural Inter/ Intrastate Nat Gas Pipelines in  
Northern Fairfield CT, red line my home

The Hum is typically described for its intensity, pitch and timing of day as the worse. All can be explained as scheduled changes in operations of any given gas pipeline system. The worst of conditions are typically late at night and early in the morning when the transmission companies receive their “nominations” of natural gas to

move from storage to the user. This is called “line packing” which maximizes the BTU content per cubic foot.

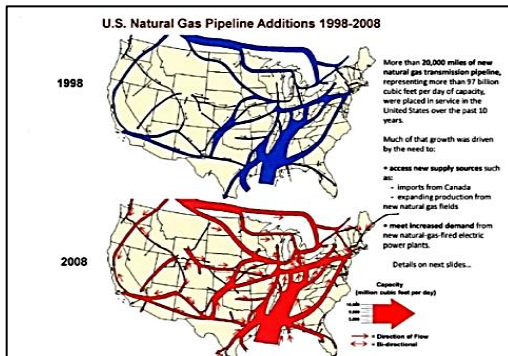


Example of this from the TC Gas System in Canada. To do this the transmission company runs the compressors hard to increase pressure. This typically is done late at night and early in the morning. There is also another operation where the line is packed for something called “Park & Loan” that occurs regularly. All this affects the sound power capability inside the line to radiate sound waves to receptors many miles

away.



I have to think that the reason my Hum began occurring on 2009 was



due to the President Bush passing the 2005 Energy Act (Epackt).

Pipeline use has been expanding in leaps and bounds. This image

shows how that occurred since 1998 to 2008. Since then, many more changes, additions, closures, flow reversals have all played into the changing acoustic condition of these systems.

Upstream Pipeline Projects	
• Vector	<ul style="list-style-type: none"> <li>- Added 200 MMcf/d in 2007</li> <li>- By 2009 could add another 100 MMcf/d</li> </ul>
• Dawn Gateway Pipeline	<ul style="list-style-type: none"> <li>- 400 MMcf/d by 2010 from Michigan Storage to Dawn</li> </ul>
• Dawn Express Project	<ul style="list-style-type: none"> <li>- 1 BCF by 2012 from ANR to Dawn</li> </ul>
• Union	<ul style="list-style-type: none"> <li>- Adding 1.2 Bcf/d from Dawn to Parkway between 2006 and 2008</li> <li>- By 2010 could add another 250 MMcf/d</li> </ul>
• TCPL	<ul style="list-style-type: none"> <li>- Added 180 MMcf/d in 2006</li> <li>- Added 90 MMcf/d in 2007</li> <li>- Non-binding open season closed 12/10/2007</li> <li>- Received over 1.5 Bcf/d interest for 2009+</li> </ul>

## What are System Changes?

Older systems are being asked to do things they weren't designed for when they were built. Operating conditions are different, the physical integrity of the design is still acceptable for the changes. But an unwelcome operational consequence has been a change in the ILFN environment that has broken acoustic thresholds that were not an issue in the past. Changes in the system are gas composition, operating pressures, elevated line temperatures, higher (or lower) gas flow rates, reversing flows and infrastructure changes affecting the dynamics of sound generation. Infrastructure changes include modifications to line geometry, expecting preexisting components to function properly in new service, addition of pipeline "loops" and side connections for "city gates", etc. An obvious sound source is "sound carry through" and setting up of "standing waves" from the compression equipment. It is well known that LFN travels many miles from the conditions created by tens of thousands of horsepower being applied. Other change is there is so much more steel in the ground that could be "sistering" with other sources.

## Industry Studies about Noise Propagation

Noise and vibration have been a problem near industrial facilities since the industrial revolution. This has been studied mainly considering "spherical" type point sources. Pipelines are "linear" sources and ILFN generally not considered.

The propagation of noise from petroleum and petrochemical complexes to neighboring communities:

[https://www.concawe.eu/wp-content/uploads/2017/01/rpt\\_81-4ocr-2004-01264-01-e.pdf](https://www.concawe.eu/wp-content/uploads/2017/01/rpt_81-4ocr-2004-01264-01-e.pdf)

Other studies have been more specific to Evaluating Industrial Noise in the Oil and Gas Industry. They address Low Frequency problems from point sources, not from linear ones that have the capability to distribute the sound radiated sound tens of miles away from the point source which is the only thing ever considered. A table of contents of what looks to be an interesting article about evaluation of noise in the industry.

[excerpt\\_sinclair\\_2017.pdf \(emlf.org\)](#)



CITE AS 38 Energy & Min. L. Inst. 3 (2017)

### Chapter 3

### Evaluation of Industrial Noise in the Oil and Gas Industry

Donald C. Sinclair II  
Steptoe & Johnson PLLC  
Wheeling, West Virginia

## Hum Related Government Studies



There have been some Government attempts to get to the bottom of problem where is there a large public outcry, but yielding nothing. In 1993 at the urging of then State Rep Bill Richardson regarding Hum complaints (late 1980's) in Taos New Mexico, researchers from Sandia Labs, Los Alamos National Labs and the University of New Mexico looked into identifying the source.

Another group looked into the Kokomo Indiana hum (2004). The researchers thought a Chrysler foundry plant fan was the cause. I believe it was fixed and eliminated the fan noise, but not the Hum.

Both problems still persist to this day and frustrated citizens have just stopped complaining.

What did these researchers miss, the high pressure natural gas pipeline systems in the area that transport gas and used for collection fields.

This bates the question to why no one considered these systems. One can surmise many reasons for this, but it could just be that no one knew? Or was it something more under handed?

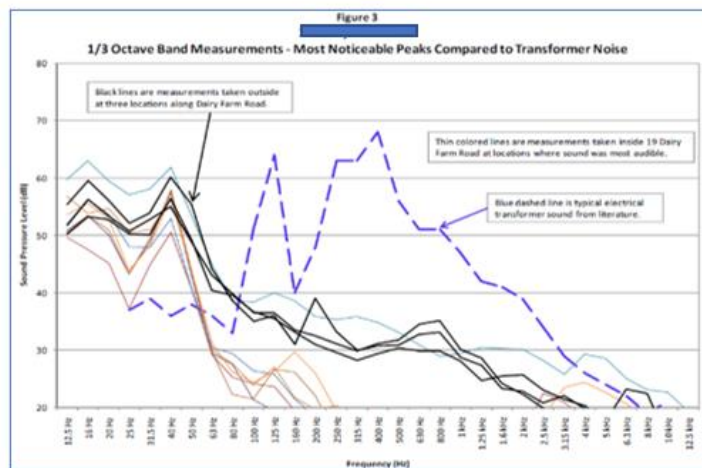
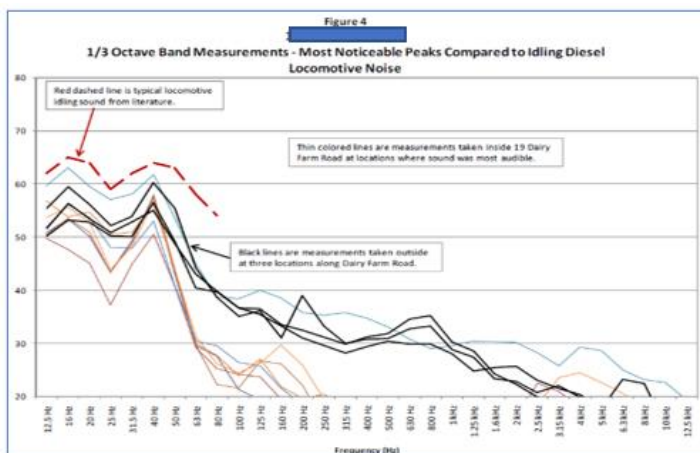
There is very little published about how pipelines play a role in the emissions of ILFN. So, my work had to draw on cloning information from many sources. Including the 2 consultant acoustic studies done by CL&P and IGTS, my experience, boots on the ground data collection, desk top research and analysis, observation, etc.

Interestingly I found much published regarding Wind Turbine Syndrome and its health effects.

## Section 7 –Proofing the Hypothesis

These following sections employ **problem solving techniques** suitable to study the sound patterns for my purpose. Certainly, experts have many more, but what my efforts show is that with some minimal knowledge the amateur can be an acoustic sleuth!

In January 2010 CL&P did Power Quality testing in my home and then contracted TRC Environmental Consulting to do an acoustic study inside and outside my home to determine if the High-Tension Power Lines behind my home was the source of my Hum. This was the last traditional “thought about” source in the area to be considered without before the revelation about the Pipelines.



2 TRC images from the report are shown. The first compares the spectral data collected inside and outside the house with a typical diesel (locomotive) idling sound profile (dashed red line). The light-colored solid lines are the sound spectrums inside the house. The black lines are from outside the house at 3 different locations along our drive. The familiar 40 Hz band I see in my testing is apparent. Interestingly there is also a band at 16 Hz indicating infrasonic sound.

The second image is overlaid with a typical electric transformer pattern. The blue dashed line is the transformer and is quite different than the spectrum of My hum, thereby eliminating the suspicion of the electric substation just under a ½ mile away.

After this I was stuck! But experiences of hearing it at work many miles away and talking with a friendly lawyer, led me to a revelation about the pipelines and the timing when all the changes occurred to the Iroquois and Algonquin systems. I believe I started calling it a **Hum** at this point.

My neighbor Bruno and I started extensive low frequency testing around the facility and found locally intensity and learned and witnessed the severe conditions at neighbor's home right outside the station fence line. This data was all provided to FERC hoping they would take action!!!

From the beginning I began keeping an observation and activity log thru 2012 with some later updates. Later on, I joined forums to collect experiences and hum report location data. I discussed cases with people who contacted me.

Searching out others in my area experiencing similar conditions was futile. Most I asked said they did not hear what I was hearing in their homes while visiting with them. I learned years later to ask questions tied to the like headaches, sleeplessness, ear ringing, vertigo, discomfort in space, etc. and began to realize non hearers were having the same issues as me.

After trying to get FERC and the Gas

scale is an arbitrary indication of sound level in house

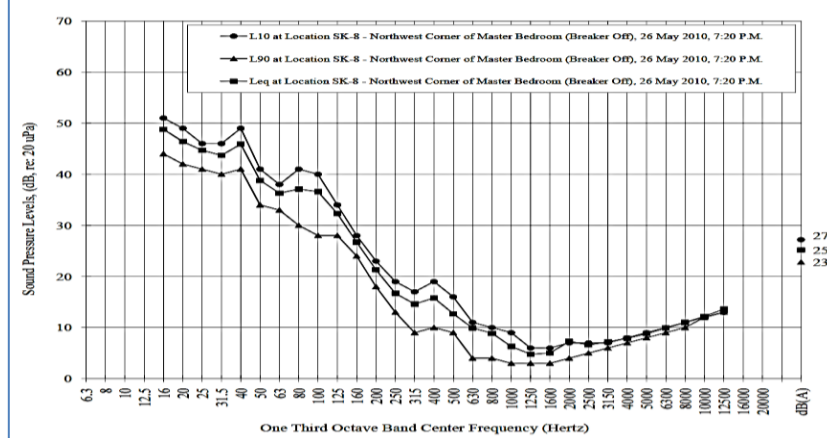
- almost undetectable, 5- bothersome 10- Unbearable- above 2 sleep interference

Flow frequency phenomenon: Ambient-dba neighborhood noise

C.B.P pulled sign from KVAR project late summer

Date	Time	HUM Scale (1-10)	Notes
8/26/2009			Increasing Emails to Ruth Iroquois Gas started 9/13/09, Iroquois notice email 8/26/09, started after that when we started closing up the house
			July 17, 2009 coyotes running up and down front street, adult attacks young coyote in front yard
			Visited IGTS station with Ruth et. Al not running and there was hum in home. Felt vibrations and told them from ground there
			IGTS suggests hum (not figuring lines at this point) from 115kv lines, RT 84 impact, Rail road, pond pumps, small industrial location
0/21/2009	9:30 AM	10	Stan from Spectra confirmed sound
	22-Oct 9PM	2	lot of road noise
	10:15	8	
	23-Oct 8am	3	no road noise
	6pm	2	
	24-Oct 8am	6	
	midnight	2	
	25-Oct 8am	7	
	26-Oct 8am	4	
	27-Oct 1-4 pm	8	realized coyotes were no longer in long lived habitat in wooded area along gas lines and tracks
	midnight	9	
	30-Oct 7:30 AM	7	blow downs at station whining (hiss)
	9 Nov 7:30pm	3	clear 50deg
	10 Nov 5:30am	2	Dog skittish
	6:30am	5	

Figure 57 - Measured Leq, L90, and L10 sound pressure levels at Location SK-8, with the House Power Off, IGTS Brookfield Station, Brookfield, Connecticut.

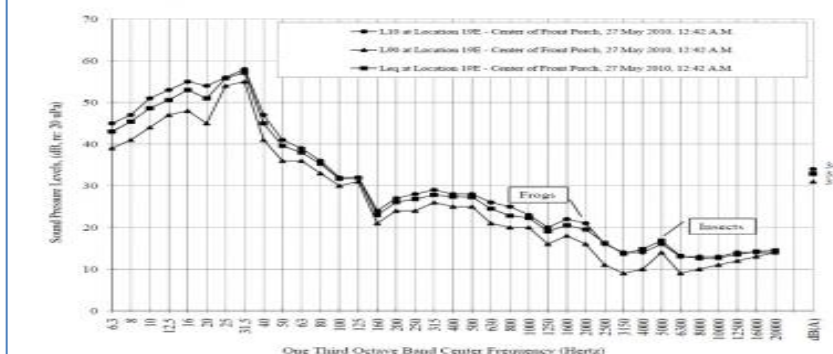


Company to admit there is a problem, with support from the CT Attorney General's office, FERC got Iroquois Gas in May 2010 to agree study low frequency in the area around the new Brookfield Station as part of its permit certification. For this testing Iroquois Representatives made it very clear, this study was not being done to investigate the Hum.

The spectral profiles of both consultants yielded similar results in many spots tested.

As expected, they got their permits for the station! The silver lining from this was in a **back handed way** that the report was packed with useful sound/ location data that reaffirmed the TRC study and my field data and hypothesis. This image is a copy of LSG data taken **outside** on my home front porch. The familiar 40 Hz band is

Figure 24 - Measured Leq, L90, and L10 sound pressure levels at Location 19E, IGTS Brookfield Station, Brookfield, Connecticut.



evident with a hint of a 18Hz band like that in the TRC report done **inside** the home. The significance of this is two independent consultants found similar acoustic environments. The LSG report expanded the impact area to outside my neighborhood where the 2 Algonquin lines are and away from the IGTS compressors.



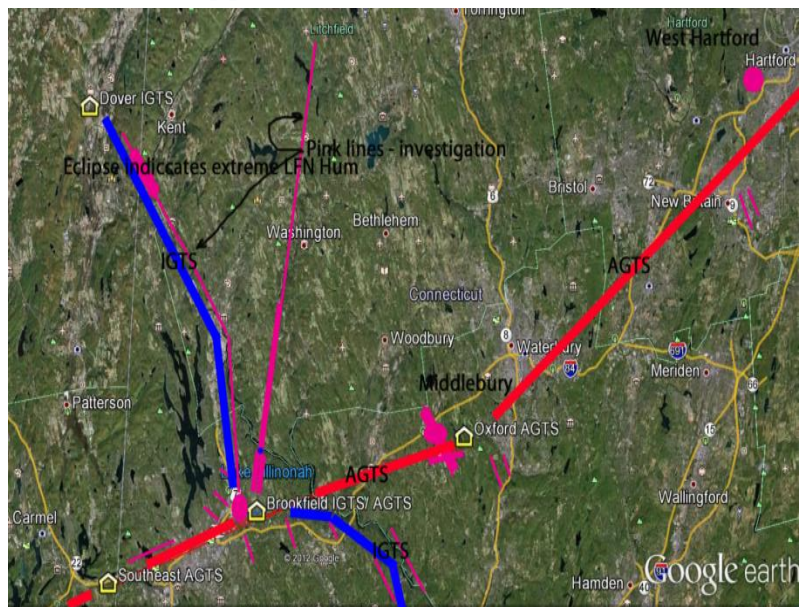
I continued to use various FFT programs to learn and document the occurrence of the Hum.

In October 2011 all the power in the NE USA was out and the Hum was rampant! Further confirming the TRC study the high-tension lines and electric sources are NOT the reason!

So, the question is how to confirm the pipelines are epicenter of the ILFN causing my Hum and vibrations? The only way is canvassing a large area and doing an acoustic attenuation map.

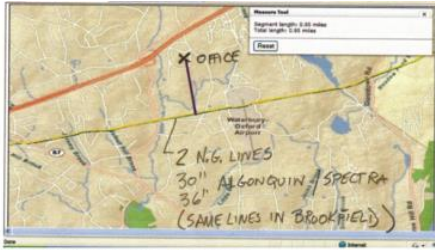
## Locating the Source Using Acoustic Attenuation Mapping

Since the human is incapable of sound localization of ILFN a different method must be used to locate an ILFN source than most would consider. A combination of techniques used to locate, say debris in the depth of the ocean using grid measurements for a spot location of non-acoustic materials (airplanes, ships, etc.) and using the difference in SPL to hone in on an acoustic source, kind of like what is done to locate the ping of a black recorder box from a plane crash to determine the attenuation pattern of ILFN and its epicenter. Thereby the source. The big difference in the experts and us is the tools we have to do the testing in the field. What I used are simple, hands-on tools and methods available to anyone with some level of understanding how to use them and what the goal of the effort known.



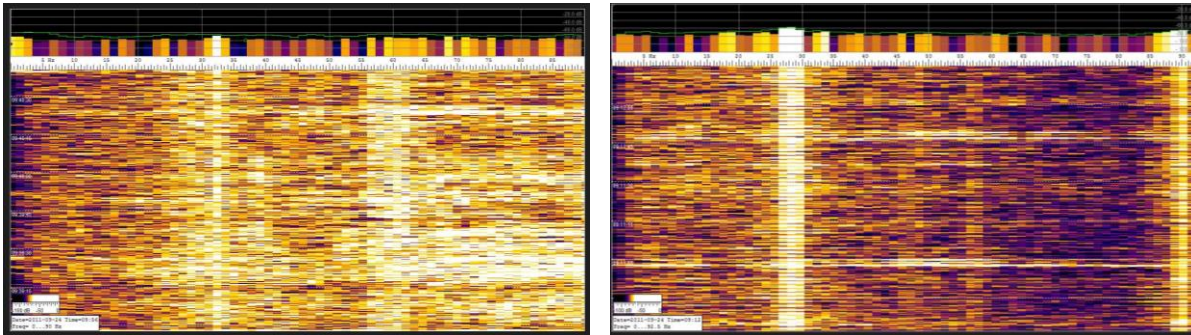
In 2010 I did data collection **Confirmation Mapping** along the IGTS and AGT lines in my area. The graphic shows 4 compressor stations (house icons) and the IGTS and the 2 AGTS High-Pressure Gas lines in Northern Fairfield, Southern Litchfield and Western New Haven Counties in CT. The Brookfield IGTS compressors and AGTS interconnect is approx. 1300ft from my home. The blue line is the 24 in Iroquois line (~1400psi) and the red line is the 26- and 30-inch Algonquin lines (~600+ psi) which are as close to my house as 100ft. The pink color is where I travelled and did field data collections.

I did the first road trip in 2010 along these lines. As we know the car is a good Hum Resonating Vessel. So, I used my car as part of my tool kit to do observation and measurement all along the IGTS and AGT pipelines. At different locations, different intensities were observed and measured. In 2011 I added the thin diagonal pink line going NNE towards the town of Litchfield as part of **attenuation mapping** which proofed out that the 3 lines are the epicenter of the source ILFN. All this information was sent to FERC, IGTS and our Senator Blumenthal and Rep Murphy when I was tirelessly looking for help.



Building location in Middlebury CT

I began hearing and paying attention to the Hum in my car and in my office in Middlebury/ Oxford CT in early 2010, some 15 miles from my home. I began to suspect the same 2 AGT lines near my home that are about 0.8 miles from my office had something to do with the Sound. This is when I first suspected that GPSH was a far more reaching issue than I had thought. I did some field investigation around the area where my office was. I stopped by a resident where it was very intense to me, though the residents said they didn't hear it. Interestingly some 7 months later in April 2011, they emailed me that they and their neighbors began to constantly hear it. In my office building which is constructed of concrete I was hearing and sensing the sound and its nauseating conditions. I found a spot in the basement where the conditions were unbearable. I escorted associates there so they might get a sense of what I was telling them about. They all sensed the conditions with a couple of them needing to leave the space because it was so bad! On a day that everything in the 318,000 sf building was off and electric power the site disconnected I did testing on the corner area where the cage are in the basement on the side of the 2 Algonquin lines less than a mile away. The **left screen shot** is the sound profile outside the building and the **right screen shot** is the inside conditions of standing waves made the space uninhabitable. There were no conditions sensed outside. The color pallet of Spectrum lab program display is the same in both locations and is set to be very sensitive. The peak frequency in this cavernous, concrete constructed basement is a narrow band at 29 HZ, whereas in my wooden structure home with smaller rooms is a narrow band at 40 Hz and possibly one at 18 Hz.



In 2011, I did **Attenuation** mapping mentioned above where I further confirmed the epicenter of **Wide Band Low Frequency Spectrum** of sound intensity is the pipelines that we know that length and mass define the spectral profile. We know that a structure picks up the resonant frequencies of the wide band. I set out with my car and tools on a route to Litchfield CT shown as the thin pink line. This works out to be at least 20 miles away from the sources where I confirmed the existence of the Hum.



octave analyzer and FFT programs on a laptop computer and results. Hum intensities that day were upper around a 6 out of 10. The highest dB reading was near the Pipeline Right of way (ROW) at my home (133.1 dB (FFT)/ 52.5 dB (1/3 Octave dB linear)). The attenuation rapidly lessened for the first mile then flattened out for as far as I went to the Town of Litchfield (120 dB/ 43 dB).

Strangely the Hum level heard at my home in the car was about the same in Litchfield some 20 miles away from the sources!

After doing some research about the anomaly from seismology. I found out about how Geology and topography affect sound wave propagation.

## Geology and Topography

Almost everyone knows how weather affects sound propagation. But fewer understand how geology and topography affect it. Things like material type, stiffness, water tables and aquifers, caves and tunnels, are also factors. But could these explain the anomaly of the Hum at the boat landing? Probably so!

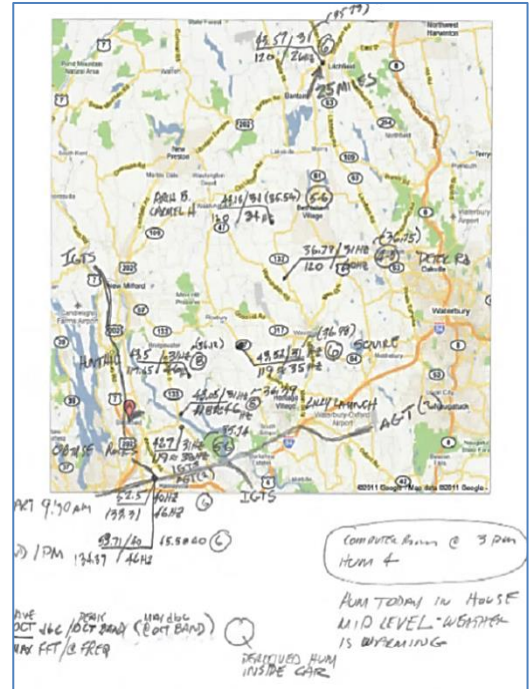
I researched the subject and found something called Trapped Seismic Wave Guides. Like wave guides in electronics. This is well known about in Seismology. These geological features are like channels that can propagate and amplify low frequency energy to over longer than usual distances.

<https://pubs.geoscienceworld.org/ssa/bssa/article-abstract/80/5/1245/119356/Fault-zone-trapped-seismic-waves?redirectedFrom=fulltext>

WIKI- [Waveguide \(acoustics\) - Wikipedia](#)

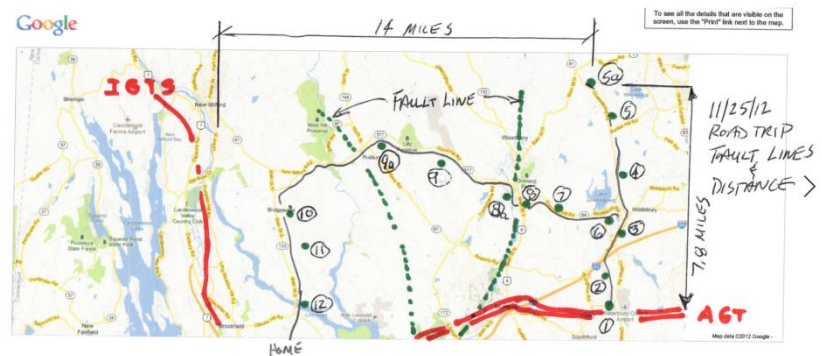


On a hunch to explain the Anomaly I checked the geology of the area and found there is a fault line that follows the river valley as part of the Housatonic River from Sandy Hook up through as far as where I tested in Brookfield and Bridgewater. This could be the Cameron Line in the area.



Surface Guided Acoustic Waves (SGAW) known as Longitudinal/ Rayleigh/ Love Waves can be guided by Topography-Samuel D.M Adams, Department of Mathematics, Imperial College London South Kensington Campus, London: <https://royalsocietypublishing.org/doi/full/10.1098/rspa.2006.1779>

To do a quick check on the Wave Guide theory I took a field trip to a place where I could get to that crosses 2 fault lines, I found on the CT Geological map. It showed some support to the hypothesis that the wave guides do play a role with propagation of the ILFN, so the jury is still out. Much more work is required to bring more confidence to this.



**Caverns/ Aquifers-** spelunkers report Hum sound in caves all the time. Certainly, there are natural sounds from the earth, wind, etc. But could some of this be the result of ILFN from pipelines? Can the caverns and voids in the earth cause standing waves and amplify them into sound and vibro tactical sensations. Also, could they play a critical role in cases like the Windsor Hum. The entire area has salt mines and other depleted cavities used to store petroleum products. Under my area is a large aquifer. The effects of underground cavities (abstract): <http://www.sciencedirect.com/science/article/pii/S0267726106001552> ,

## Pipelines as an Accumulator/ Radiator of other sources

Question that comes up on occasion- Instead of the pipelines being the generator of ILFN is it possible they are simply the accumulator/ emitter of other unknown worldwide sources of ILFN? Not likely, but would be answered in a GPSH investigation.

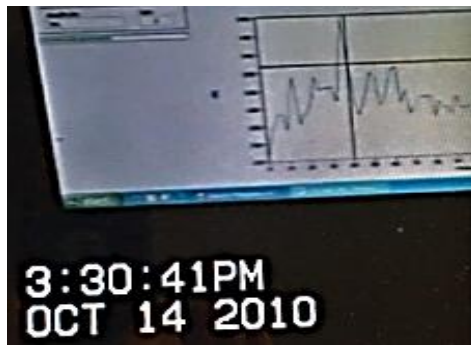
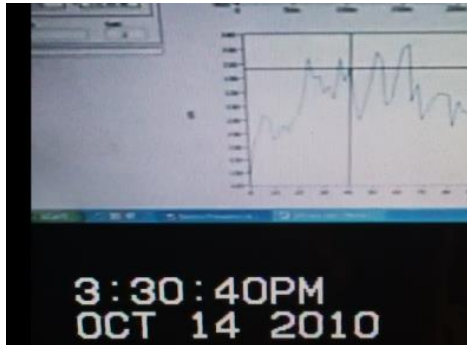
## Turbo Machine Compressor Spectra and Pipeline Flow Noise

It is important to see how sound and standing sound waves set up in long pipelines. This likely plays a role in the dysrhythmic characteristic of the perceived sound in the receptor location. A **Rueben Tube** is a visualization that demonstrates standing sound pressure waves act inside pipelines. This demonstration using music (picture a huge natural gas compressor as the source) shows that sound from sources like compressors, valves, orifices, pipe components such as tees and elbows, etc. are very active inside these systems- Reuben Tube Video:



<https://www.youtube.com/watch?v=gpCquUWqaYw>. These cyclic pressure conditions are discussed in later sections for a potential role in failure mechanisms where Flow Induced Vibration and Acoustic Fatigue can lead to cyclic fatigue and crack propagation with pipeline ruptures in pipe used in the past that the material composition of the steel leads to Brittle Fatigue.

After the San Bruno pipeline failure in 2010, I raised concerns to FERC and the Gas Company about the effect



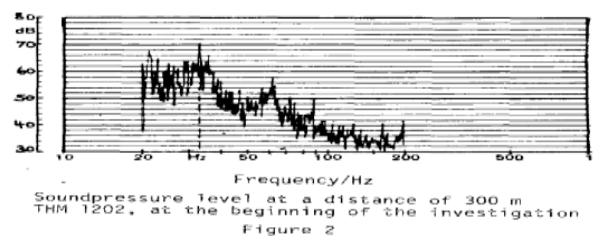
that the sound generating mechanism of ILFN from the lines may have played a role in the SB failure though Cyclic Fatigue. IGTS and AGT did NDT stress examinations of their 3 lines after I raised

these concerns that the cyclic effect of the Hum might affect pipeline integrity. The testing will be discussed later. For this examination they shut down and restarted the IGTS compressors. This provided an opportunity for me to measure the sound profile of the compressors during restart. In the images a distinct 40 Hz frequency peak develops. To which 40 Hz is a typically measured frequency range found in Hum research work.



Figure 2-1. Accelerometers and Strain Gages on the 26 Inch Pipe

Low Frequency Noise Emissions from Natural Gas Compressor Stations. LF radiate out into communities and causes vibration and standing sound waves inside dwellings. This abstract doesn't include is any discussion of the pipelines. The image shows peaks at 20 and 40Hz peak for



compressors (Hisbano Suiza Turbo units) like TRC and LSG data as well as mine:

<https://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=2213605>

Other sound recordings provide evidence that there are extreme acoustic conditions from inside the pipeline that need to be considered in all this. Gas flow can generate different levels and different types of audible sound condition at different distances. So, we know they are noisy and it is very plausible there is a LF component of this sound generation/ carry though causing emissions of sound waves resulting in the Hum. Evidence of extreme flow noise is highlighted from a noise complaint investigation done by Pacific Gas and

Electric engineers 2001 near Barstow CA.



## How Structural Resonance and Standing Waves Impact GPSH Conditions

It is important to have an idea how ILFN Longitudinal/ Rayleigh Surface radiating from a high sound energy source can cause the conditions of GPSH low frequency sound, vibrations and standing pressure waves inside **Receptors such as dwellings, vehicles, caverns, etc.** It is also important to be aware of Helmholtz Resonators which is a container of gas where a driving acoustic condition causes the gas to vibrate inside (standing waves). The conditions are influenced by space size and configuration.

Everything has a natural frequency and **resonance** of it can cause vibrations and sound to be generated by walls, floors and ceilings of rooms. The vibrating surface cause air particles to vibrate and make sound. In addition to these standing acoustical waves set up inside these spaces that AMPLIFY the “sweet spot” of the wider driving frequency band and the effects of the Helmholtz resonance ns of the chamber. This is what causes the typical vibrotactical sensations, sound and pressure feeling sensations that people have.

The degree of frequency band coupling of the structural resonance to the driving frequency vs the actual source intensity measured may play a role in the intensity heard and felt inside the structure even though the measured intensity of low frequency indicates the conditions should be more intense

A couple technical papers best cover the details for those interested in getting into the weeds about this:

### Noise Induced House Vibrations and Human Perception\*



Harvey H. Hubbard, member ASCE, summarizes noise induced house responses including frequencies, mode shapes, acceleration levels and pseudo-static noise reductions. The role of house vibrations in reactions to environmental noise is defined and some human perception criteria are reviewed.

Noise Induced House Vibration and Human Perception:

<https://waubrafoundation.org.au/wp-content/uploads/2013/08/Hubbard-1982-Noise-Induced-House-Vibrations-airports.pdf>

## How Vibration Acoustics Works

A Must Watch about Vibrational Acoustic by Denis Foley of Acoustic Fields. Easy to understand. Acoustic Fields- Vibration Acoustics

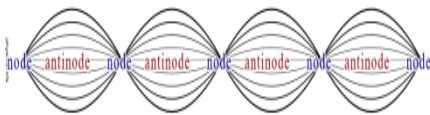
<https://www.youtube.com/watch?v=GZNZYksp2zs>



Standing waves in rooms are stationary waves that set up in chambers having a dimension at a wave length of a frequency component that matches one that is part of the impinging travelling sound wave. This explains the standing wave pattern I saw and provide a video in section 10 of this paper (word doc format only) of the eerie waves that regularly occurred on the surface of my pool after the intensity of conditions increased leading to my first hearing the Hum The higher the sound power in that wave the greater the amplitude of the standing waves. A good visual representation of standing sound waves in a small room from a site for designing recording studios. The smaller the room the more disorganized the patterns are. These conditions are part of the body pressure phenomena hearers and non-hearers feel. **Wiki** covers the topic in detail. [https://en.wikipedia.org/wiki/Standing\\_wave](https://en.wikipedia.org/wiki/Standing_wave) -



The HELMHOLTZ RESONANCE behavior of single and multiple rooms -NASA 1986:  
<https://ntrs.nasa.gov/api/citations/19870001316/downloads/19870001316.pdf>



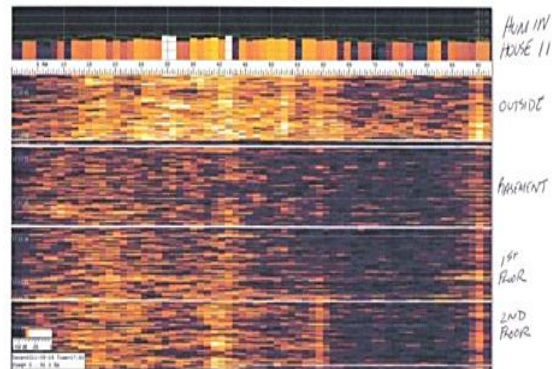
In our case the radiated sound couples with the room acoustics like a Helmholtz Resonator. In turn that sets up pressure variances called nodes and anti-nodes. This is likely what makes a Hummer “feel” it in their ears on their bodies.

It can be rationalized that the sound heard is a result of the vibrating surfaces and standing waves, like speakers in a room. The walls of rooms act as sound wave guides and concentrate the bass sound conditions in the corners which is why there is always higher measured spectral conditions there and why that’s the worst place to put furniture.

High frequency is reflected from penetrating through walls due to their wave lengths being less than the thickness of the structure. Whilst low frequency sound waves travel right through the wall, unattenuated. This is why closing windows; increased insulation is of no benefit in blocking out the ILFN that causes the conditions inside.

### **Brighter yellow colors in this app are higher intensity SPL’s (Sound Pressure Levels)**

LF measurements will differ in different parts of the house. The size of rooms and where they are located in a building affect intensity. This image measured in August 2011 is an extremely high hum level. It shows differences from outside, basement, 1<sup>st</sup> floor room, and 2<sup>nd</sup> floor of my home. Typically, outside corners of rooms towards the source are the worst. 2 primary frequency bands of sound at 40Hz and 18 Hz are noticeable. The 58 Hz is likely computer noise. At these levels Low Frequency Vibro tactical sensations can be sensed on the bottoms of both feet but for some reason not on the hands.



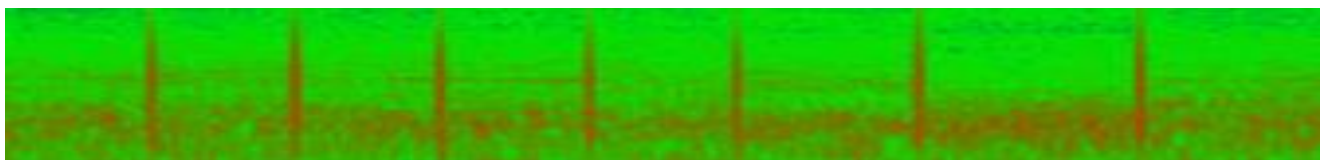
These variations of sound pressure due to standing waves were likely the explanation behind people's Paranormal experiences investigated by Vick Tandy. And at a certain resonant frequency it sets up a fear reaction he termed the Fear Frequency. [The fear frequency | Science | The Guardian](#)

Studies of ground vibrations from earthquakes and high-speed trains show where broad band low frequency sound radiating away from the source travel long distances, unimpeded by structures and causing sympathetic resonance (vibration) of them. An example of this transmission of sound from one object to another can be demonstrated using tuning forks chambers: <https://www.youtube.com/watch?v=C-Bn70PpbrM>.

The reader can search on their own using search terms such as "Perception thresholds .....".

### **Outdoor Hums**

Why do some hear the sound outside. For the most part the Hum is heard and felt inside buildings/ structured cavities like a car, etc. But at times I do hear it faintly outside in my yard. I wondered if the air or the sonic environment was causing this or if my home was actually casting off / reflecting off sound waves that cause my house to have Hum inside to be heard outside. So, to answer that I did an experiment to see if I could find an attenuation pattern off the resonant house structure.



While noting the intensity of the Hum outside I walked towards the house at approx. 8- 10 ft. increments and measured the intensity at those spots on my iPhone app. What I found was the observed sound didn't noticeably change due to the ubiquitous nature of ILFN. But what I did confirm is that the measured intensity did change and increase the closer I moved towards the house (to the right side). This image shows the attenuation pattern leading to the source. In deed the house is acting as a radiator of the ILFN and likely affected by atmospheric weather factors. The left side of the image is 50 ft. away the right side is next to the house. The redder fill, the higher the sound intensity. The spikes are hand slaps to delineate the different distances.

Hums away from any receptors require further investigation to explain.



## **Sound and Structures Further Study**

This section is for those that want to delve deeper into the study of the sound and structures

**Infrasonic sound pressure in dwellings at the Helmholtz resonance actuated by environmental noise and vibration- Roman Vinokur- only an excerpt:**

[https://www.researchgate.net/publication/229208843\\_Infrasonic\\_sound\\_pressure\\_in\\_dwellings\\_at\\_the\\_Helmholtz\\_resonance\\_actuated\\_by\\_environmental\\_noise\\_and\\_vibration](https://www.researchgate.net/publication/229208843_Infrasonic_sound_pressure_in_dwellings_at_the_Helmholtz_resonance_actuated_by_environmental_noise_and_vibration)

*"The Helmholtz resonator effect of a room with an open window or ventilation duct has been studied theoretically and experimentally. The effect results in a sound pressure buildup at infrasonic frequencies. For comparison, the frequencies of the standing-wave room resonances are above the infrasonic range for residential dwellings. The relations between the sound pressure inside a room and outside (environmental) sound pressure or vibration acceleration have been calculated for the third-octave frequency band incorporating the Helmholtz resonance frequency. The experiment on a small-scale model illustrated the Helmholtz resonator effect caused by environmental vibration"*



An article about pipeline sources of noise and methods such as Helmholtz resonators to reduce the problem:

[https://www.researchgate.net/publication/51694752\\_Noise\\_reduction\\_in\\_pipelines\\_using\\_Helmholtz\\_resonators](https://www.researchgate.net/publication/51694752_Noise_reduction_in_pipelines_using_Helmholtz_resonators)

## **Building Construction and Acoustics**

Different materials in construction result in different acoustic and vibration conditions inside rooms. There is much that can be found on the internet to the interested reader

A white paper from PSU starting at page 8/19 covers Structural Vibrations induced by Sound Waves and Part 2 Interaction with the structure:

[http://personal.psu.edu/users/s/a/sah19/StructuralAcousticsTutorialPart1AcousticsToday\\_lowres.pdf](http://personal.psu.edu/users/s/a/sah19/StructuralAcousticsTutorialPart1AcousticsToday_lowres.pdf)

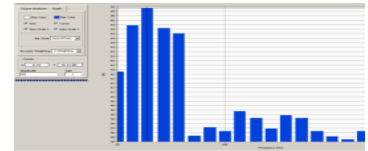
<https://acousticstoday.org/structural-acoustics-tutorial-part-2-sound-structure-interaction/>

The only true solution to the problem is at the source! Either design it out using things like Helmholtz resonators or active noise cancellation (ANC) that was studied in the 1970's but considered impractical for use. Our only solution now is masking as a physiological defense.

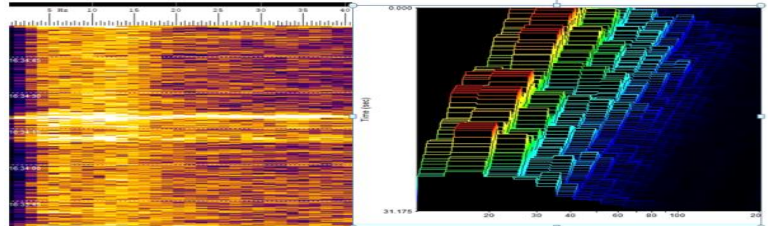
## Section 8- Tools for Analysis

I firmly believe the only way to achieve a fact-based conclusion and something that can be taken to the authorities of the discussions from a large diverse group experiencing The Hum is to understand what the observer is sensing, but more importantly to collect data using tools to remove the human physiology from the equation. I don't pretend to be an expert about analyzer tools I've used and I do understand the limitations of such tools and what they are useful for at this level. Those uses are to understand the persons environment and to use for seeing the relative intensities where the hum is occurring, since ILFN to eh human is ubiquitous. We aren't trained, aren't certified nor are the tools calibrated for regulatory purposes.

In 2010, I started using laptop programs like **Spectro Frequency Analyzer 2** (1/3 octave analysis) that to see what frequencies bands are occurring to cause the conditions I was experiencing. The consultants that came to my house used 1/3 Octave Band analysis in their tool box in their 3-4 studies. Tools like this are important to have in group discussions where consistently is essential. I found that the internal mic on the laptop had a higher band frequency signature, but has no bearing on the ILFN bands. I started to use a remote mic. **But I found it wasn't specific enough to understand the finger print of what the hum the hums spectral characteristic are. This is important to know that the hum I was investigating in different areas of the state and country are the same, based on the sound profile of its frequencies and make up.**

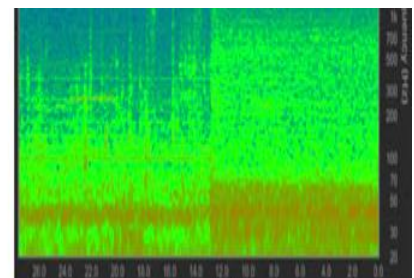
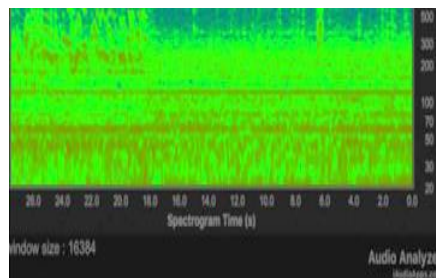


More recently I have been using programs such as **Spectrum Lab**  
<https://www.qsl.net/dl4yhf/spectra1.html>  
and a higher end program called **Spectra Plus** to "see" the spectrum. Also used for "seeing" the differences of the conditions from day to



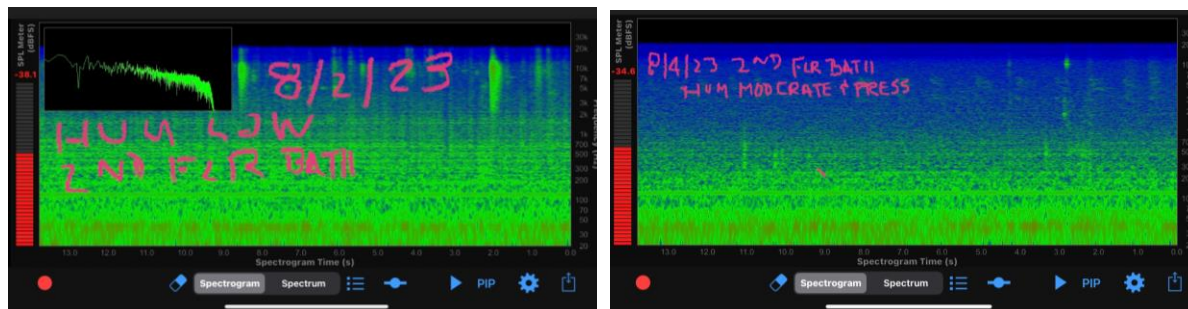
day, room to room, etc. The left image uses a laptop and external Shure Microphone for a Hum level of 10 inside my garage with the FFT waterfall option. The right image uses a 3D option in **Spectra Plus**. What is very clear is the undulating/ dysrhythmic nature of the spectrum which may have some influence from turbine "flutter". These profiles are consistent with the work the 2 acoustic

consultants did in 2010. Interesting the typical 40 Hz band is less prominent. It should be noted these images contain some degree of Flutter inside my home, but would not be in measurements away from the compressor station. **It is very apparent the conditions are not a pure tone!**



Also, the degree of frequency band coupling of the structural resonance to the driving frequency vs the actual source intensity measured may play a role in the intensity heard and felt inside the structure even though the measured intensity of low frequency indicates the conditions should be more intense.

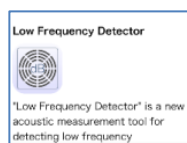
Since we are not experts in acoustic analysis/ vibration analysis, nuances we miss will mislead our opinions from what we hear and feel to what the analyzers are indicating regarding intensity level differences. A keen eye will see indicators because the second analysis is different than the first. The first is a low hear and feel, the second is a moderate hear and feel in the same room on different days. At times. Sometimes the apps do not work on as expected on different mobile devices, why, I don't have an answer.



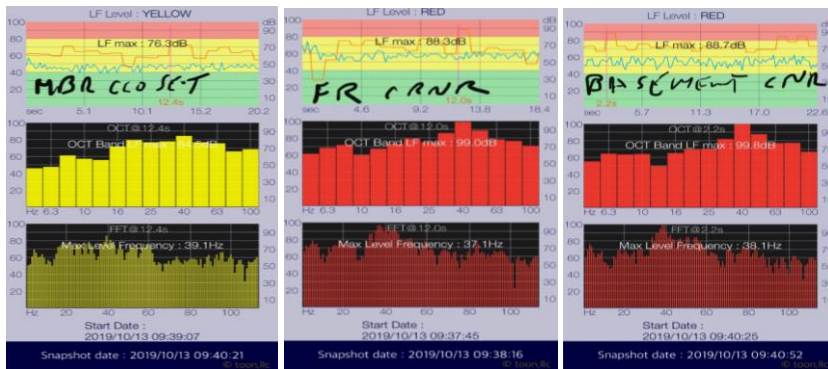
Readily available [Audio Analyzers for the iPhone](#) provide quick and easy analysis on the fly. The left image shows the intensity inside the house on a **low hum** time, the right image is the hum inside (left) the house and outside (right) the house on a **bad hum** time. Bad days always have a concentrated narrow band. In these images the undulating characteristic of the Hum is again seen.

The general consensus is the Hum and all the sensations cannot be recorded. Of interest, but not critical for my work. And what I do hear of recordings have no similarity to the My Hum and are defeating to truly understand what the Total Hum sensation is.

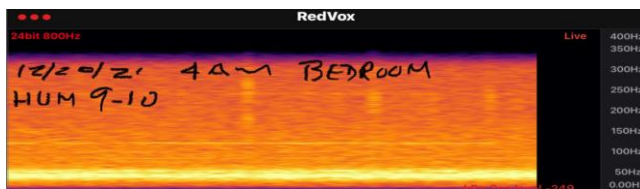
Four “on the go” apps I use for quick analysis:



The following screenshots were taken on Oct 13, 2019 using [LF Detector by Toon, LLC Analyzer](#) when the hum was extremely high (10). Starting on the left with the same 2<sup>nd</sup> floor closet corner, 1<sup>st</sup> floor Family Room corner and a basement corner on the north side of the house that faced the pool. Data shows intensity reaching close to 100 db!! The red line is the low range db, the blue line is the audible band db in the normal hearing range. Within an hour the conditions returned to levels similar to the ones above. It is suspected that something changed in the operations of the gas system.



A RedVox image of a 9-10 hum level at 4 am on 12/20/21. The 40 Hz band is almost always prevalent.



## What did the Acoustic Consultant use in their 2010 Studies?

- TRC used-Rion NA=27 1/3 octave band analyzer
- LSG used- Bruel & Kjaer type 2260 (2) with a Marantz PMD620 recorder

A developing tool that could be used to capture minute acoustic conditions of solids is enhanced photography:

<https://www.youtube.com/watch?v=fHfhorJnAEI&feature=youtu.be>

**It must be stated that my data collection is qualitative to determine location source, attenuation patterns and spectral patterns. It is not quantitative, so recording the sound and the actual decibels “dB” are not suitable for noise regulation use.**



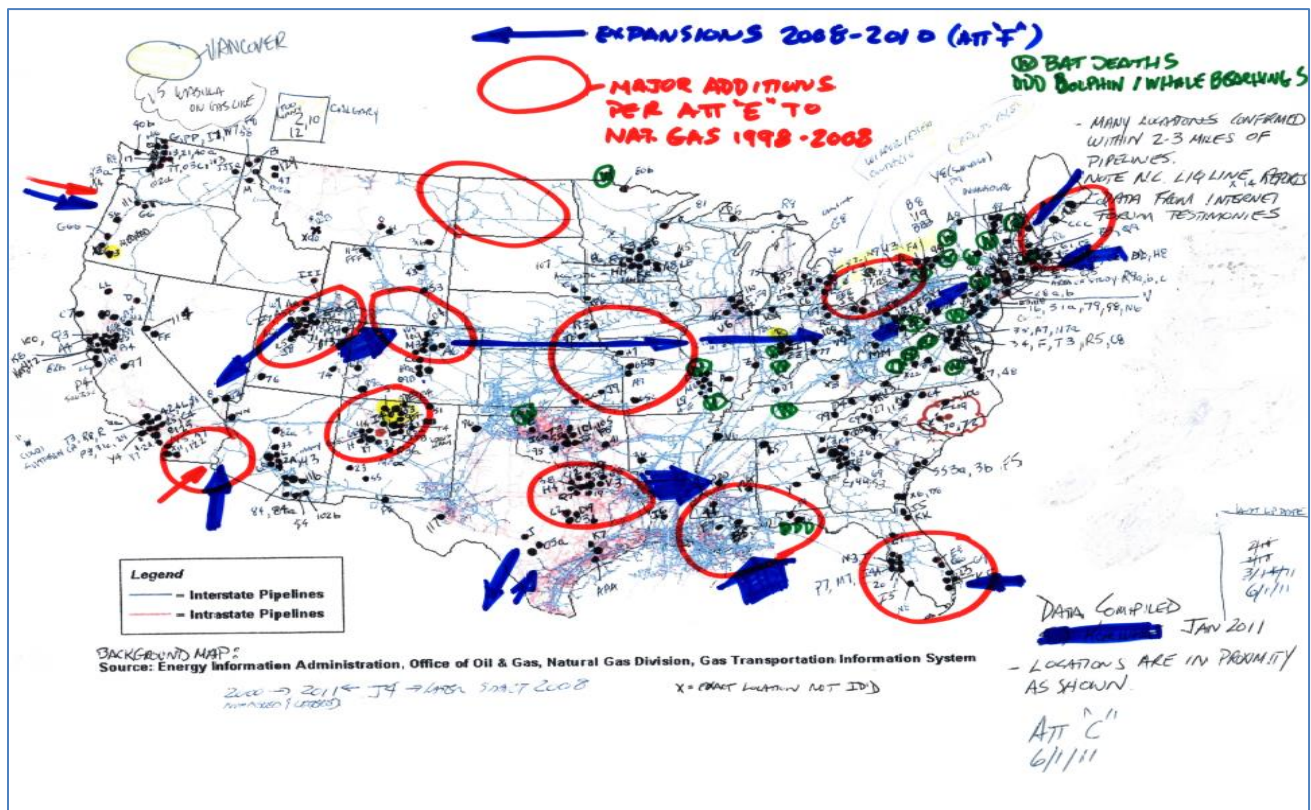
## Section 9- Connecting the DOTS of The Mystery Global Hum to GPS

After coming to the conclusion about the source of my Hum and getting nowhere with the authorities to address it, I realized my problem, would stay my problem unless many more are suffering and if the conditions were affecting people's pets and animals. I felt the best approach to validating the GPSH Theory was to do a deep dive into US centric cases. So, I began searching for US reports of a strange low frequency noise and to correlate those with pipeline locations on the 2009 EIA natural gas pipeline map. This effort became more of an **exercise in statistics** than science and engineering..

What I found was astonishing! I found data in masses and when I started overlaying them as a dot onto the EIA map, I began seeing a pattern that fit my hypothesis. Most dots fell within a reasonable distance that showed a solid correlation between location where high-pressure natural gas transmission pipeline systems are and the Hum is reported!

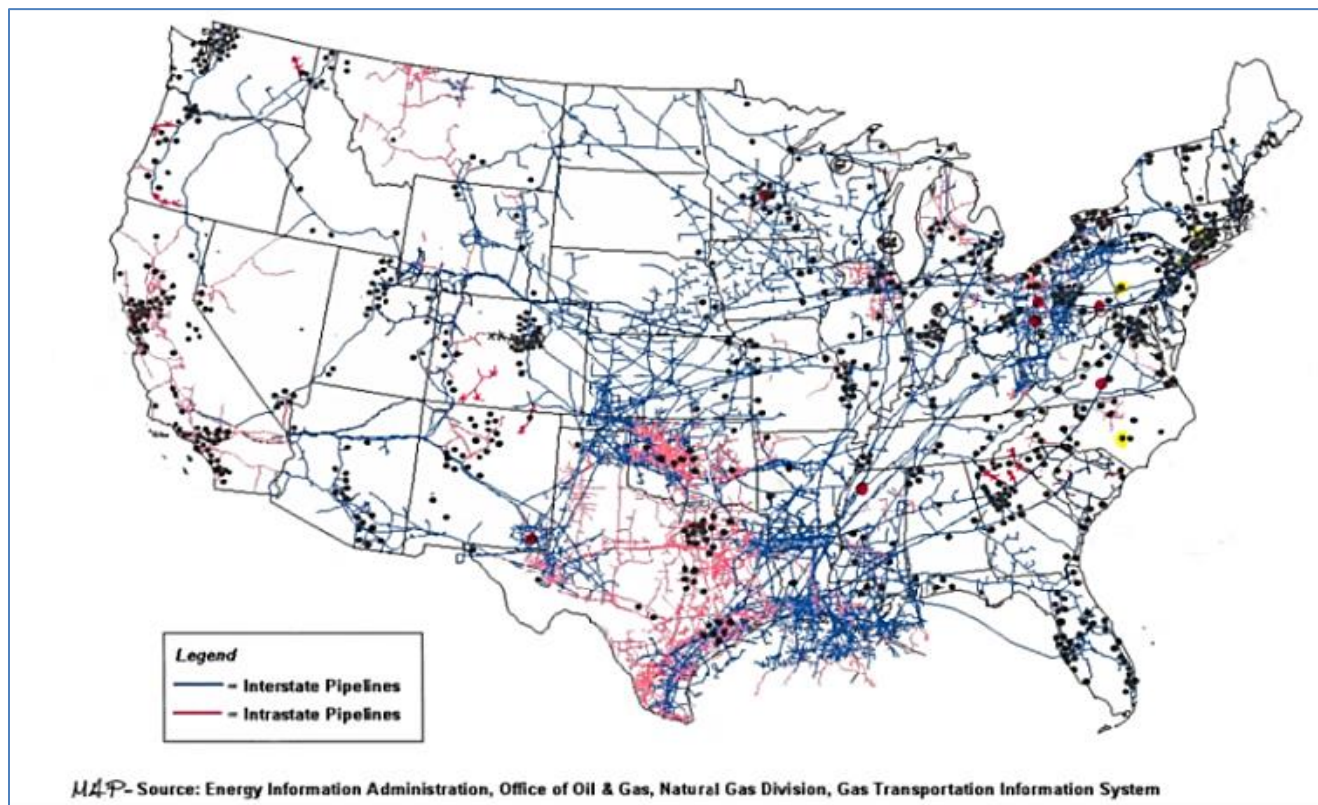
My first mapping was pulled together in 2012 with data from many internet sites and groups since 2000. Another was done on 2015 using with only a copy of the global hum map from thehum.info site. In 2021 I did another map using excel 3 D mapping and a **consolidated** from various sources.

This is the original data collection map started.



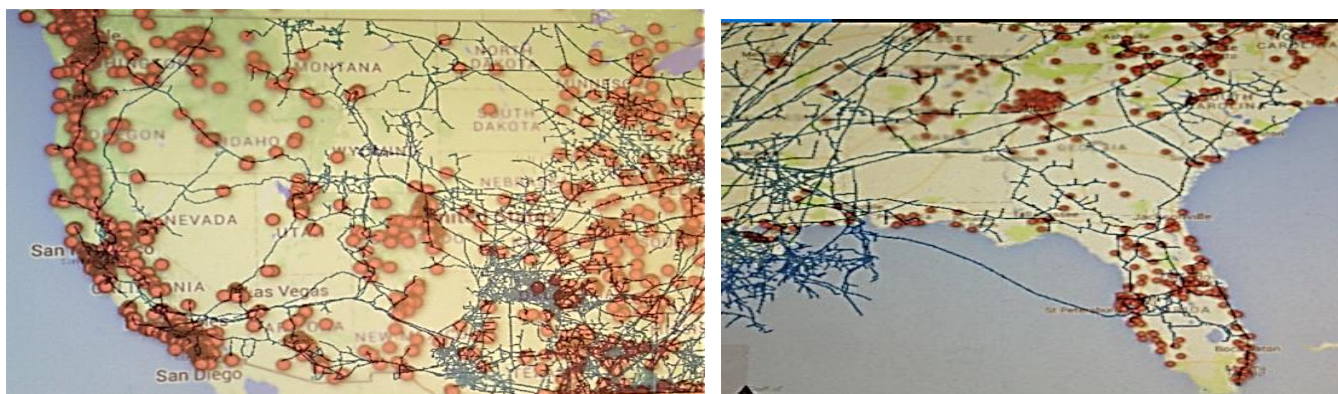
## Mapping Project- 2012- (Winkel Tripel Map Projection)- Summary Map

I spent considerable time searching for reports that fit My Hum. I ended up with 900 US locations (black points on map) dating back to 2000. The most compelling locations are those areas away from large population clusters. Conclusion- The majority of Hum reports do correlate to US inter/ intra state natural gas pipelines



## Mapping Project 2015 using thehum.info database (Mercator Map Projection)

In December 2015, I re made the map using data from [www.theHum.info](http://www.theHum.info) and a copy of the 2009 EIA map to do



a picture over picture overlay. The same conclusions came to be as with the 2012 project! Images of sections of that map are shown where it is very clear that within the accuracy of the overlay there is a solid correlation that Hum reports follow the proximity to where pipelines are located. I firmly believe mapping using a true database of the pipelines and the hum reports would be even more graphically indicative. A full copy is in the appendix.



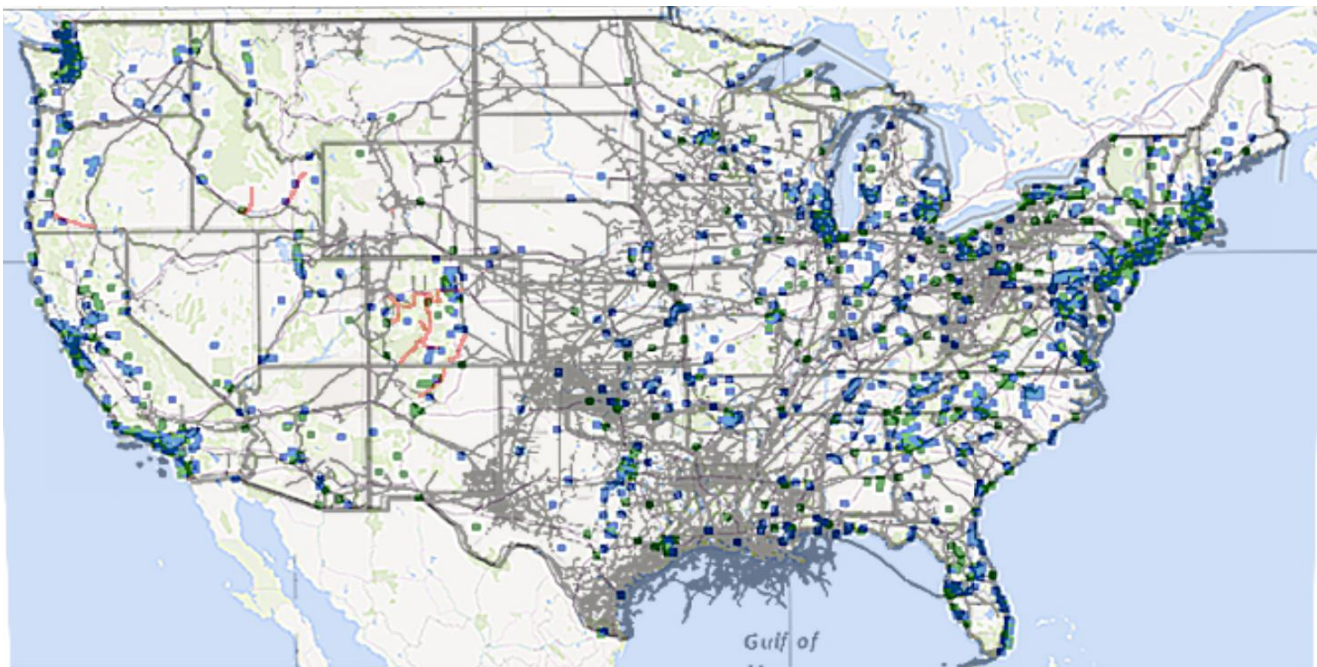
The blue lines are inter/ intra state HP gas pipelines, round red dots are Hum reports. A copy of the 2016 PHMSA pipeline map is provided in the appendix to use for the incompleteness of the 2009 EIA map.

**Conclusion-** Using a different database the majority of Hum reports do correlate to US inter/ intra state natural gas pipelines

### **Mapping Project 2021** Consolidated Data Base

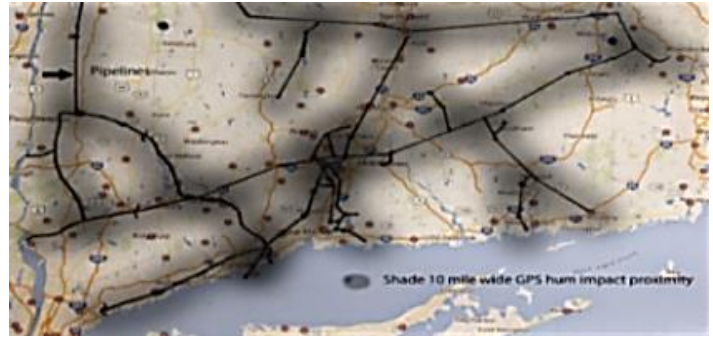
I made a **consolidated base** from my contacts, the 2012 database and a list downloaded from thehum.info having over **2000** US points. Globally it tallied over **4500** reports as of April 2021. And as I keep repeating, it is vastly understated as to the expanse of the problem!

We also know that many high-pressure systems are not shown on the EIA maps. Such as Gas Field Collection Systems and possibly CO2 pipeline systems. To which is why investigation by total knowledgeable SME's is required. Plot points are random reports of the Hum regardless of pipeline location and included as long as the description of the conditions fit those if this type ILFN Hum problem



- [Blue Points](#) are my collected general data points from internet search since 2010
- [Green Points](#) are from the cleansed thehum.info global mapping in 2021. Many points in the 2015 mapping were eliminated, question is why.
- [Red Lines](#) are new lines from the 2018 PHMSA map added to the base map used from the 2009 EIA map. The added red lines show the importance of using the most up to date available information for evaluation of all variables.
- Not considered- hazardous liquid product lines, natural gas gathering systems, pipeline compressor stations, low pressure distribution systems, wind turbine farms, etc. A map of US compressor stations can be found in the appendix or the US Homeland Infrastructure site: [HIFLD Open Data : Natural Gas Compressor Stations : Natural Gas Compressor Stations \(arcgis.com\)](https://hifld.openstreetmap.org/#map=10/38.9072/-98.5795)
- **Conclusion-** No change in the original 2012 premise

In 2016 I did a mapping to see what the zone of influence of the pipelines could be based on the GPSH model and to see if the Hum reports in CT fit into those. Within a statistical error the model fits. It held to the GPSH model. The individual points would require further evaluation. This image shows these adjacencies for a 10 miles wide swath. And based on my observation work this swath could actually be 20 miles wide.



While searching the Taos site I came across an interesting map from the 1990's that looks amazingly similar to my 2012 map. This similarity is likely due to my use of many of the Taos's data points. The key difference between the two is my map had a hypothesized source to correlate to:

<http://amasci.com/hum/hum.html>

[Taos Hum Page \(eskimo.com\)](http://eskimo.com)



## GPSh and Well-Known Hums

I decided to see if GPSh applied globally which would explain the Mystery Global Hum. Though the studies were higher level than the US cases they present a similar situation. A couple of International and US case studies is included.

### Bristol Hum

One of the earliest cases from the late 1970's is the Bristol Hum for which it and eerie "Sky Trumpet" complaints are still occurring in 2021. The Bristol Hum is one of the earliest published Hums of this type. After perusal of the UK National Grid Gas Pipeline site, I found that the area is half ringed by at least 2 high pressure natural gas/ LNG lines (pink lines) looping around the city. The timing of the occurrence of the HUM coincides with the **change** to the conversion of the country to transporting high pressure gas over long distances using pipeline grids in the 1970's. There is again, now a large Face Book Group that is reaching out to get tot eh bottom of the problem.



The **blue arrow** is where I visited in July 2022 and confirmed low level hum inside a home there that day.

The occurrences of complaints have never gone away, just in a gray fog. In 2017 Linda Geddes who is a journalist did a very informative video about the Bristol Hum – Can you hear a Hum? Earth Lab-

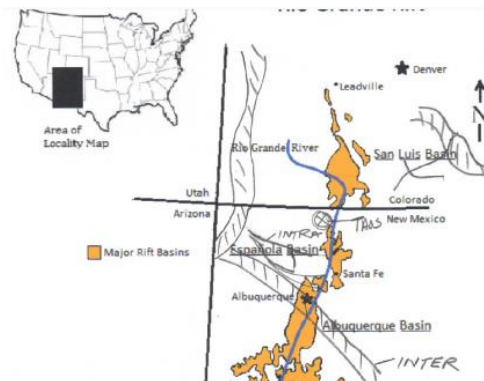
[https://www.youtube.com/watch?v=QpeKot2X\\_08](https://www.youtube.com/watch?v=QpeKot2X_08)

## Taos Hum

People in Taos NM began to complain about a Hum around 1993. This case intrigued me to see if the GPSH model could explain this after the experts failed to do so, to which the Hum still persists in 2021. Based on my work I looked into the NG industry in New Mexico and what could have **changed** to cause the conditions to be sensed by so many residents. Going through the Energy Information Agency (EIA) records of NG activities in that period (<https://www.eia.gov/naturalgas/data.php#pipelines>) it became apparent that a huge change occurred in the net gas flows through the state. Deliveries to Out of State changed from -694,554MMCF in 1985 to -1,073,957MMCF by 1993, almost double the export and coincidental with the Hums occurrence! Around that time people began reaching out from all over about similar problems <http://amasci.com/hum/hum.html> .

The thing is with the little I knew about NM gas it seemed the major lines were exceptionally far south to explain GPS. So based on the anomaly I found at the Boat Basin on the River in my area and how geology and topography might play a role in all this I investigated to see what the geology of the area had that fit being a “seismic wave guide”

What an eye opener I got! There is a huge geological feature that runs north – south from Mexico into Colorado called the **Rio Grande Rift**. It is my belief the Taos Hum has a contribution to the Hum there from GPSH theory and Trapped Seismic Wave Guide channeling from lines farther south passing through the Albuquerque area. In recent years I have also found that there are natural gas fields in that part of NM.



Rio Grande Rift- Problems and Perspectives:

[https://nmgis.nmt.edu/publications/guidebooks/downloads/35/35\\_p0001\\_p0012.pdf](https://nmgis.nmt.edu/publications/guidebooks/downloads/35/35_p0001_p0012.pdf)

## Windsor Hum



In 2011 residents Windsor Canada in Ontario began complaining about “rumbling” that NRCAN investigate and summarized and the acoustic waves

originated in the vicinity of Zug Island.

this writing (September 2011). In June 2011 four seismometers were installed in the western part of the city of Windsor where the largest number of noise complaints originated. The stations ran until late August 2011. Examination of the data revealed a signal on two of the stations that was consistent in character with the reported rumblings in terms of time, duration and behavior. Further analysis of the signals revealed that they were propagating as acoustic waves in the atmosphere and that they originated from the general vicinity of Zug Island, Michigan. Further investigation is required to determine the exact source of the signal.

Again, major natural gas industry pipeline operation **changes** when the US became a major exporter of gas around 2011 is when their Hum began. The locals stick to their interpretation from NRCAN that the vicinity of Zug Island means it is the US Steel plant on Zug Island in Detroit. The problem is it has operated for decades before the Hum. After Two University investigations yielded no apparent conclusion yet the locals still claim USS is the source.





[https://www.international.gc.ca/departement-ministere/windsor\\_hum\\_results-bourdonnement\\_windsor\\_resultats.aspx?lang=eng](https://www.international.gc.ca/departement-ministere/windsor_hum_results-bourdonnement_windsor_resultats.aspx?lang=eng) .



5. We note that the bearing from Array 1 to the most probable source of the Hum points well to the South of Zug Island. The bulk of our observations from both stations do not support the hypothesis that the source of the Hum emanates from Zug Island.

And for some reason summary note 5 on page 13 of the Western

University report that says the probable source of the Windsor Hum is “South” of Zug Island plant is ignored.

<https://docs.wind-watch.org/Windsor-hum-UWO-2013.pdf>.

“South” would suggest the likelihood of GPSH off the Panhandle’s Gas pipeline that crosses the Detroit River between the US and Canada to which I suggested to the group in 2012 and in 2021 reported one the same line in Ecorse MI.



Again, geology probably plays a role in the conditions complained about. Under this area in Ontario is a vast salt mining industry as well as underground product storage caverns. It is likely the acoustics caused by these caverns is creating higher intensities and standing wave patterns that are sensed in their homes. In the spring of 2020 Zug Island closed and the Hum is still pervasive today in 2021.



**The residents waived the flag that the Hum would be gone. But it is Not!**

### Ecorse MI Hum/ Windsor Hum

In January 2021 Patsy from Ecorse MI (The Ecorse Hum) contacted me about a Hum and



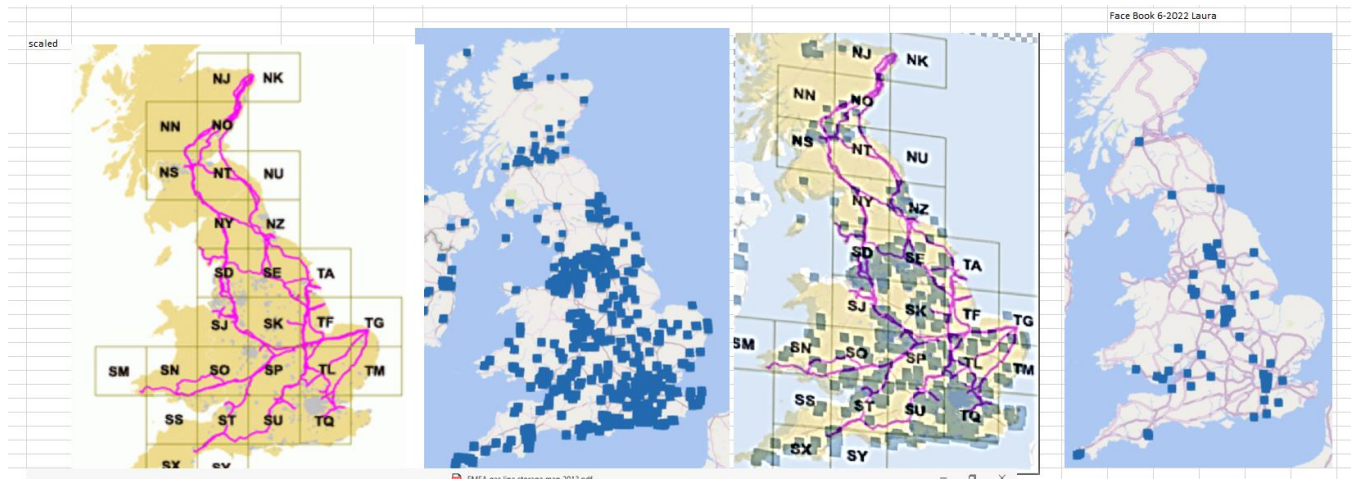
vibrations that she has been experiencing for a couple years.

She has lived in the home for all her life and didn’t realize a high-pressure natural gas line runs down her street. Ecorse is just southwest of Zug Island and across the river from Windsor ON. The line in her street is the one that was discussed in the Windsor Hum. The Energy Transfer Panhandle pipeline crosses into Windsor and is the line that falls on deaf ears that I told the Windsor Hum group to consider for years. It is not surprising MI is loaded with Hum reports!

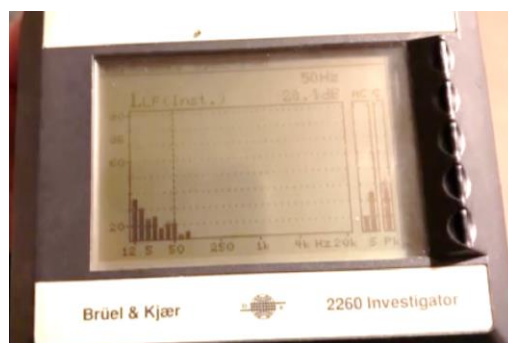


These maps for each state are on the US EIA site [State Energy Profile Overview - U.S. Energy Information Administration \(EIA\)](https://www.eia.doe.gov/state/)

British Isles Nationwide Cases and GPSH correlations- combined database as of 6/22 and plot of the FB “The Hum Low Frequency Noise Support Group” reports then



Case Study from a FB Member “The Hum Low Frequency Noise Support Group” UK Hum 2021



National Grid Pipelines UK

In Home 1/3 Octave Haslington

There are physical and operational differences of every natural gas pipeline system Could the conditions in a dwelling in the UK resemble that we are seeing on the US below the 50 HZ range. The conditions could differ a little due to differences in the materials of construction of the buildings. The 1/3 octave analysis from Haslington UK is extremely like those in the US, if not exact. More evidence that GPSH is not CT and US centric!



I was puzzled why the south coast of the UK had so many reports of the hum on thehum.info. It is possible that subsea natural gas movement in the North Sea is a plausible source to further investigate. It may propagate all the way into the English Channel, whilst we see a heavy Hum count in the Netherland as well.

The North Sea gas fields and pipeline certainly have to be suspected as ILFN sources if one is to buy into GPS. It is well known that sound, especially low frequency sound travels very long distances in water. That acoustic power from the

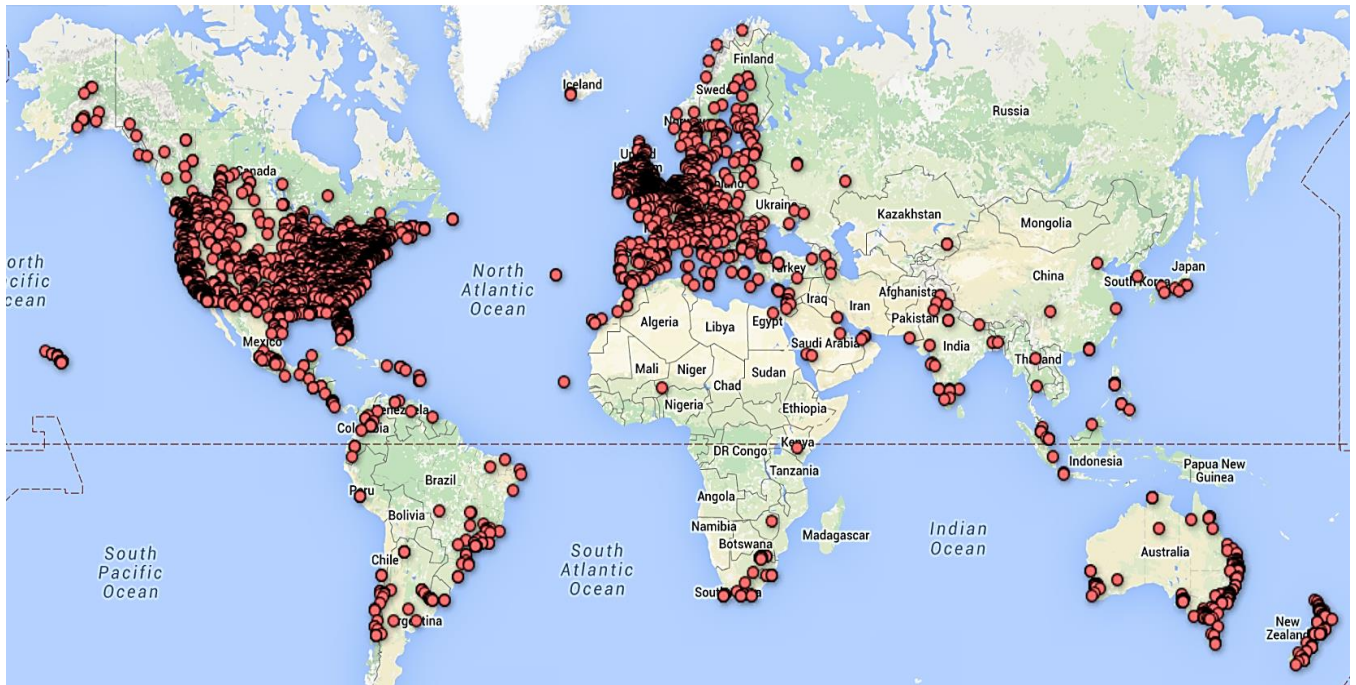
subsea line crossings at the northern end of the English Channel make sense where it doesn't appear a heavy pipeline concentration on the UK southern coast. Other phenomena called the SOFAR layer may play a role like geology and topography do on land.

In the UK there is at least some citizen process to deal with maladministration issues of the government called “ombudsman”.

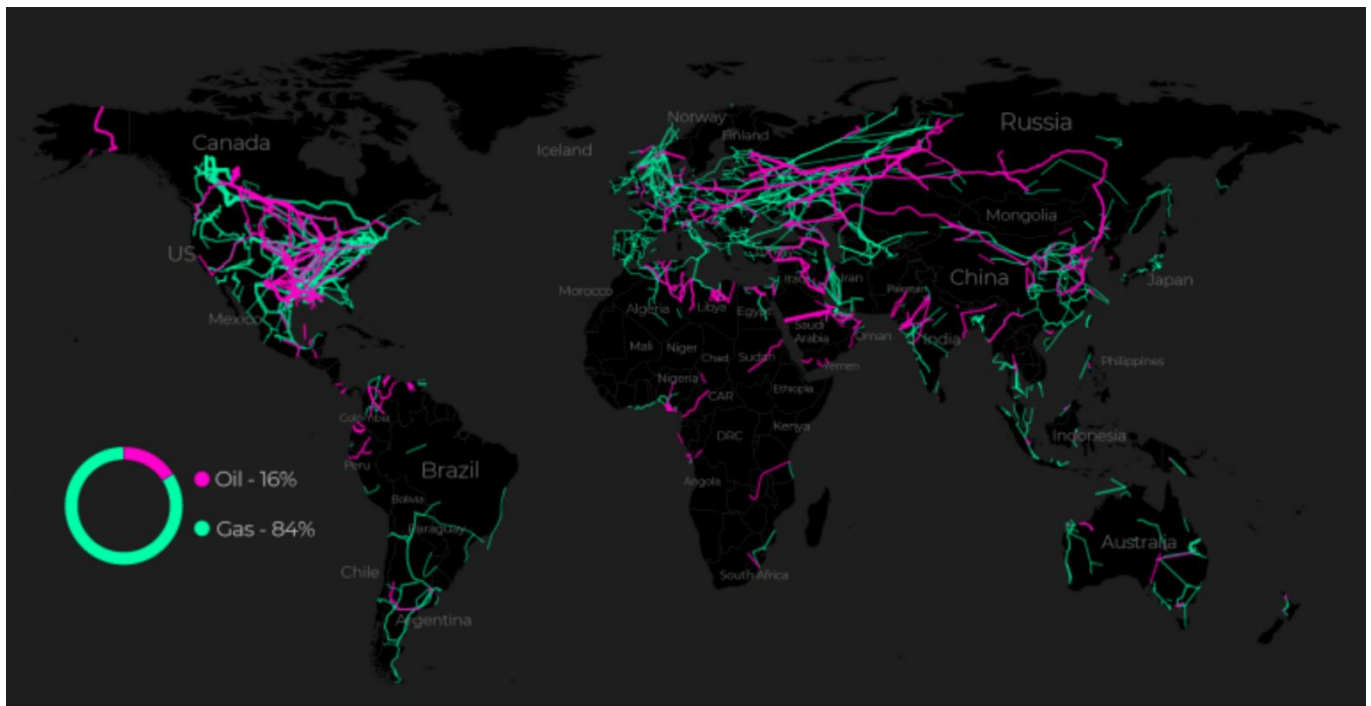
### GSE Pipeline and Storage map for the EU:

## The Overall Global Perspective of Hum and Pipelines

**Global Hum Reports- Source Thehum.info- Glenn MacPherson- March 2016**

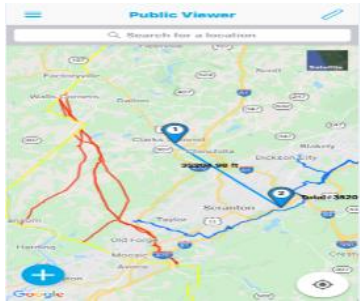


[Mapping the world's oil and gas pipelines](#) | Infographic News | Al Jazeera

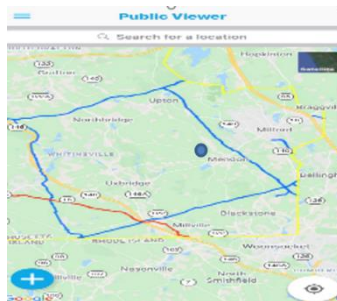


## Cases people have contacted me directly on

These are examples from two affected ladies I have worked with for the last couple of years. One is more tortured by sound sensitive, while the other is tortured by vibration



Clark Summit PA- Dee

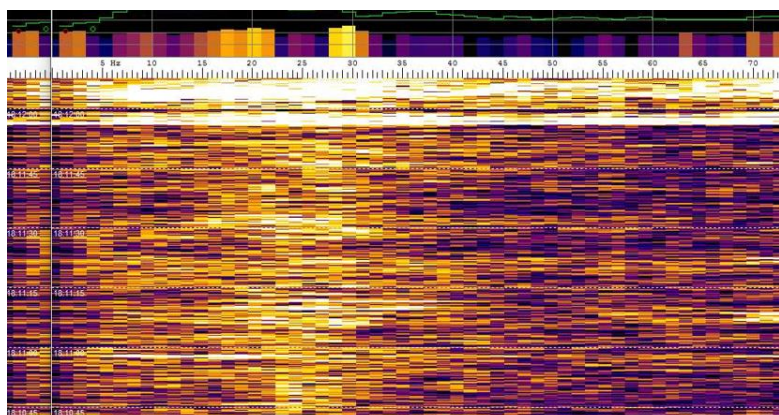
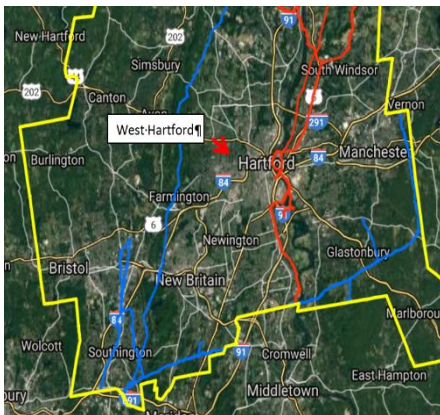


Mendon MA Joyce

A few other locations (surely missing a whole bunch more) that people have reached out to me from since just 2019.: West Hartford CT, Monroe CT, Woodbridge CT, Long island City NY, Ecorse MI, San Luis Obispo CA, Nevis Alberta, Austin TX, Longmont CO, Winnipeg MB, Rye NY, Mission TX, Grenoble FR, Berlin GER, Netherlands, Covington GA, Shelby TX, Turner OR, North Vancouver BC, AU Park Washington DC, Falmouth in the Beacon/ London, Cornwall UK, Many others in the UK in 2021, San Francisco CA, Hollywood CA, Malden MA, and on and on and on!

## **Creighton's Son Case**

One heart wrenching case involved a co workers son and wife. After they fully insulated their home and redid very old windows after a fire in an older 3 story wood framed home in West Hartford CT, a co worker was talking with me in 2011, and in tears. His son who was 18 at the time had undiagnosable behavior changes and head aches and would not leave the home. A total personality shift. At the time I was intent on study cases like this that fell into zones where pipeline locations might be causing GPSH. I visited the home and as soon as I walked in, I was met with the sound and pressure of the conditions of the Hum. I learned that the son had moved his bedroom to a small 2nd floor bedroom. Measurements of the acoustics were very eye opening. The home was saturated with ILFN and the Hum. The home is located between 3 major pipelines at a sweet spot for the interaction of sound waves from the pipelines. A plethora of LF sound is affecting the son.



## **Proofing the Theory of GPSH**

At this point, I have concluded my research and in a phase of continuous affirmation of the Model. I openly share my work with anyone who is interested and have received hundreds of emails, messages and calls from people experiencing the conditions in their homes. I take these opportunities to proof test the GPSH model. In doing so I find that in almost 95% of the cases, the model fits the GPSH model. Though it is possible there are contributions for those cases wind turbines, transformers, industrial sites, etc. Some cases turn into longer-term conversations and friendships. Others just come and go once they understand the situation. I have never talked with anyone who has a point on the World Hum Map being, so as I repeatedly say it is severely understated!

***“An error does not become truth by reason of multiplied propagation, nor does truth become error because nobody sees it. Truth stands, even if there be no public support. It is self-sustained” – Gandhi***



## Section 10- Manifestations of GPSh in the Environment

Unlike the limited 2-3 % of those able to hear the Hum sound the proof of the sound wave interactions of these conditions are readily observable to everyone. This section provides examples of the effects of ILFN from that cause Standing Sound Waves and strange sounds from Flowing Fluids.

If reading this paper in a pdf form, the embedded videos will not open. But links to you tube are provided to get a sense of what my pool was doing (not to same extreme as in the YouTube videos though)

**FFT Analyzer-** The spectrum of analyzers for the real time and FFT screens is extremely busy in Hum saturated locations. Even visible as noise to those who do not hear or feel the conditions.

My first experience with visible manifestations were in the form of **dysrhythmic resonance** water surface vibrations in containers of water like Jurassic Park scenes. Then I started to notice strange surface patterns of vibration on my pool 24 ft pool cover in 2009. The vibrations were like water spiders dancing in unison with the fluctuations of the wobbliness if the pitch changes of the hum inside the house.



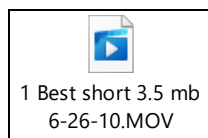
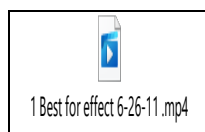
Then in June 2010, I began noticing very strange **standing waves** on a still water surface of the pool. The source are sound waves from the 3 pipelines in the area). Before viewing these video clips, I suggest watching a YouTube video that is very eye opening to what these clips of my pool are reflecting:



Standing Wave videos:

<https://youtu.be/JcdOWImPh1w>.

[\(31\) Experiment demonstrates how 'rogue waves' can be predicted - YouTube](#)



These standing waves all likely explained as being a **Seiche**. Which is from the interaction of waves in fully enclosed or partially enclosed bodies of water. They do occur in nature. But this may be the first evidence of it being induced by sonic conditions of the propagating Longitudinal/ Rayleigh Surface waves setting up as standing waves on the pool. The conditions would last for hours in zero wind or other noticeable conditions. Video of 5 pool seiches associated with earthquake vibration as the driving force rather than the intense ILFN in my yard where there is no earthquake. <https://youtu.be/RIV0jdLwPXs>



Pool in Phoenix: <https://www.12news.com/amp/article/opinion/talker/explained-waves-in-pool-could-be-a-seiche/75-198830644>

## **Eerie Sky Horns and Booms**

Besides the Hum there are other likely associated pipeline conditions such as turbulence and liquid slugging which may explain what is causing the strange Booms and Sky Horns

Sky Horn sound recorded sound to me like something reverberating deep within a large echoing tunnel. These unexplained “sky horn/trumpet” sounds, rumbles and booms could be from the movement of high pressure gas through pipelines.

Trumpets in the Sky: <https://www.youtube.com/watch?v=ox5saU4Xnmc>.

Strange Unknown Apocalyptic Noises Heard In The Sky - The Hum Phenomenon.

<https://www.youtube.com/watch?v=XiObNnnlONU>

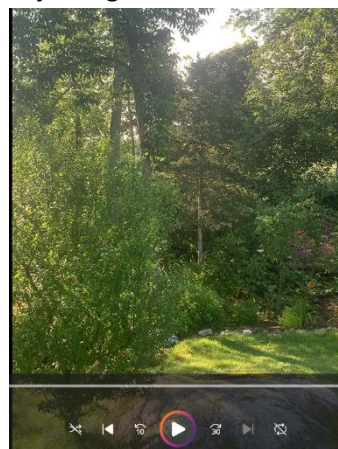
The eerie sounds reported and recorded of Sky Horns are very indicative of the strange sounds that are observable from uninstalled fabricated long lengths of a large diameter pipelines. Imagine these type sounds setting up in pipelines pushing gas at over 1000 psig around the perimeter of a town, like Bristol UK. There would certainly be bewilderment not “seeing” a source. Empty Gas Pipe Produces Creepy "Hollywood" Sound Effects:

<https://www.youtube.com/watch?v=NbslstEXUM>



## **UPDATE: MY Encounter with a “so called” sky horn – July 15, 2023**

Sitting on my front porch early Saturday morning at 8 am I noticed an abnormal jet engine sound over 10-15 minutes then random bursts of it for another 10 minutes in the vicinity but some distance away. My hunch was depressurization sound of a high pressure gas line safety relief or rupture. It turned out after talking with Algonquin and Iroquois gas controllers that in deed Iroquois had a problem with high pressure compressors at the Athens NY station and had to do a procedural depressurization into the lower pressure Algonquin system at high flow rates, casuing the rush and turbulence of gas flow causing the sound to radiate, like that of the ILFN sound waves that casue the Hum. This sounds very similar to many reports of sky horns minus the empty pipe errie sound disucussed in the previous paragraph.



SDK Sky Horn  
7-15-23 .MP4

Mystery Booms also present a similar bewilderment and those may be attributed to liquid drop out and slug flow from natural gas liquid drop out from the gas stream as the changing quality of the type gas is pushed through these systems. Possibly attributable to formation of slugs being transported in the gas phase. Though the gas company's claim where and when this occurs, it was not caused by them. But without the question being asked about this directly, I don't accept their position. At times I hear, feel and measure low frequency muted **rumbling** sitting on my outside front porch facing 2 AGT pipeline ROW's that a very muted sound like the swinging tail gate of a dump truck banging. I suspect turbulent flow or vortex shedding conditions as the cause, but I really can't have confidence it is from the pipelines. The pops of sound are distinctly evident on spectrograms as fully in unison with the pops.

**The POINT is, most of the unexplainable hums and Hum cases can be explained by GPSH!**

Snow Circles- IF not intentionally man made ILFN may explain this vibrational modal phenomena known as **cymatics** that causes strange patterns in granular substances on flat plates and containers of liquids resonating at different frequencies that change the patterns. This unexplained phenomenon is worth mentioning for consideration in the future.

<https://www.youtube.com/watch?v=Q3oItpVa9fs>



Note that the snow which has been removed to create the rings is not piled up around the edges-it is simply missing altogether. Copyright: Photo: Roy Boschman.

## Interesting Sound Phenomena of Moving Fluids

Aeolian Harp- An interesting example of flowing gas used for art is a piece called the Singing Ringing Tree. Its sound is uncannily like some of the sky horn sounds. So, suppose this is setting up inside of the miles of pipeline in an area and this is what their hearing: <https://www.youtube.com/watch?v=4B0hGyKV9qs>



Singing Sand Dunes- There are natural occurrences of similar hums as lava tubes, winds through valleys, sand dunes. An interesting watch and explanation-Singing Sand Dunes- National Geographic:

<https://www.youtube.com/watch?v=4mbypyJqhk>. The take away is that mysteries can be solved if the binders are removed and everything is considered using proper unbiased scientific method.



## **Section 11- Principles of Room Acoustics, Pipeline Sound Power and Propagation**

The concept behind GPSH is that Pipeline systems generate and radiate many sounds. Some are machinery noise others are swooshing sounds of gas flowing through the underground pipeline system, for which some lines can be diameters as large as 48 inches. These are the kind of sound and noise that the average person can hear, especially outdoors.

### Resonance Standing Waves Harmonics - Tutorials

[\(2\) What Are Room Modes? Finally A Simple Explanation - YouTube](#) What are Room Modes A simple explanation- - Room size and different modes in room

[\(2\) Room Modes And Harmonics Example - Room Acoustics - YouTube](#) Room modes and Harmonics

[\(2\) Resonance - YouTube](#) Resonance of glass and Tacoma Narrows Bridge

[\(2\) Top 10 Demonstrations With Tuning Forks | Arbor Scientific - YouTube](#) 10 demonstrations of tuning forks- resonance, beat frequency (interference frequencies), multiple frequencies making a note

[\(2\) \[DEMONSTRATION\] - Resonance: Torsional Oscillator and Barton's Pendulum - YouTube](#) Torsional oscillator and Bartons Pendulum, describe mechanical boundary vs mass drivers, maximum responses

[\(2\) longitudinal vibrations - Tuning Forks Physics Demonstration - NPS Physics - YouTube](#) longitudinal vibrations - Tuning Forks Physics Demonstration - NPS Physics- mass demonstration

<https://www.youtube.com/watch?v=828WrmZei9Y>

[\(2\) What Are Standing Waves In Rooms? - www.AcousticFields.com - YouTube](#) Standing waves in rooms

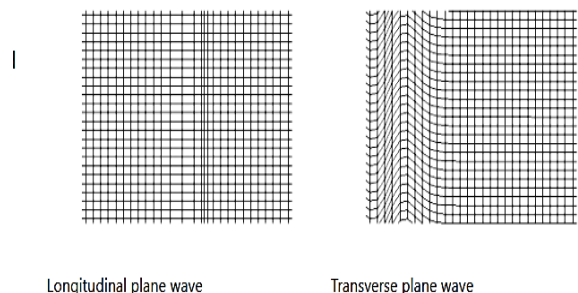
[\(2\) Ideal Bass Absorber Panel Placement - www.AcousticFields.com - YouTube](#) Low Frequency pressure management basics.

[\(2\) How BASS Works \(In Rooms\) - Acoustic Geometry - YouTube](#) Acoustic Geometry

Understanding sound propagation -Wave interactions and interface:

<https://www.ck12.org/book/ck-12-physical-science-for-middle-school/section/19.3/>

Then there is a band of low frequency sound that is not typically heard by people out doors, not even by hummers. Sound is a Longitudinal wave as demonstrated in the video of the Wiki articles <https://en.m.wikipedia.org/wiki/Sound>



But these LF sounds do propagate into dwellings to reinvent themselves as the hum and resonance of the structure. These **surface acoustic waves (SAW)** are known as Longitudinal/ Rayleigh Waves, Love Waves and are well studied in Seismology. The sound pressure of these low frequency sound waves travels very long distances through the air and ground. They meet up with resonate capable structures, permeate into the structure causing vibration, sound resonance and standing acoustic waves inside hollows.

From the tutorials we know that **Wide Band Low Frequency Spectrum** of sound intensity from the pipelines are defined by and mass define to construct the spectral profile. We know that a structure picks up the resonant frequencies of the wide band

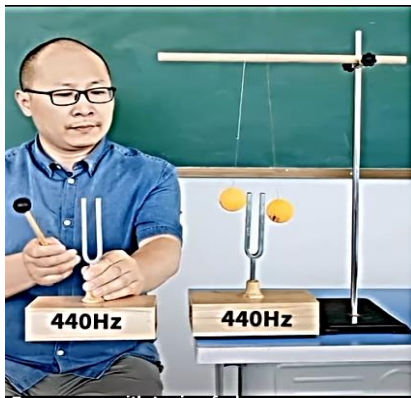
We also know that sound

A demonstration of resonance can be done using science class teaching tools with tuning forks and sound boxes. Where this applies to GPSH is the sound wave pressure comprised of a band of low frequency propagate for many miles away from the pipeline and interact with the structure at its resonate frequency resulting in the LF Hum and other GPSH conditions:

<https://www.youtube.com/watch?v=aCocQa2Bcuc>

<https://youtube.com/shorts/ohciUaOw1BE?si=OzTmNFLH9XEELP1c>

<https://youtube.com/shorts/DwXWAZn7p-Q?si=8gPrbykikk2ciiKj> (notice that at similar frequencies the ping pong balls vibrate off the tuning fork)





## Mechanisms of Sound Generation

More in depth research by others must consider the topics discussed in this section. In this section are listed sound references to help future interested individuals looking to get a start at investigation.

My work pulls from research work done regarding well known noise and vibration sources like compressor stations, air coolers, controls etc. to support the GPSH argument as there is no available work that I can find that specifically addressed pipeline radiated ILFN into the community. My position is that pipelines are linear sources and as such serve as a huge distribution network far more expansive than compressors and other point source sound generation equipment. This explains the complete source to receptor process of the GPSH model.

Resonance in pipes: pipelines have their own resonance characteristics which play a large role in how intense the radiated sound pressure will be. At the sweet spot of the pipe the sound amplifies. This is shown in this Pipeline Resonance demonstration in the lab= [Pipe Resonance - YouTube](#)

Bull and Rennison presented a technical paper in 1974 about turbulent pipe flow as an acoustic noise source noting that “the results obtained indicate that undisturbed fully developed turbulent pipe flow in thin-walled pipes may well give rise to objectionably high radiated sound levels”:

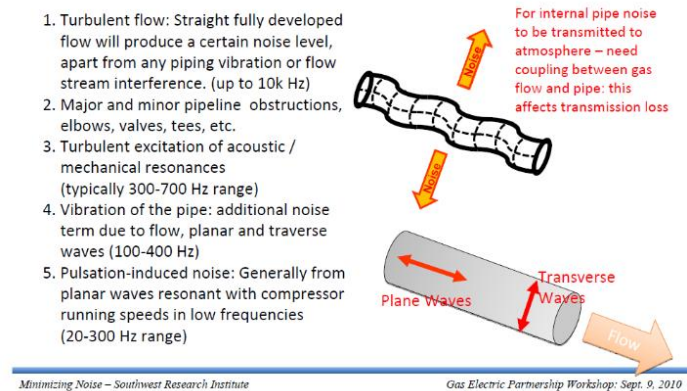
<https://people.eng.unimelb.edu.au/imarusic/proceedings/5/BullRennison.pdf>

Lighthill's Acoustic Analogy in 1952 with the birth of jet engines is about how sound is generated:

<https://academic.oup.com/imamat/article-abstract/32/1-3/113/889940?redirectedFrom=PDF>

Rienstra and Hirschberg in 2019 published a paper for the Introduction to Acoustics which is a higher-level theoretical discussion of many aspects of the mechanisms of sound and acoustic applicable to understanding GPS: <https://www.win.tue.nl/~sjoerdr/papers/boek.pdf>

## Noise Mechanisms for Pipeline / Compressor Station Piping



 Victor V. Krylov  
IL36.02 - Loughborough University

### Abstract

The hypothesis is examined about sources of disturbing low-frequency hums arising from buried gas or petrol pipes in which turbulent flows of gas or liquid generate sound waves of high amplitude propagating in pipe-lines as in waveguides. Theoretical investigation of this problem shows that if the velocities of sound inside the pipes (450 m/s for methane) are higher than the velocities of Rayleigh surface waves in the ground (typically 300-600 m/s) then ground Rayleigh waves are effectively generated by sound waves propagating inside the pipes, the mechanism of generation being similar to that of sonic boom from supersonic jets. The Rayleigh waves then propagate to buildings and cause building vibration and structure-borne noise. Central frequencies of generated Rayleigh wave spectra are in the range of 5-20 Hz and depend on pipe-depth. The amplitudes of ground vibration velocity may achieve 70 dB (relative to 10<sup>-9</sup> m/s). This is quite enough to annoy some people both due to the direct impact of vibrations and to structure-borne noise. The results obtained may contribute to a fuller understanding of the nature of low-frequency hums.

In 1997 Prof V. V. Krylov of the Nottingham Trent University in England evaluated a connection between the Hum and gas pipeline where he concludes that “Theoretical study proved that generation of the low-frequency noise by underground gas pipes is feasible”, but also comments that “At least during this series of experiments,

there was no evidence of underground gas pipes being a source of environmental low-frequency noise". To which GPSH study work has done!

- Krylov Investigation of Environmental Low-Frequency Noise:  
<https://core.ac.uk/download/pdf/288382366.pdf>
- Krylov Generation of Low-Frequency Ground Vibrations by Sound Waves Propagating in Underground Gas Pipes: [https://www.researchgate.net/publication/277211707\\_Generation\\_of\\_Low-Frequency\\_Ground\\_Vibrations\\_by\\_Sound\\_Waves\\_Propagating\\_in\\_Underground\\_Gas\\_Pipes](https://www.researchgate.net/publication/277211707_Generation_of_Low-Frequency_Ground_Vibrations_by_Sound_Waves_Propagating_in_Underground_Gas_Pipes)

Some work in a thesis from 1987 discusses Flow Induced Vibration resulting in generation of pipeline acoustics at McMaster University

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=40&ved=2ahUKEwjH9YHWgLPoAhXXG80KHfFaCI84HhAWMAI6BAGDEAE&url=https%3A%2F%2Fmacsphere.mcmaster.ca%2Fbitstream%2F11375%2F6872%2F1%2Ffulltext.pdf&usg=AOvVaw251NmVb3a76YvNwEkD9wUE>

Structural Vibrations Induced by Infrasound from Pipelines. Case Studies in the Mountains of the Peruvian Andes Montano, Walter A.1, 'Joseph Sauveur' Acoustics Laboratory-ARQUICUST Presented at Internoise 2019:  
[https://www.researchgate.net/publication/343140566\\_Structural\\_Vibrations\\_Induced\\_by\\_Infrasound\\_from\\_Pipelines\\_Case\\_Studies\\_in\\_the\\_Mountains\\_of\\_the\\_Peruvian\\_Andes](https://www.researchgate.net/publication/343140566_Structural_Vibrations_Induced_by_Infrasound_from_Pipelines_Case_Studies_in_the_Mountains_of_the_Peruvian_Andes)

Sick Building Syndrome Air Flow in building HVAC duct work systems can be a source of low frequency and Infrasonic sound, annoyance and illness. Essentially pipelines act as huge ducts that contain massive amounts of sound power.

Low Frequency Noise in Ventilation Systems - Criteria and Control - [H.G. Leventhall](https://journals.sagepub.com/doi/abs/10.1177/026309239401300402?journalCode=lfna) 1994 -  
<https://journals.sagepub.com/doi/abs/10.1177/026309239401300402?journalCode=lfna>

### **Sound Propagation- Outdoors and in the Pipeline**

A SIMPLE OUTDOOR CRITERION FOR ASSESSMENT OF LOW FREQUENCY NOISE EMISSION N. Broner, Sinclair Knight Merz, Acoustics.asn.au April 2011; [https://www.acoustics.asn.au/journal/2011/2011\\_39\\_1\\_Broner.pdf](https://www.acoustics.asn.au/journal/2011/2011_39_1_Broner.pdf)

**VIBROACOUSTICAL ENERGY FLOW THROUGH STRAIGHT PIPES**, G. Pal, published 2003 in the Journal of Sound and Vibration, Vibro Acoustical Energy Flow through Straight Pipes. Many additional study topics are referenced in the article in the link, but all may require purchase to see the documents.  
<https://pdfs.semanticscholar.org/7b12/0422dbb580415b858db1a9f2a4a69be16efd.pdf>

Characteristics of Wave Propagation and Energy Distributions in Cylindrical Elastic Shells Filled with Fluid, Fuller and Fahy 1982; <https://pdfs.semanticscholar.org/93ea/04ec07b0e44c6f774245b29b7b0edc33da6f.pdf>

The experts at South West Research Institute (SWRI). FLOW-INDUCED TURBOCOMPRESSOR AND PIPING NOISE AND VIBRATION PROBLEMS IDENTIFICATION, DIAGNOSIS, AND SOLUTION by David E. Jungbauer Principal Scientist and Linda L. Eckhardt Senior Engineering Technologist Southwest Research Institute, 26<sup>th</sup> Turbomachinery Symposium:  
<https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/163421/Vol26008.pdf?sequence=1&isAllowed=y>

There is quite a bit more research available about the creation and transmission of low frequency internal sound through pipes radiation of sound through pipe walls. What needs to be done is to apply these to explaining GPSH instead of just compressors and ancillary facilities! What can be concluded is that the source conditions over large areas are not the typical vibration we usually associate with an acoustical problem from these systems.

### **Radiated Sound**

The Effect of Internal Flow Disturbances on the Vibration Response of and the Acoustic Radiation from Pipes 421 pages- Norton and University of Adelaide 1979 early study supporting GPS

[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiO27D5g-TgAhWL14MKHWF3AG4QFjAAegQIABAC&url=https%3A%2F%2Fdigital.library.adelaide.edu.au%2Fdspace%2Fbitstream%2F2440%2F21099%2F2%2F02whole.pdf&usg=AOvVaw2yMg-F6Ou8msW\\_kg7Jq6wi](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiO27D5g-TgAhWL14MKHWF3AG4QFjAAegQIABAC&url=https%3A%2F%2Fdigital.library.adelaide.edu.au%2Fdspace%2Fbitstream%2F2440%2F21099%2F2%2F02whole.pdf&usg=AOvVaw2yMg-F6Ou8msW_kg7Jq6wi)

Transmission of low frequency internal sound through pipe walls 1976:

<https://pdfs.semanticscholar.org/1d5a/7b2f701941cad5c75e4d7657e88787815c81.pdf>

Transmission of sound through pipe walls in the presence of flow 1980:

<http://www.sciencedirect.com/science/article/pii/0022460X8090601X?via%3Dihub>

Transmission of LF internal sound through Pipe walls 1976:

<https://pdfs.semanticscholar.org/1d5a/7b2f701941cad5c75e4d7657e88787815c81.pdf>

Mechanisms of the generation of external acoustic radiation from pipes due to internal flow disturbances Norton and Bull 1984 (originally published in 1974):

<https://www.sciencedirect.com/science/article/pii/S0022460X84800085>

ASME Energy Transmission in Piping Systems and Its Relation to Noise Control 1972

<http://manufacturingscience.asmedigitalcollection.asme.org/article.aspx?articleid=1442504>

Gas Flow Acoustics Resonance and LO NOX Turbo Compressors article 16.3

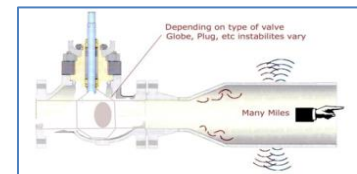
<https://www.sciencedirect.com/topics/engineering/acoustic-resonance>

Simulation programs like Caesar need to be used to study resonances of piping and compressor systems indicating for these conditions

<https://www.dynaflo.com/wp-content/uploads/2015/04/Lecture-30-08-2007-Dynamic-module-of-CAESAR-II.pdf>

### **Sound Generation Not Typically Considered for Causing the Hum**

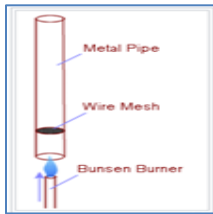
Components in the flowing gas stream are designed for certain proprieties such as pressure, density, viscosity, other specific fluid properties, etc. When the conditions change these components can create flow disturbances that can be acoustic and travel many miles inside the pipeline. They too cause other unwanted flow conditions.



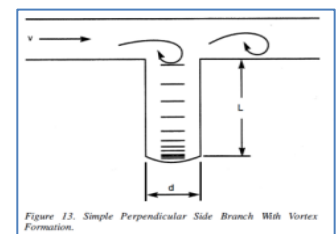
**Thermoacoustic Oscillations** are where a heated gas streams thermodynamics create acoustic oscillations, hence sound. The reason this is a suspect can be seen in how snow melts over the pipelines indicating some elevated temperature that is needed to operate these lines to avoid drop out of liquids. [Thermoacoustics - Wikipedia](#): [Thermoacoustics - Professor Artur J. Jaworski \(google.com\)](#).



A Rijke Tube demonstrates this phenomenon. It uses a vertical tube and external heat source (like in line pipe heaters do) causing the flow of heated air and pipe resonance (singing pipes) <https://www.youtube.com/watch?v=pncG3lJUOdY>. These are called Soundhaus oscillations. Line Heaters are used in gas transmission where pressure is reduced to avoid problems with liquid drop out and hydrate formation. Typical of locations where high pressure is reduced are City Gates Regulators that reduce pressure to community distribution systems. This needs to be considered and applied to possibly the reason that change in these pipeline systems has had unwanted and underappreciated consequences.

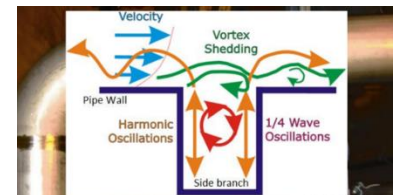


**Aeolian Sound**- standing waves caused by side connections like blowing over a bottle from the addition of long parallel pipe “loops” used to increase the capacity of line storage from “line packing” or other major side connections installed for new compressors or users could be setting up the strange low frequency tones from Tube Resonance and standing wave patterns. Connections like these and other modifications of the pipelines were undertaken as part fo the changes made here in CT in the late 2000’s. Tube Resonance - Standing Sound Waves:



<https://www.youtube.com/watch?v=bHdHaYNX4Tk>.

An example of the aeolian effect from a steam line “power up” example from the nuclear industry : Acoustic Resonance in Main Steam Line Side Branches, 1 Nuclear Science and Technology Symposium (NST2016) setting up acoustic



reasonance and fatigue cracking Fauske- [https://ats-fns.fi/images/files/2016/syp2016/presentations/TSB3\\_JConzen\\_AcousticResonanceInMainSteamLineBranches.pdf](https://ats-fns.fi/images/files/2016/syp2016/presentations/TSB3_JConzen_AcousticResonanceInMainSteamLineBranches.pdf) .

#### Additional Study References

The basics of engineering principles relating to acoustic circuits and pipes as reasonators:

<https://mysite.du.edu/~jcalvert/waves/acoucirc.htm>

Basics of Sound and Noise Propagation Bechtel Corp.-

[Basics of Sound and Noise Propagation \(powermag.com\)](#)

HVAC Acoustic Basics – McQuay Corp.-

[AG31-010lo.pdf \(vibrationdata.com\)](#)

## Sound Propagation and Attenuation- Point vs Linear Sources

How can I think that low frequency sound traveled so far away from the pipelines in my observation travels and mapping efforts? The answer partially lies in the difference between point and linear sources. It makes a difference in how far sound travels. A **Point** source of sound power is like a compressor station, a speaker, a wind turbine, etc. A **Linear** source of sound power are pipelines, long tunnels, high speed trains, etc. A linear source attenuates less than a point source over distance.

Attenuation in this case is the natural atmospheric reduction in sound pressure over distance

**Point** sources are typically what is claimed as the root cause of a low frequency issue. In many cases that works. In many cases it is a mistake like the Kokomo Hum foundry fan, the Windsor Hum Zug Island Steel mill, etc. Point sources are less impactful to the greater community.

**Linear** sources are like long tunnels, high speed trains and pipelines. These have never been evaluated as the root cause for the Hum! Graphs for sound levels and distances for both type sources are plotted in "figure 6 Attenuation Curves for Line and Point Sources". It shows the differences in attenuation for 3 different circumstances. The difference may seem inconsequential but considering that LF sound travels farther than

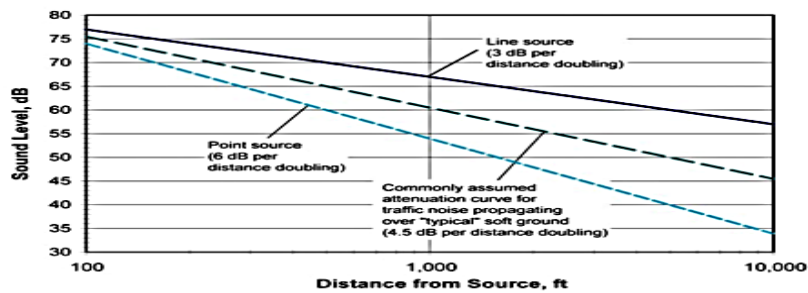


Figure 6. Attenuation Curves for Line and Point Sources

anthropogenic noise coupled with this lesser attenuation means the acoustic pressure is stronger at long distances than a point source of the same magnitude would be.



The reason is a mathematical difference of geometrical spreading of the surface area of spherical object (point source) vs a cylindrical object (linear source). Envision what a halo of each would like as it grows away from the object. The formula of the surface area of point source is  $A = \pi r^2$ . The formula of the surface area of a linear source is based off a circle whose area formula is  $A = 2\pi r$  multiplied by length (L). The greater dissipation of the sound/ unit measure of cylindrical object is due to the squaring of the radius  $r^2$ . Where the surface area gets larger much faster than the linear source. The sound pressure caused by the generated power at the source dissipates faster for point sources than linear sources.

Another facet of ILF sound waves is they do not get dampened out by walls or insulation due to the sounds wave length, unlike typical anthropogenic community noise.

<http://www.sengpielaudio.com/calculator-distance.htm>

**There is a common theme that people say the sound intensity level of the Hum changes pretty dramatically from day to day in a same space. An explanation of this could be that besides operational changes in the offending gas system this human perception plays a role in the swing. Besides sound attention of distance, the human perception of the doubling of sound of LFN is only 3 db. Whereas for higher frequency it takes 6db.**

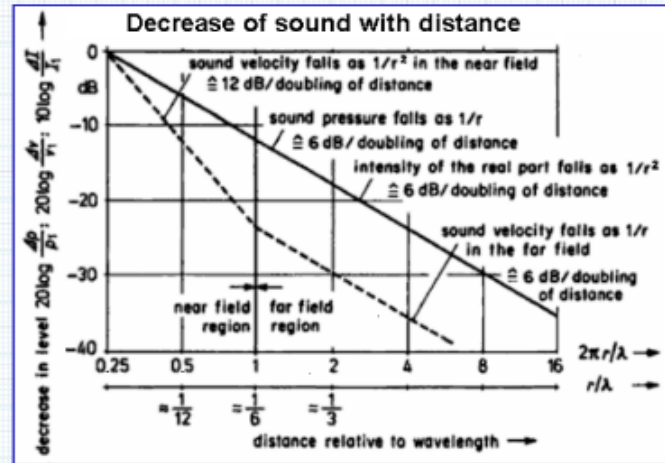
**This means a small change of sound pressure at low frequency has a more prominent change in loudness than higher frequency sound pressure. The db scale is logarithmic so a 10db difference means 10 times change in sound pressure, a 20 db change means 100 times change in sound pressure. Sound pressure is what causes sound.**

### Attenuation due to Atmospheric Conditions

There are several important natural occurring factors which affect the propagation of sound: *geometric spreading, atmospheric effects, and surface effects*

For those interested it delving into how sound propagates outdoors from point type sources Penn State covers this in a Noise Control paper: [https://www.mne.psu.edu/lamancusa/me458/10\\_osp.pdf](https://www.mne.psu.edu/lamancusa/me458/10_osp.pdf)

### Sound pressure and sound power



Decrease of sound pressure, velocity, and intensity of the sound field near to and distant from a spherical radiator of the zeroth order

For a **spherical wave** of a point source we get:

The **sound pressure level** (SPL) decreases with doubling of distance by (-)6 dB.

The sound pressure falls to 1/2 times (50%) of the initial value of the sound pressure.

The sound pressure decreases with the ratio  $1/r$  to the distance.

For a **spherical wave** of a point source we get:

The **sound intensity level** decreases with doubling of distance also by (-)6 dB.

The intensity falls to 1/4 times (25%) of the initial value of the sound intensity.

The sound intensity decreases with the ratio  $1/r^2$  to the distance.

For a **cylindrical wave** that is a line source we get:

The **sound pressure level** (SPL) decreases with doubling of distance only by (-)3 dB.

The sound pressure falls to 0.707 times (70.7%) of the initial value of the sound pressure.

The sound pressure decreases with the ratio  $1/\sqrt{r}$  to the distance.

\*) A loudspeaker line array operates according to this principle, but takes account of the finite length of the array. Therefore the sound pressure level (SPL) (l) of the low frequencies decrease (-)6 dB spherically with doubling of the distance.

For a **cylindrical wave** that is a line source we get:

The **sound intensity level** decreases with doubling of distance also by (-)3 dB.

The intensity falls to 1/2 times (50%) of the initial value of the sound intensity.

The sound intensity decreases with a ratio  $1/\sqrt{r}$  to the distance.

The emitted **acoustic power** does not decrease with the doubling of distance.

Additional reference on Geometric spreading and the atmosphere's effects on sound propagation: [Sound Propagation \(sfu.ca\)](http://sfu.ca) .The levels of outdoor noise whether they are intrusive or not over the normal background environment, vary extensively at distances greater than about a hundred meters from the source. This variation is caused by changes in weather conditions and by topographical features such as ground cover, hills and other obstacles between the source and the receiver.

## **Section 12- Gas Industry Noise and Operational Changes Being Made**

Now that we've established the basics, Let's see what the industry experts are saying about equipment and systems using compression and community noise. Though not directly discussing GPSH the under lying discussions need to be carried forward into the pipeline itself. With the unprecedented increase in transporting natural gas though new and pushing more gas through older pipeline systems needed for power generation, gas liquefaction for export, manufacturing, production of fertilizers and chemicals and heating these issues need to be addressed and if an act of Congress needed, so be it!

### **Resource Materials**

I will not get into all the background about these systems noise and vibration problems. But rather provide some references to get a better understanding that ILFN is a problem in these systems, not some contrived notion. Still, with all this work very little work has gone into exposing the pipeline as a major contributor to how these systems reach into communities and other places and saturating them in ILFN, mostly unbeknownst to the community.

Flow Induced Turbo compressor and Piping Noise and Vibrations Problems Identification, Diagnosis and Solution-by David E. Jungbauer Principal Scientist and Linda L. Eckhardt Senior Engineering Technologist Southwest Research Institute San Antonio, Texas cover many topics of noise from equipment used in most modern day compressor stations:

<https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/163421/Vol26008.pdf?sequence=1&isAllowed=>

### **How to design and Operate Quiet Centrifugal Compressor System**



At the 2000 International Pipeline Conference, ASME, Roman Motriuk eloquently raises the fact about pipework in the role of noise from modern centrifugally driven transmission systems. I only reviewed the abstract but it directly seems interesting and probably needs to be extended to the entire pipeline system where LFN radiation is occurring.

<https://asmedigitalcollection.asme.org/IPC/proceedings/IPC2000/40252/Calgary,%20Alberta,%20Canada/266065>

### **The Missing 16 Hz**

At the 19th International Conference on Acoustics Sept 2007 the low frequency, problems and siting issues were



#### **THE MISSING 16 HZ – CAN WE LIVE WITH IT?**

PACS: 43.50.Rq

Broner, Norm  
Sinclair Knight Merz, 590 Orrong Road, Armadale, Victoria, Australia 3143;

the topic of the problems at 16Hz and lower from these type facilities. *“OCGT manufacturers generally supply noise data for these down to the 31.5 Hz octave band. However, most of these units also generate significant energy in the 16 Hz octave band. Both of these bands need to be considered when assessing potential noise impact on neighboring residential communities. However, Regulatory Authorities generally have not considered this in their*

*approach which is generally based on achieving a nominated A-weighted noise level criterion. This paper discusses criteria for low frequency noise including the 16 Hz octave band and the implications for the siting of*

peaking plants near residential or commercial/industrial locations". [http://www.sea-acustica.es/WEB\\_ICA\\_07/fchrs/papers/env-05-004.pdf](http://www.sea-acustica.es/WEB_ICA_07/fchrs/papers/env-05-004.pdf) This is one of the best articles I've read, regarding Gas Turbines of information applicable to gas pipeline equipment drawing from the electric power peaking industry

### Noise Risks in the Natural Gas Industry

Expert Consulting- Wood - Much work and study has been done regarding compressor station piping noise and acoustic conditions near the station, but none address the problem of ILFN radiation and it's Sound Power from vast lengths of buried pipelines as a source of sound pressure that leads to distant structural resonance leading to the hum:

#### 1 TONAL AND HIGH-FREQUENCY NOISE

There is a significant risk that noise in gas compression applications is tonal, or 'discrete frequency' noise, which is generated by rotating equipment at a predictable frequency relating to the rotational speed of the shaft and the number of compressor vanes, fan blades, engine pistons or gear teeth. Tonal noise is characterized by pure, spectral tones that occur at a single frequency. Additionally, significant noise can be generated by high flow or pressure drop through a valve, and be transmitted for long distances along piping.

<http://www.betamachinery.com/knowledge-center/noise-risks-in-the-gas-industry>

There is an understanding of the basics but there is no appreciation of the consequences in today's society of the exponential impacts of the sound radiation from these systems at Bechtel's

Virtual Technology Expo 2018:

<https://www.bechtel.com/getattachment/Blog/technical/October-2019/Differentiating-Between-Acoustic-and-Flow-Induced/Differentiating-Between-Acoustic-and-Flow-Vibrations.pdf>

Differentiating  
Between Acoustic  
and Flow-Induced  
Vibration  
2018

### Combating Noise in Gas Pipeline Transmission

An article from Dec 2015 explains to some degree the reason behind the increase in both high frequency and low frequency noise from pipelines observed since 2009:

Peterson- Pipeline and Gas Journal 2015. A good

reference about typical noise problems in the pipeline system. It approaches the point about underground pipeline likely for noise of higher frequency but addresses attenuation in the free field and in the pipeline.

*"Meanwhile, although noise typically propagates and attenuates with distance, it continues to travel through the pipe with little attenuation. Noise attenuates at a rate of 6dB for every doubling of distance from a point source and at 3dB every doubling of distance from a line source (pipe) in free-field environments. However, it attenuates at only 1dB for every 30m of pipe travelled. This means that enclosing the noise equipment in a building is only effective until the pipe exits the building. Consequently, most pipelines are buried, with noise noticeable in the station location only"*



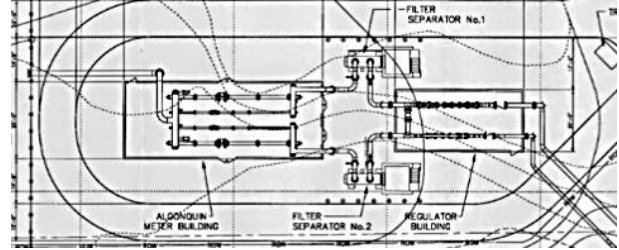
Noise characterization of oil and gas operations- thesis- Most noise issues in the past have been from higher frequency noise that is typical in industry and has been an issue and studied to infinitum since the early industrial age:

[https://mountainscholar.org/bitstream/handle/10217/173508/Radtke\\_colostate\\_0053N\\_13531.pdf?sequence=1](https://mountainscholar.org/bitstream/handle/10217/173508/Radtke_colostate_0053N_13531.pdf?sequence=1)

Changes made in 2008- 2009 in Western CT Potentially Behind My Hum's Onset

- i. **Gas composition** differences in type of gas now being moved

- ii. **Increased** operating pressure in pipelines and directions of flow
- iii. Operating at “**sweet spots**” for acoustic causing conditions (pressure, flow, temperature, etc.)
- iv. Higher packing intensity for “**gas nominations**”
- v. Addition of **LO NOX** turbine engines causing Gas flow aero dynamic noise from other station upgrades during the same period that are known to cause community tonal noise
- vi. **Addition** of noise generation potential connections, valves and fittings, etc. such that happened with a neighborhood wide flow related noise termed as “hiss” when the new Brookfield Station was put on line to transfer gas between the two companies at this location
- vii. Installation of **Aeolian and turbulence** causing capable connections such as town gates and pipeline “Loops”.
- viii. Operating **existing** pipeline components under new flow conditions not designed for



**Possible reasons these changes have caused this acoustic environmental problem**

- i. The acoustic power has increased improving the acoustic radiation efficiency of the system (Fagerlund)
- ii. A change of the speed of sound and acoustic propagation
- iii. Turbine blade passing frequencies are syncing up between multiple stations
- iv. Aeolian/ Helmholtz resonance of added or existing side connections
- v. Increased valve noise, turbulence and standing wave sound generation
- vi. Phase synchronization and “sistering” of multiple line conditions setting up standing sound waves and beat frequencies due slight phase discontinuities of multiple compressors and adjacent pipelines
- vii. Liquid drops out from causing 2 phase gas streams
- viii. Amplification and distance travel by trapped seismic wave guides such as fault lines, other geological irregularities or terrain.



## **Section 13- Pursuit of Action and Taking the Story to the Public**

Overtime the direction behind my efforts regarding this problem have changed based on my knowledge about it and what I had facts on. Initially my complaints to the town of the problem had no supporting data. This was made worse in that almost no one else sensed the harbinger of the low frequency sound other than my dog. After other potential area sources were ruled out, it became more likely that the new compressors were the problem. After talking with the Gas Company for a few months I finally contacted Town, State and FERC officials to get assistance to work in a **cooperative spirit** to address the problem. I felt behind the scenes cooperation vs the media approach was the best course of action. On the surface there was allot of activity including additional low frequency testing done. But only done as part of getting their full operating permit. It was done to study the mystery conditions of low frequency sound and vibrations in my home and elsewhere. At that point my investigation and study started to identify what harms may be associated with chronic exposure to these conditions. After all, since they wouldn't listen to one individual maybe if the nation learned about the problem, then finally the problem would be addressed. My journey to do this started in earnest in mid-2010.!

**Brookfield homeowner fears sound waves may harm natural gas pipelines (video)**

Saturday, July 14, 2012

By Luther Tummelle, North Bureau Chief  
ltummelle@nhregister.com / Twitter: @luthertummelle

At times living in these conditions is like an attack by a sonic weapon. When I was accusing the CL&P High Tension Power Lines behind me, I was fortunate that my company CL&P account representative was compassionate of my situation and convinced CL&P management to have an acoustical study done at my home. In January 2010 TRC Consulting did the study and convincingly proved to me that the power lines were not the source of the type Hum I was disturbed by. That turned me right around and back to the thinking somehow the compressor station was in some way part of the problem. From my persistence FERC required Iroquois Gas to do LFN testing at and around the station in May 2010. LS Goodfriend who was the companies commissioning noise consultant did the work. After 2-3 studies their work showed a similar spectral condition of LF sound as did the TRC study and that the LF Hum was not specifically associated to the operation of the compressors. Both consultant studies provided a plethora of data in their reports to that which I included in my research.

I was bounced around being advised to check with other US Government agencies. They all took the fifth and said a problem like this doesn't fall under their charter and nor did they want to help! PHMSA representatives visited the IGTS site for other reasons and said they could not feel vibrations which they interpreted to the problem with which emboldened the gas companies defense. It has to be kept in mind that at this point I did not have all the supporting research and facts I do now and not started considering the pipelines yet!

I contacted the offices of Attorney General Blumenthal, Governor Rell and Representative Murphy asking them for assistance. They did send letters to FERC asking FERC to look into the problem, but that was it! In May 2010 I presented at fact finding meeting about the problem in Hartford at AG Blumenthal's office with 3 AG office attorneys and the Iroquois CEO, lawyers and PR person. This seemed to have gotten some attention at FERC but I soon began to realize nothing but delay and avoidance of the root complaint was SOP.

I tried for many months to get the local Hearst Danbury New Times paper to run a story, they would not. Finally, the Haven Register had interest and ran an article in July 2012. All this time my life was being tormented:  
<http://www.nhregister.com/article/NH/20120714/NEWS/307149943>.

It is strange why I have such difficulty having the local Hearst paper run a story. But I understand data and a plausible theory at that time may have made them skeptical, or something else was going on.

My opinion is that in General, the MASS Media is not interested in helping to resolve this issue, only to use it for story lines. However, having said that it is critical to getting any attention and critical mass to effect getting an investigation. So once my story started to get some coverage a couple of journalists interviewed me for a story. Problem is they were only interested in the consequences I was suggesting potentially caused by the chronic exposure of humans to these conditions rather than the core of my work. The New Republic ran such an article "A Maddening Sound". In which the article clearly skews the purpose of my work: <https://newrepublic.com/article/132128/maddening-sound>

Colin Dieley / April 20, 2010

### A Maddening Sound

Is the Hum, a mysterious noise heard around the world, science or mass delusion?



During 2010 and 2011 my neighbor Bruno and I tirelessly investigated and studied the problem. Each of us sent FERC's Environmental Staff our findings and evidence of the problem in the area around the new compressors (pipelines were not considered at this point). We came to an early conclusion that all the regulations based on dBA weighting were inadequate for this type of problem.

Worth mentioning, coincidentally in the summer of 2011 when I was at the Brookfield Town Hall reviewing design plans of the recently constructed IGTS/ AGT project, I overheard a phone call with another Brookfield resident from the Candlewood Lake area reporting and complaining about the same conditions to the Town Hall Staff. I contacted her and made my own observations that confirmed her story.

In the fall of 2011 FERC mentioned about another neighbor complaining about a compressor station. She lived right across the street from it. And why the Town didn't say anything about this to me smells of influence. When Bruno and I went to visit her, we found deplorable low frequency noise and vibration problems beyond comprehension that anyone should live in! Shortly after in November 2011, the Lead Environmental Engineer and 3 Associate FERC engineers came to her and my homes to which they witnessed and so put into the record the vibration conditions to which was part of my complaint at that point is when the gas company started referring to me and others as "Chronic Complainers".

I suppose at this point I was getting some notoriety about the subject, because residents from Minisink NY came over to Brookfield in late 2011 to see for the conditions, they had heard about for a compressor station being planned for their neighborhood in Minisink NY. This led to a visit by their State Representative Nan Hayworth for the NY State 5<sup>th</sup> District who sensed the same conditions as the FERC engineers did a few weeks earlier.

In January 2012 a group of us tried to convince our First Selectman to fund a study as a community issue. After initial agreement, he declined, why, likely "good neighbor" influence from the company? At that point it was suggested by TRC that I contact Accentech from Cambridge MA who had been involved with other notorious Hum cases in the US. TRC had a conflict of interest to be able to help me.

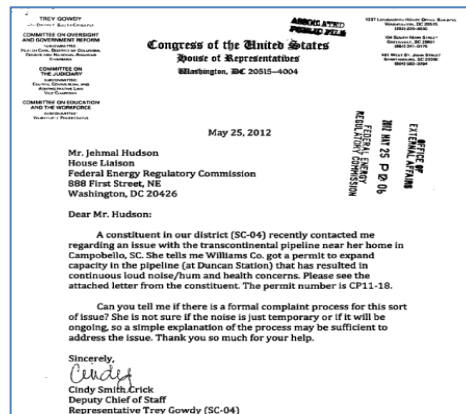
A good summary of the results by Jim Cowan from the consulting firm are covered in this paper: [\[PDF\] The results of hum studies in the United States | Semantic Scholar](#)

In July 2012 our “Good Neighbor” IGTS wrote a 444-page refute to FERC about ditching the whole mess. They skewed everything to make themselves look good and be responsive to FERC. They said that they had spent much time and money addressing the issues of a few and that IGTS concluded that there are not enough people affected, it would cost too much to fix the problem and would not benefit the greater good. The point again, all the time spent was to protect their investment and make it comply with regulations. They said over and over again that the studies they were doing were not to study the Hum!

In October 2012 and November 2012, I filed comments into the draft EIS (Environmental Impact Statement) for various new Pipeline Projects in the Northeast to try to raise awareness about all this. I filed into the Constitution and Northeast Access dockets.

In 2012, I met with UCONN to share with them my work to that point and ask for their help to undertake a study regarding environmental impacts to LI Sound marine life. But without funding they could not take up the issue.

From 2011 through 2015, I worked with a FERC Dispute Resolution Service (DRS) Rep who was very supportive and tried to escalate the problem at FERC. That did get some progress! An interesting letter came over from public files about a similar problem reported to Senator Trey Gowdy’s office and sent to FERC in May 2012. It raised the “loud noise/hum and health concerns” associated with the expansion of a Transcon pipeline in one of Gowdy’s districts. The work done to the system was on a Williams Pipeline project around 2012. When I talked with the resident Joan from Campobello SC her story was exactly the same as mine. I am not the only one who sees it this way.



In January 2013 I provided an information package and explanation to the CT State Crimes Unit about why GPSH may have played a key role in the Newtown Sandy Hook School Massacre, which is discussed in a later section

In 2013. I contacted the FBI on a suggestion. They suggested the CDC would have the authority on this type problem. In 2013 and 2014, I made a few connections with the CDC Directors Office and ultimately brushed off saying I should contact my State Health Department. Which I had already attempted to do through CTDEP.

In 2014, I made public comment in front of FERC and PHMSA representatives at a public hearing in Danbury CT on the proposed Algonquin/ Spectra AIM Pipeline project CP14-96-000.

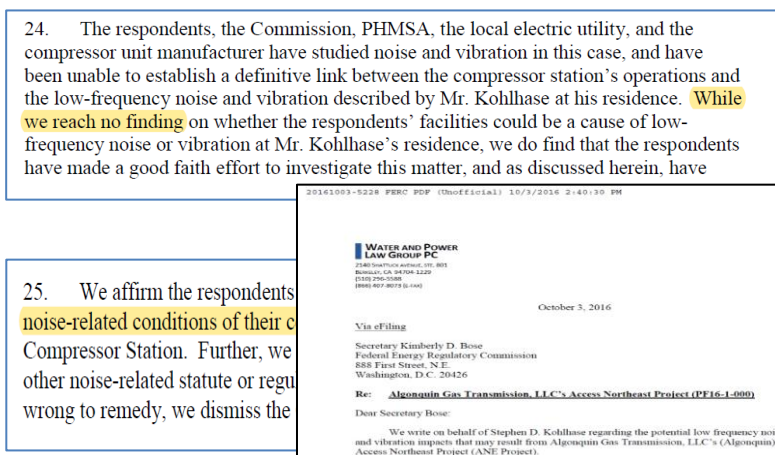
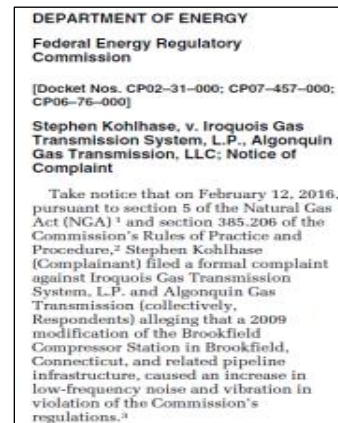
With options exhausted and **complete confidence** in my research, in September 2014 I retained the services of Water and Power Law Group PC from Berkley CA. who are very experienced dealing with FERC. We first submitted a supplemental motion to intervene on the EIS for a Spectra Algonquin project called the AIM Project EIS (CP-14-96).

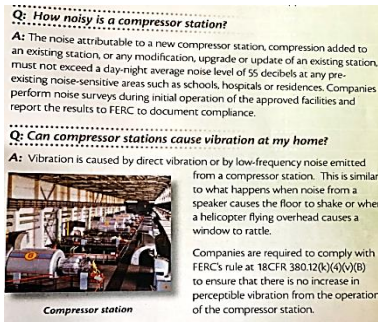
On February 12, 2016 we filed a “Complaint and Request for Relief” specific to the completed projects done by Iroquois & Spectra Algonquin (now Enbridge) about the Hum and the Flutter caused by the IGTS compressors:  
<https://www.federalregister.gov/documents/2016/03/07/2016-04952/stephen-kohlhase-v-iroquois-gas-transmission-system-lp-algonquin-gas-transmission-llc-notice-of>

Ultimately in September 2016 the FERC Commissioners dismissed the complaint based on compliance to their certificates. The “good neighbor” promises made by IGTS starting in 2001 were thrown out the window. In dismissing the complaint FERC essentially overlooked the Federal Register Vibration Standard 18CFR 380.12k.4. (v) b. In FERC’s closing statements the Commissioners said they reached no finding if the compressors were the source of my LF noise and vibrations. Which is an open ended position.

My counsel advised that this presents a substantial opportunity to further argument. FERC closed the complaint: <https://www.ferc.gov/CalendarFiles/20160907170553-CP02-31-004.pdf>. The key point missed is the lack of enforcement of the infrequently noticed standard about perceptible vibrations in the Federal Register Vibration Standard 18CFR 380.12k.4. (v) b

Subsequently in October 2016, I filed a complaint about the inadequacies regarding this standard and the need for FERC to engage the problem on the proposed Algonquin Spectra Access Northeast Project (docket PF16-1-000). To which comments must be responded to by FERC, which has not happened. These Legal Proceedings cost me upwards of \$10,000 and well worth it!





This resulted in a small change in 2020 in FERC's Notice of Project brochure to communities that now addresses emitted low frequency noise and vibrations covered by the vibration standard 18CFR 380.12k.4. (v) b. This is a copy of that section in a copy of the docket notice of the Iroquois ExC project planned for operation in Brookfield in 2023. But, the entire issue of ILFN sound from the pipelines is left unaddressed. They seem only focused on the compressor station, again.

## 11. Noise

Commenters on the draft EIS express concern regarding the noise and vibration associated with the existing Brookfield Compressor Station, identified by some commenters as "flutter" (localized vibration impacts) and "hum" (low frequency noise and associated structural vibration induced by pipelines). One commenter recommends that FERC review noise increases associated with increased compression at the modified facilities. Section B.8 of the EA provided a history of FERC's evaluation of these concerns. Given that the Project is expected to result in a reduction in noise levels at NSAs in the vicinity of the Brookfield Compressor Station, and our recommendation for post-construction surveys to ensure that the FERC noise requirements are met, we anticipate the installation of additional noise controls associated with the Project could alleviate some of the ongoing concern with station operation noise. As the EA stated, based on the analyses conducted, Iroquois' proposed mitigation measures, and our recommendation, we continue to conclude that construction and operation of the Project would not result in significant noise or vibration impacts on residents or the surrounding communities.

The recent EIS (Environmental Impact Statement) for a planned IGTS expansion now includes a discussion about LF "flutter" and "hum". This screen shot is that from the issued EIS in 2021 for an upcoming IGTS project slated for 2023 construction. It will add 2 main transmission line compressors for a project called the Expansion by Compression Project (ExC).

After all this there are new indicators of unwitting exposures to the conditions in society and nature. Just recently many of us Hummers saw similarities of the sound and vibration conditions as well as similar health symptoms caused in the Havana Syndrome issue and the actions of the travels of the elephants in South China. These are both supportable and plausible. In April 2021 my chronicle and links to my documentary were sent to the VA Senator Mark Warner to share with the Senate Intelligence Committee investigating the **Havana Syndrome**. Discussed in later sections of this paper.

It is quite obvious that these companies and those in the know in the industry do not want to this to get out of hand. It would **self-implode** and open "**Pandora's Box**". The route I took would have avoided this potential. But the **mal-administration** of this has resulted in a widening environmental problem that has let the horses out of the barn!

This Industry critical to society but these problems left unaddressed is a travesty!

**The companies take solace that their influence with FERC will shield them from needing to deal with these issues. And in the meantime, good citizens are being severely affected.**

## Videos About the Emergence of GPS and Other Popularized Hum Theories

As mentioned, my work has essentially concluded, my efforts to get resolution have not succeeded so it's time to get the **public aware** and to use the information shared to campaign for investigations



In 2014, a film producer came in from CA with a crew and interviewed me for a documentary on one of the cable channels. Unfortunately, funding the project did not materialize, so I was told. Then in 2017 I was asked to have a short film documentary made about my journey. This was released in July 2019 short documentary called “Doom Vibrations”. Garret Harkawik produced this short film documentary. It dropped by The Atlantic on 7/19/19 entitled “The Hum, The Unexplained Noise 2% of People Can Hear”. It can be viewed for free by searching on the “Hum” or purchased on Amazon Prime. The direct link to it: <https://www.theatlantic.com/video/index/593992/doom-vibrations/>



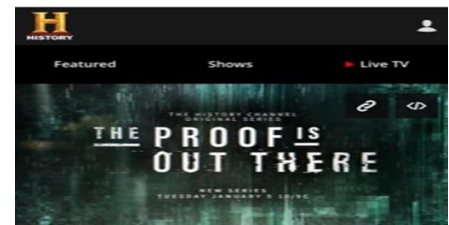
It documents much of my journey and work from the announcement by IGTS in 2001 to build a compressor station on vacant property behind our neighborhood through early 2019. The documentary must be of some interest because it has over 600k views at the end of 2021.

On December 12, 2020 I participated a Podcast for the Smile Lewis Anomaly Archives. The producer of the documentary also was on it. There is a good discussion about my thoughts and other issues followed by a viewing of Garret’s Documentary: [https://www.youtube.com/watch?v=y\\_IGItJrCnE](https://www.youtube.com/watch?v=y_IGItJrCnE)

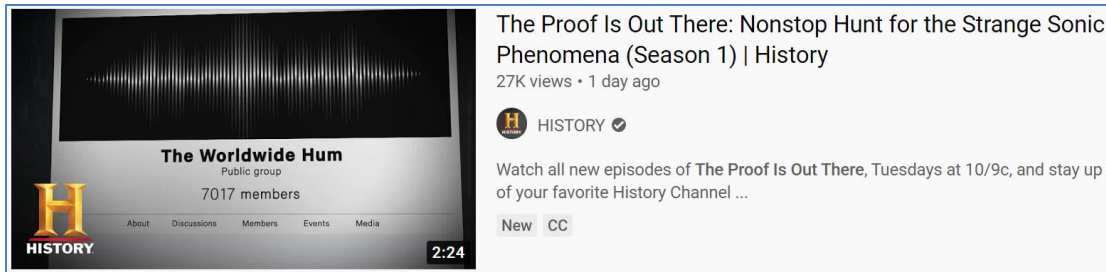


In August 2019 the History Channel aired an episode primarily about the hum in Windsor Canada called “**The UnXplained- Unnatural Nature**” hosted by Robert Shatner at minute 26. Gas transmission pipelines were never mentioned even though the residents are aware of GPSH and how it fits their situations! [Watch The UnXplained Season 1 Episode 4 | HISTORY Channel](#)

In 2021 I had a chance to discuss Pipelines on The History Channel (A&E network). I interviewed for an episode on “**The Proof is Out There**”. A snippet of that interview was used. But it did provide some basic oversight about GPS. Unfortunately, the premise of the episode was to figure out why only some people hear the Hum, making a verdict of “hyperacusis”. My opinion is that in General, the MASS Media is not interested in helping to resolve this issue, only to use it for story lines. However, having said that it is critical to getting any attention and critical mass to effect getting an investigation. Which may be correct or may not be, but not the point that I agreed to participate, but any press is good press. It aired in Season 1, episode 7 on January 26, 2021. A note to the reader, the preparation of the map by the producer is inaccurate, use the maps in this paper instead if you are doing your own research: [The Proof Is Out There: DISTURBING Sounds from Beneath the Earth \(Season 1\) | History - YouTube](#)



Meet Steve Kohlase- Most of my actual interview can be seen a separate video on You Tube. [The Proof Is Out There: Nonstop Hunt for the Strange Sonic Phenomena \(Season 1\) | History - YouTube](#)



Other discussions and video/ podcasts/ transcripts of note about ILFN and The Hum where GPS information starts to get noticed (most are enamored on the popular radio wave theory of Deming, ut worth a read). When doing research one thing to keep in mind is the skepticism and ridicule new ideas receive and it takes a strong commitment to stay the course when hearing this. But the truth will prevail!

There are sound tracks embedded in some that I suspect are renditions. Certainly, they present a sound condition but fall short from all the conditions in space of the problem

🎵 [How The Hum Works \(iheart.com\)](https://www.heart.com) Check out talk at 28 minutes which most interviews are interested in only interested in the concerns that are SENSATIONAL for ratings and need much more study. The basis of the research is of no interest to these journalists - **Josh and Chuck- The Podcast –2014**

[Can You Hear the Hum? \(skeptoid.com\)](https://www.skeptoid.com) Brian Dunning- The Skeptoid- good coverage of al the myths about a source and did not have the availability of knowledge about GPS 2019

[https://www.youtube.com/watch?v=QpeKot2X\\_O8](https://www.youtube.com/watch?v=QpeKot2X_O8) Can you hear a Hum- Earth Lab – Includes the “opinions” of thehum.info author and avoids the emerged findings of GPS 2018

<https://www.youtube.com/watch?v=PZSFI3vRabo> 2% of People have heard the Hum- Have You? 2017

<https://www.youtube.com/watch?v=3WXUOLHp54w> Taos Hum- Supposed Sound Track 2015

<https://www.youtube.com/watch?v=4zfEC1baal8> What is the Hum Classic- Certainly hits on the point that someone doesn’t want the truth out. GPS still hadn’t developed sufficiently for people to be aware of. 2014

<https://www.facebook.com/watch/?ref=external&v=1671196353266711> Have you heard the Taos Hum 2022

## **Section 14- Dealing with the Sound of the Conditions to Reduce its Impact**



This section addresses ways to temporarily change the sonic environment inside a room and other spaces so a sufferer can reduce or eliminate the sound and sound ear pressure and annoyance when needed. As I have not found any ways to deal the vibration other than eliminating the source, I cannot address that. It also does not delve into coping techniques or aides suggested by many such as ear plugs, ear drops, etc. The numbers of people using some sort of sound masking techniques for sleep is surprising. It indicates some sort of wide spread need for nighttime masking sound. It could be just a need for some sound to relax or more likely to cover over some other sound like the **tonal** conditions of GPS.

Annoyance and other distresses from tonal conditions have been shown to have a real impact on human health and performance. But is not considered by the government as an agent of harm like air pollution is. Therefore, there is no intent to Regulate or Mitigate low frequency sound and vibration pollution.

<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1040&context=archengdiss>

University of Nebraska - Lincoln  
**DigitalCommons@University of Nebraska - Lincoln**

Architectural Engineering -- Dissertations and  
Student Research

Architectural Engineering

Spring 4-22-2016

### **The Effects of Tones in Noise on Human Annoyance and Performance**

Joonhee Lee  
University of Nebraska - Lincoln, joonhee.lee@huskers.unl.edu

It is very apparent that there is a growing epidemic of sleep deprivation in the US. TV commercials are plentiful about sleep aids to help. Many people I speak with that are not official hummers tell me they need to use fans and other white noise generators to sleep at night. And they have done this for years! People comment there must be some way to cancel the noise and vibrations by using Active Noise Cancellation (ANC), which I understand has been studied and determined that the only practical method is at the source.

#### **Study: Listening to Certain Sounds Seems to Improve Sleep**

Participants played "pink noise" that was synchronized to their brain rhythms slept more deeply and had increased memory retention.  
LINDSAY ABRAMS | APR 12 2015, 9:08 AM ET

Other options people try to escape from the persistent bombardment of the Hum and vibrations is to move. What they find this may work for the typical anthropogenic noise, but fails to mitigate the ILFN conditions. Why? I find they simply moved to where another pipeline system is operating!

Many people think upgrading home insulation is the answer. But, in fact due to the nature of the LF sounds waves entering the dwelling from outside it just allows the LF sound band to become prominent.

Some people claim its radio/ microwaves and wrap their heads in tin foil. Highly unlikely a physical solution, but maybe it has a psychological benefit?

Others postulate that these radio/ microwaves (Frey effect) are causing an internal stimulation of the brain and thus for the LF hum and tactical vibrations. The author of The Global Hum Mapping project felt so convinced that he got donations to build an experimental Faraday Cage in his yard. This was to test Oklahoma State Universities Professor Deming's 1990's theory that radio waves cause the Frey Effect and thus the Hum. The finding, ½ inch of steel has no effect to eliminating the 33 ft long wave lengths of the external conditions that are the true source of this acoustic Hum; <https://www.youtube.com/watch?v=WuSdzxhWpU0> .  
<https://www.youtube.com/watch?v=vul4SYL4QiQ>

FREY Effect- the original technical part- <https://braincontrolhedge.files.wordpress.com/2013/05/auditory-system-response-to-radio-frequency-energy-technical-note.pdf>. In the paper there is no mention or intent that this was done to determine if RFE could cause a low frequency hum. It simply did a lab experiment to see if certain people can sense anything from lab exposure. The result was certain people said they sensed a high frequency pitch.

#### ■ www.micro...

*Newsweek* also talked to Allan Frey who offered qualified support. "If you use the correct frequency and modulate it properly, it's easy to induce sensations," Frey told the magazine. "But how it is perceived, it's too early to tell." Frey had authority in these matters because three years earlier he was the first to report people's ability to hear certain types of microwaves. Many now call this the "Frey effect."

A few days ago —or forty-nine years later— we called Frey and reminded him about the *Newsweek* article. It was not fresh in his mind! "I don't know what they measured, so I don't know what to conclude," he said, but he did allow that Mrs. G was probably hearing low frequency, not microwave, signals.

Mrs. G's condition is no different from what we now call electromagnetic hypersensitivity, Frey told us.

For another reminiscence, see "*The Man Who Was Allergic to Radio Waves*."

Allen Frey interviewed in 2012 and commented to the likelihood that Mr.'s G condition examiners were evaluating were probably hearing low frequency, not microwaves. But her conditions were no different than they call electromagnetic hypersensitivity.

[https://www.microwavenews.com/short-takes-archive/2012?fbclid=IwAR3zjyyQqsyiW\\_OmGUyKzGNXv-BBKmT6x2SoojuBDDICNG8tGlQuGv6Adl&mibextid=tejx2t](https://www.microwavenews.com/short-takes-archive/2012?fbclid=IwAR3zjyyQqsyiW_OmGUyKzGNXv-BBKmT6x2SoojuBDDICNG8tGlQuGv6Adl&mibextid=tejx2t)

"Faraday cages" seem to be a popular misnomer to a solution for these type sonic conditions! I had the opportunity to see this for myself in 2 laboratories at my companies Middlebury CT location that are lined with **copper sheets** as EMI Shields for sensitive electronic used in research, built in the early 70's. Used to shield from the external effects of radio/ microwave waves. I found the Hum was bad in these rooms in the row of multiple laboratories. An interesting effect occurred walking done the corridor of this area with open doors. Passing each door, the Hum increased. Exhibiting a Helmholtz effect. The entire lab wing and building was vacant at the time of the observations. It is obvious that thin sheets of metal have no effect on long wavelength sound waves!



I also found an enclosed corner of the basement nearest the side of the direction where the same 2 AGT lines are had conditions so bad it made some people I took there to see what I was talking about the hum, feel ill. These 2 lines are the same ones 150 ft from my home!

**This confirms that putting up physical barriers like liners and insulation provide no relief and the principles of sound propagation and science must be considered in any LF noise problem, not something from a Flash Gordon comic strip!**

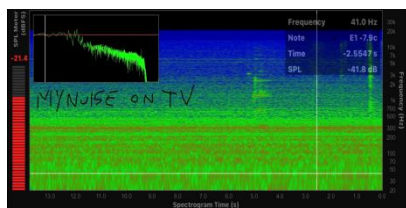
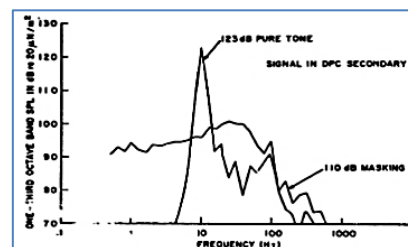
The first I began looking for relief/ escape from the conditions was when I started to scale back my investigation. The first useful suggestion was that I read about on The Yahoo Hum Forum was to use a loop of a 747-cabin



noise on You Tube to sleep with. Also talked about were using fan powered HEPA filters and humidifiers. I found the best tool for me is playing **aircraft cabin noise** from mynoise.net <https://mynoise.net/> adjusted to my need using the equalizer function of the app. It's simple to link an iPhone to a good system capable of producing quality full frequency range speakers like a Bose Sound link Mini Link II, Revolve II or some other brand. I find putting it under the bed at night works best. I typically need to adjust the volume from the iPhone to deal with the changes in intensity of the Hum. Sleeping and dreaming has benefitted. At the levels I use the sound the masking does not get rid vibration that I am aware of.



Tonal type sound is far more annoying than broad band noise. One thought I have why sound masking using brown noises works is from “covering over” the irritating narrow band tonal range (s) of the Hum. Shown is a chart of the masking effect of a 10 HZ tone using masking sound. This covers over the tonal aspect of the condition and soothes the discomforting sound pressure and disturbance in the ear, “neutralizing” the conditions of the tone.



Using the Spectro graph FFT analyzer on the iPhone with the sound masking of the mynoise aircraft cabin on on my 65 Samsung TV Sony Sound Bar shows how the masking overlays the hum at 40 Hz. We know the FFT of only the Hum shows a tonal **dysrhythmic vibratory sound pressure** that seems to be wiped over making it more of a broad band noise that is less harmful.

One Hum Forum suffer from CA by the name String (Barry), came across that a sound generated at a frequency of 207 Hz completely masks the annoyance and discomfort of the Hum, hence this finding is called String 207. Though it works the 207 HZ tone is distracting. But for future reference it is worthwhile noting.

Choice of tool is subjective to the user's comfort of the other noise generated to mask the Hum.

Other things than can minimally help are relocating furniture pieces to areas of a room that measure to be lower intensity. Usually not very practical but worth mentioning. Corners of a room are the worse locations.

Another way for relief is to hit the road. Maybe you'll find a “hum less” location. But people need to be cautious of a quick stop and listen to see if the hum is occurring in a pace. There seems to be something that happens to hearing causes a TTS (Temporary Threshold Shift) where there is a temporary elimination of the hum heard, either at the destination or at when returning home. So, this is a problem for investigation where the hum is truly occurring by only using the human ear. Some Hummers have coined this as the “Holiday Effect”.



### **Helping Others and Validating the GPSH Model- Case Studies**

Since the time my work has made it into the public domain and especially after the release of the Documentary in July 2019, I have been contacted by many people asking for my assistance in their case. For most the GPSH model fits 98% percent of the time. And for most the sound masking mentioned here works. But, for those where the vibration and body pressure from the airborne standing waves in homes, the model fits, but the masking doesn't help! For many just the knowledge of knowing what is making their acoustic environment uncontrollable benefits them.

I always ask to be sure they have seen their doctor to assure something else is not going on. I also suggest they contact their local authorities and report/ complain about this.

Hopefully, a wider informed audience about this and GPSH will bring attention to this matter.

## **Section 15\*- Unrealized Impacts of GPSH and Unprovoked Attacks**

### Questions of Consequence

This section falls into a category of “out of the box” thinking of an unrealized impact of GPSH and unprovoked attacks. There is enough evidence and supporting scientific research to warrant more research.

### Search on Low Frequency Noise- Violence

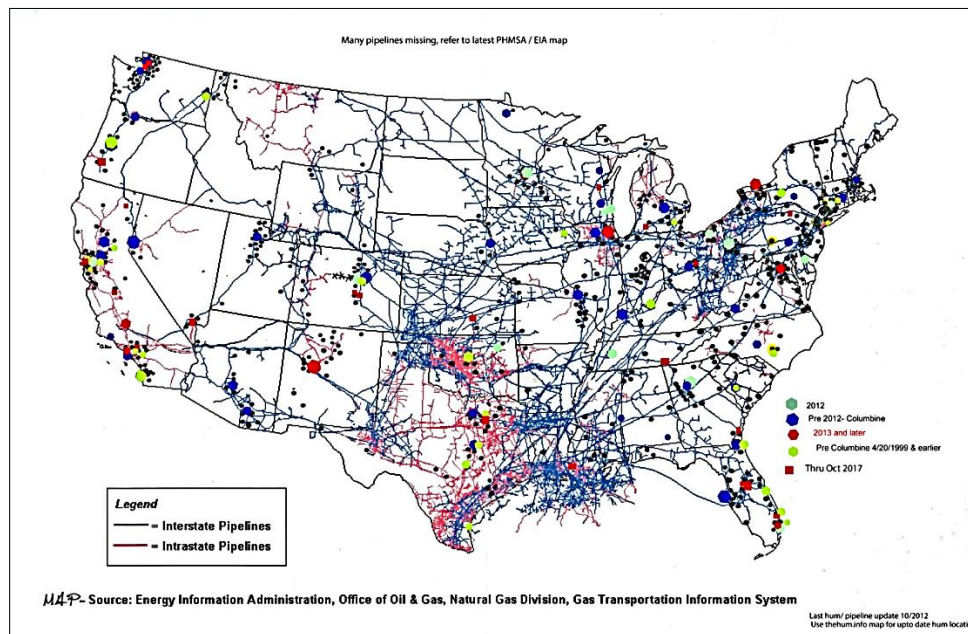
Can Infrasound Mess with your head? [Infrasound Can Mess with Your Head | NeuroNotes \(neuroresearchproject.com\)](#).

Noise and Violence [Effect of Chronic Noise Exposure on Aggressive Behavior of Automotive Industry Workers \(nih.gov\)](#)

Leventhal LF Noise and Annoyance [Low frequency noise and annoyance - PubMed \(nih.gov\)](#)

A must read before continuing is a paper by Col. Nuno A.A. Castelo Branco, MD regarding the effects observed of LFN exposures on Military Operations. The topics covered bring credence to what I have pulled together in this section. <https://apps.dtic.mil/dtic/tr/fulltext/u2/p014113.pdf>

There has been enough work done for me to postulate that there may be links of the occurrence of GPSH and



many of the atrocities we see occurring today. Certainly, people will reject this until much more work is done. But the cases covered should raise questions. And even if these deranged people weren't complaining about the hum, did something subliminally occur like Aaron Alexis?

In 2011, while assembling the 2010- 2013 Mapping of Hum reports and pipelines I began noticing a pattern of

unprovoked acts of terror in Hum cluster locations. In that I made an overlay of these locations (large colored dots) onto the Kohlhasse hum map in 2012. What I saw I couldn't believe and was taken back by the question, could this be a contributor in the mental derangement occurring in the country leading to these acts against society? And it wasn't until after the Sandy Hook massacre that I realized it just might be!

## **Awareness of Chronic Infrasound and its possible link to Personality and Brain Disorders**

What's been established so far is we are in an ILFN rich environment and chronic exposure to it does affect the Human. So, it is reasonable to suggest that chronic exposure to high levels of infrasound and vibration in residential settings could be contributing factors to the increased level of mental health issues today. My read into this is that researchers need to be aware of the effects of ILFN and how it is delivered into millions of homes and frequented spaces and understand how to address the symptoms: <https://waubrafoundation.org.au/health/symptoms/>

In the news



### **Survey Finds Big Increase in Number of Kids Estimated to Have Autism**

NBCNews.com - 7 hours ago

A new government survey finds that more than 2 percent of U.S. kids have been diagnosed ...

## **Altered States of Mind -Fact or just a Matter of Coincidence**

I started to do desktop research to see if chronic exposure to ILFN could be a contributing factor to the current state of insanity showing up in society. What I found convinced me that external conditions such as those from the Hum (heard or not heard) can affect and alter the brain. From the unborn to young and old adults already having mental health issues, I refer to them as **fragile minds**. And for some of these fragilities noise and particularly ILFN is a problem. Regardless of what people want to accept, chronic, high levels of infrasound are occurring and likely to continue. And unless we begin to understand what it is, everyone from Hummers to non- hearers will be affected directly or indirectly in one way or another after an atrocity occurs. Neuroscientists are beginning to understand how oscillations in the brain affect it and are associated with things like schizophrenia:



<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3122299/>.

Chronic exposure to ILFN is known to affect the brain in ways not understood before, this article is leading edge study work into the effects of IS (Infrasound) on the cortical section of the brain:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5389622/>

So, what's to say the causative ILFN sound and vibrations of the Hum and GPSH saturating our being is not in some way altering the brains development and way of thinking.

Researchers in China have shown that ILFN affects the certain brain activities of rats. I don't proclaim to understand this complexity but it is an indicator of the contribution of ILFN of the problems that GPSH may be having.

<https://journals.sagepub.com/doi/pdf/10.1260/026309209788056348>

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### **RESEARCH NOTE**

#### **Effects of Infrasound on the Proliferation and the Expression of BDNF in the Hippocampus**

YUAN Hua, LONG Hua, MU Xiang, LIU Jing and CHEN Jing-Zao  
Department of Rehabilitation and Physiotherapy, Xiang Hospital, Fourth Military  
Medical University, 15 Chang Le Xi Road, Xi'an 710032, PR, China  
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Received 13<sup>th</sup> July 2006

Researchers at UC Berkley are studying how the brain waves coordinate complex activity. **Brainwave entrainment** is the altering of the brain's frequencies by external stimuli. The interference with neural paths causes changes in the synapses and possible alteration of parts of the brain such as the hippocampus and spinal cortex area: [https://www.berkeley.edu/news/media/releases/2006/09/14\\_theta.shtml](https://www.berkeley.edu/news/media/releases/2006/09/14_theta.shtml)

An article posted on a The Brain and Behavior Research Foundation I came across in November 2019 stated “newly published research, which appears in the *American Journal of Psychiatry*, provides what the researchers term “compelling evidence” that activation of a portion of the brain’s hippocampus “is impaired in early psychosis,” and that this activation is directly related to hyperactivity of the region in question, which is called the anterior hippocampus



This research should raise concerns that GPS- ILFN exposure may affect the brains frontal area and the section of the brain called the hippocampus and cortical regions that play a large role in emotions such as that observed lacking in many of the mass murderers. This may be most problematic during brain development from pre-natal to young adulthood explaining the schizophrenic behaviors such as remorseless killings and rage attacks are occurring from people less than 30 years old.

### **Evidences of Mind-Altering Contributions That can be Tied to GPS**

Evidences and testimony of the occurrence of the Hum and these deranged people is left to forensic analysis. There are a few cases though that there is enough to suggest that the GPSH model is applicable. Obviously, much work needs to be done to demonstrate it is and certainly warrants consideration what derangement these people have to want to cause death and terror. I witnessed where these conditions appeared to be changing the demeanor and emotions of a young man in his late teens at a home in West Hartford CT. Fortunately I think the family realized and understanding the GPSH explanation may have gotten them through this dark, demonic period.

Then there is the case of the girls with a TIC condition in LeRoy NY in 2012. Many things were considered including Tourettes/ Conversion Disorder which is stress related . Of course at that time I considered everything a candidate for GPSH consideration. As of 2016 there is a Hum report from LeRoy where there are pipelines on both the north and south side of town. Blanco and his team suggest that chronic exposure to LFN can lead to Reflex Epilepsy who’s symptoms included body jerking and twitching: LFN A Major Risk in Military Operation as part of an overall series : <https://apps.dtic.mil/dtic/tr/fulltext/u2/p014113.pdf>

Current events in early 2019- an abnormal cluster of cases of a Neurological Syndrome of Unknown Cause (NSUC) in the South and North Eastern regions of New Brunswick Canada in the Arcadian and Moncton areas of Symptoms common to Creutzfeld- Jakob disease, a review of the outward symptoms show they seem to have some of the similar traits as GPSH symptoms! As reported by the Washington Post - <https://www.washingtonpost.com/world/2021/05/12/canada-new-brunswick-brain-disease/> [washingtonpost.com] Moncton is a gas area and also has the Maritime Gas line and certainly unknown quantities of gathering field collection systems.

## Sandy Hook CT- School Massacre



Talk about an eerie turn of events. In 2010, I did a region wide ILFN data collection and hum mapping in Northern Fairfield County CT. I sent the information to the FERC Engineer I was dealing with about this problem relating to recent Iroquois Gas Pipeline Projects. This information in 2010 included data from a block away from the Adam Lanza neighborhood 2 years earlier prior to the Sandy Hook School massacre. In doing my US mapping of hum

locations and pipelines in 2011-12 I began noticing a strong correlation between these type mindless massacres and Hum clusters. In Oct 2012 I filed a technical discussion and complaint to FERC while it was on my mind that these type massacres were occurring in Hum Cluster Areas.

This was before the Sandy Hook massacre! On December 6, 2012, I sent a hash email to FERC about extremely high Hum levels in my home and how sick of it I was. I then followed with another on Dec 10. Then December 14, the Sandy Hook School massacre happened, the town right next to us. A day or two went by after the shock when I recollected to fellow workers who I discussed the Hum problem with that I had visited a neighborhood in Newtown 2 years earlier to investigate the Hum where Iroquois had



installed a "loop" as part of their expansion project in 2009 (blue dot). First thing I realized I was near where Lanza lived when I was collecting field data in 2010. Disturbingly, I read about him spending all his time in the basement, one of the worse spots I found to be for the hum! At this point my GPSH model was proving out which says that the closer to these

lines the worst the ILFN conditions. Adam Lanza's basement was about 485 feet from Iroquois' line and within proximity (within 10-20 miles) of the 2 suspected Algonquin pipelines. We now know that his home had been recently remodeled including insulation, which we know worsens the conditions and hell he was probably living with. He wore ear plugs at the shooting, why, possibly like many other hum hearers to try to stop the hum.

There is no written record of him complaining about the hum. That doesn't matter, because like many he likely didn't realize the conditions affecting his fragile mind. We know he has Alsbergers, a form of Autism. This is an 1992 article about the effects of conditions like these on noise sensitive people, to which people on the Autistic spectrum are part of. Noise, noise sensitivity and psychiatric disorder: epidemiological and psychophysiological studies [Noise, noise sensitivity and psychiatric disorder: epidemiological and psychophysiological studies - PubMed \(nih.gov\)](#)

I struggled for a month and a half about what to do. I decided it was my civic duty to provide what I had to the CT State Police Major Crimes Unit in February 2013 regardless of what heckling this might bring.

But before dropping the information off at the Southbury Barrick's, I revisited the area to recheck it for hum and it was as bad as 2 years earlier. I did get a call, but because this is so little understood, the information was simply filed. Interestingly enough, the information must have been considered noteworthy and

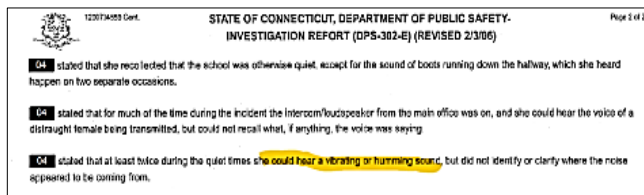


STATE OF CONNECTICUT, DEPARTMENT OF PUBLIC SAFETY- INVESTIGATION REPORT (DPS-302-E) (REVISED 2/3/06)										Page 1 of 1
Report #: 120074599 - 00336250										
Report Type: Initial Report: <input type="checkbox"/> Prosecutors Report: <input type="checkbox"/> Supplement: <input checked="" type="checkbox"/> Re-open: <input type="checkbox"/> Assist: <input type="checkbox"/> Closing: <input type="checkbox"/>										
Attachments: Statements: <input type="checkbox"/> Teletype: <input type="checkbox"/> Photos: <input type="checkbox"/> Sketchmap: <input type="checkbox"/> Evidence: <input type="checkbox"/> Other: <input checked="" type="checkbox"/>										
CFS NO 120074599	INCIDENT DATE 12/14/2012	TIME 0941	INCIDENT DATE 12/14/2012	TIME 0941	PRIMARY OFFICER JEWISS, DANIEL E.	BADGE NO 0006	INVESTIGATING OFFICER DOWNS, MICHAELA	BADGE NO 0002		
INCIDENT ADDRESS 00012 Dickerson Dr Newtown 06462					APRIMENT NO	TOWN CD	TYPE OF EXCEPTIONAL CLEARANCE	CASE STATUS		
							Not Applicable	Active		
ACTION TAKEN: On 02/05/13, I received an informational binder from Steven Kohlhasse regarding a low-frequency hum that he has researched in the area of Adam Lanza's home in Newtown, CT. Kohlhasse began researching the hum in 2009 after renovations were made to the natural gas lines in the area of his home in Brookfield. Kohlhasse began hearing the hum at his home and began researching in areas that may be affected due to location to the gas lines. It is Kohlhasse's belief that Adam Lanza may have been affected by the hum and that the hum may have been a contributor to Adam Lanza's mental state (See attached informational binder).										
CASE STATUS: This case remains ACTIVE pending further investigation.										



not a hoax or random opinion and significant enough to be released to the public in December 2013 along with the investigation files. The files released on December 27, 2013 are under file number 00039290.

Interestingly in the release there is an account of someone saying in the quiet aftermath there was a vibrating and hum sound inside the school. This can be found in the *CT State Police report 1200704559-00258258*. Can't make this up!



After the information release to the public in late 2013, the Newtown Bee ran an article on December 29, 2013: "Brookfield Man Implored Police to Consider Gas Pipeline Syndrome in Lanza Investigation" <http://newtownbee.com/brookfield-man-implored-police-to-consider-gas-pipeline-syndrome-in-landa-investigation/>.

A resident of Newtown by the name of Denis called and told me about the article and told me he suffered from the same exact symptoms I explained in the filing since 2004 and had no idea what it was until this article. After that I visited his home on numerous occasions and confirmed his story. Incidentally, the last major upgrade to the Iroquois system was in 2004 when Iroquois expanded their system from Northport LI to the LIC area of NYC. Which likely explains why Denis began sensing it in 2004, **change** in pipeline operations. Another resident also called and felt it was a possible reason for her son's mental health issues, they lived in the Sandy Hook area and adjacent to the Iroquois line. Is my work a premonition or just coincidence?

Considering I believe these issues are a mental health issue I tried contacting Avielle's Foundation in May 2013 who were working on mental health issues and cases like this. The founder who committed suicide in 2019 was the father of one of the children and a mental health expert. I sent the foundation my information and a copy of Brigitte Berglund's paper -Sources and Effects of Low Frequency Noise:

[https://www.researchgate.net/publication/14558678\\_Sources\\_and\\_effects\\_of\\_low-frequency\\_noise](https://www.researchgate.net/publication/14558678_Sources_and_effects_of_low-frequency_noise).

## Washington DC – Navy Yard Massacre

Looking for answers as to what drove Alexis to his killing spree it was discovered in his writings that, *"An ultra low frequency attack is what I've been subject to for the last three months, and to be perfectly honest, that is what has driven me to this."* Also etched onto the barrel of his shotgun

Soon after Sandy Hook, a "from the grave" testimony came out from Aaron Alex that ELF (ELF = ILFN= The Hum= GPS) to why he shot up the Navy Yard in Washington DC. Prior to this he told the Veterans Administration doctors about, vibrations, hearing voices and the inability to get away from all this. It led to his paranoia, hearing voices, sleep disorders and claiming he was targeted by ultrasonic devices (though this is infrasonic). He claims this led him to attack the Navy Yard offices where he thought the sound source trying to control his delusions emanated from. In his case he lived for years in Hum cluster locations (like most recent murderers) in Seattle, Fort Worth and the Atlanta area. His rage steadily increased moving from location to location. This was assumed caused by PTSD, maybe and maybe not, maybe GPSH was a contributing factor. His confession is inscribed on his rifle "my ELF weapon", "better off this way". Thou reported and probably wrong, extremely low frequency electromagnetic waves, when in fact is that he likely had exposure to Infrasound/ low frequency Hum like millions do!

Navy Yard Shooting Update: Aaron Alexis etched messages into shotgun used in massacre



## Davis CA- Murder of Police Officer

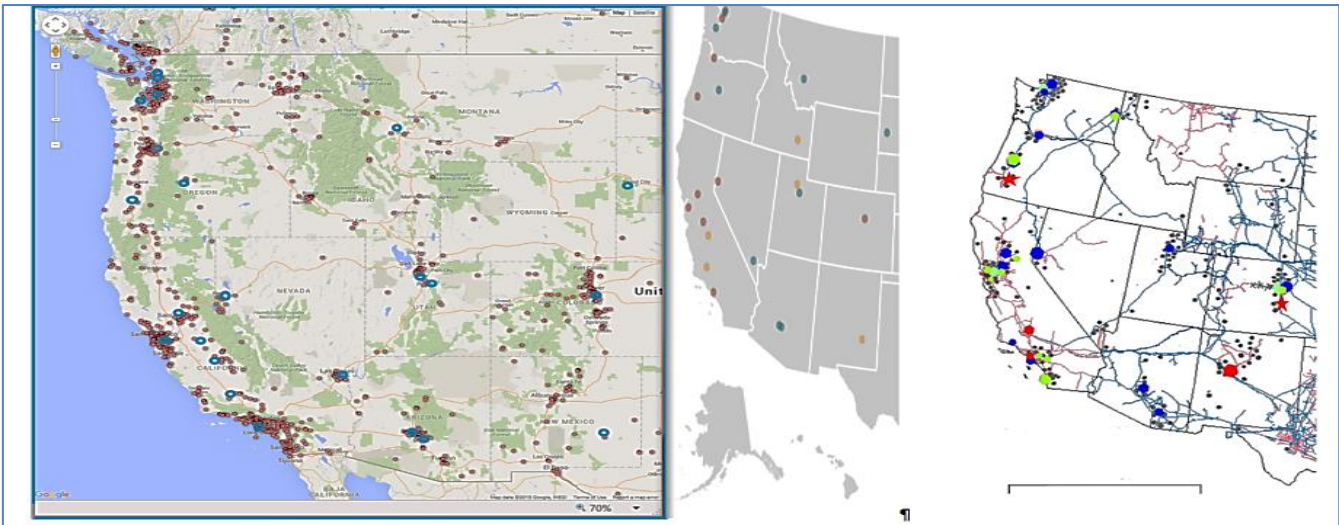
In January 2019 a police officer was murdered by Kevin Limbaugh. He rode up on a bike and in cold shot to death a 22-year-old police officer attending to a car accident. He left a letter in his home that he was being attacked by sonic waves by the police for years to keep a dog from barking. Obviously fragile minded and again no explanation offered by anyone who knew him. But explainable by GPS, as hum reports are shown on my map as well as the hum.info map AND multiple gas pipelines are shown to pass through there according to the NPMS Pipeline Viewer. Regardless of the terms used in the short note GPSH is written all over this!



When new cases occur each is briefly reviewed against the GPSH model. In almost all cases the GPSH model fits, where the attacker mostly dwells at is near pipeline systems and Hum reported areas.

## A Far Larger Problem than Anyone Can Imagine

I did an evaluation to see if there was any over whelming evidence that there is a link between pipeline hum,



pipeline locations and unprovoked attacks and murders. What I found was alarming! Shown is the section of the Western US from the study. Its very obvious there is a correlation of the variables, hum reports, pipeline locations and unprovoked attacks on the public and schools. On the left public attacks (blue points) vs hum reports from the hum.info map, in the middle school shootings since Sandy Hook and to the right an overlay of the combined variables plotted on to my map from Oct 2012 (colored points are attacks, black dots hum reports) through 2015.

## This appears to be the Smoking Gun everyone is looking for!

The Hum reaches almost everywhere in the country and its conditions have worsened over the last 2 decades as its manifestation of Atrocities has as well! Considering no one else has a better explanation the authorities need to stand up and put some serious effort into this issue, and stop addressing the symptoms and not getting to the root cause. People are getting tired of hearing *"there's no way this person was capable of all this"* and others

say ***“there must be something in the water or the air”***. Considering what has been presented about GPSH in this paper it probably is a major contributing factor to this mess where the root cause lies beneath our feet. And where chronic ILFN exposure on **fragile** minds is affecting the brain in some way to bring on a disconnect between reality and make believe. Not displaying any outward tendencies of doing bad things!

Dr. David Fraser, Head of the School of Toxicology at the University of South Carolina concluded that clusters of suicides in the 70's in Medford Oregon were happening in an area his team claimed to be part of Ultra Low Frequency experiments by the military. Never proven, I suggest that the ULF he claims is in fact the early signs of GPS!

Investigators need to start looking at the factors of GPSH of the individuals doing this. Mental health issues drive the emotions and thinking of people who are the ones that pull the trigger or swing the blade. Blaming and controlling weapons may help, but solving these mental health issues caused by GPSH may result in far better outcomes. Be it rage, lack of emotion, radicalization, etc. everything is tied to the brain and mental health of the person! Investigators need to be knowledgeable and trained to assess for GPS, investigators need to inspect and access for these conditions in places frequented by the accused. Simply someone saying they don't hear the hum isn't enough to determine if the same conditions like those Lanza, Alexis and Limbaugh aren't affecting them. With questions aligned to asking the right questions their friends, family members and neighbors need to all be interviewed. Testing for the conditions must be done as well as participation of someone who is a hearer and knowledgeable about GPS.

The information covered here has been given to authorities and agencies at the State and Federal levels including the FBI and the CDC. My opinion is that I would be more concerned about those that aren't aware of this than those mine canaries who are. The canaries have something to blame other than demons or someone else for their issues.

And our elected Representatives obviously do not want to divert attention in their efforts for gun control as the where with all answer to all this insanity occurring. But every time another occurrence of this happens, they need to look at it with an eye towards the information brought forth in this section to look into those that do not fit into some other explanation like terrorism or criminal activities!

## **Section 16- Is there an ILFN Imbalance in Natures Sensory Ecology**

### **Questions of Consequence**

This section falls into a category of “out of the box” screening research into the plausible unrealized impacts associated with GPSH. There is enough evidence and supporting scientific research to warrant more research.

### **It’s all about the Base- Could any of these be associated to GPS!**

So, with all these pipeline systems and other infrasound sources expanding their spheres of influence the obvious question that comes to mind is what impact on Mother Nature these conditions have on the **Sonic Sensory Ecology** of nature. It is possible that in my assessment that some of the articles may have been taken out of context and application of the research not particular useful. However, that application is left to the experts, as this is meant to reveal the potential consequences of GPSH in nature.

Animal and insect species communicate and some navigate using infrasound. Many exhibit behavioral changes like our pet dog reacting to the hum and thunder. As pipelines are installed in remote areas away from people, there could be extreme levels of ILFN we aren’t aware of, but the creatures that live there just might be. It’s like the preverbal question “does a tree make noise when it falls in the woods and no one is around”- yes. The conditions are happening in the most pristine parts of the country where these huge pipelines pass through areas and wildlife habitats where they are the only thing around. It has also been established that changes to the infrasound environment change natures balance and natural rhythms. So, what’s to say that the ILFN increases from natural gas pipelines as GPSH aren’t changing the acoustic environments on land as well as in the sea and air?

The challenge trying to get help from academia and state environmentalists are number 1, I am not a biologist and number 2, and they seem not to think beyond the popular causes such as global warming and pesticide use. I’ve contacted people at Bucknell, Penn State, UConn, Cornell and Federal and State agencies such as the CTDEEP, ARS @ USDA, and USFWS about GPSH and none have given this any thought.

There is ample evidence to suggest gas pipeline syndrome is in some way contributing to some of the problems and unexplained changes we see occurring in nature recently. There are just too many correlations and supporting research to through the baby out with the water: <https://www.wind-watch.org/documents/low-frequency-noise-and-infrasound/> . In 2006 author Ivan Buxton nicely summarizes facets about Low Frequency Noise and Infrasound and some possible causes and effects upon land-based animals and freshwater creatures: [http://wiseenergy.org/Energy/Health/Infrasound\\_and\\_land\\_based\\_animals.pdf](http://wiseenergy.org/Energy/Health/Infrasound_and_land_based_animals.pdf)

*The following issues facing animals and insects have made the news and like the human health issues discussed earlier appear to correlate to GPS*

### **Brown Bat WNS (White Nose Syndrome) –**

GPSH is an acoustic/ vibration phenomenon. When I began considering the impacts of GPSH on the top 10 modern day scourges affecting animals and insects, I came to considering the White Nose Syndrome WNS problem. I made a number of calls and talked with Carl Herzog the Bat expert from the NYDEC.

We talked, he provided a lot of information but for the purpose of my inquiry the point he made about the unexplained winter activity of bats at the entrance of their hibernacula when they should be in torpor peaked my interest and led to my hypothesis pipelines near these locations could be causing a vibrotactical condition of the perches of the hibernating bats in the roost area that awakes the bats, causing them to fly and lose an replaceable stored body fat, become frail and in turn like any other creature this reduces their immune system making them susceptible to things normally they are not. In this case the bacterium/ fungus to be suspected of causing WNS. Recovery and the stop of the spread impossible

In talking with the CT DEEP biologist of course she made it clear, their position is that the fungus is the root cause of the disease and GPSH has no contribution! Not sure how they can just throw out this revelation without investigating it!

Merlin Tuttle: How Disturbance Harms Hibernating Bats

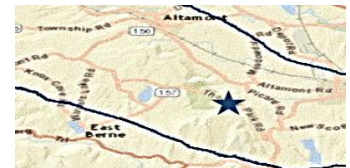
<https://www.merlintuttle.org/resources/disturbance-harms-hibernating-bats/>

Effects of Disturbance on the Energy Expenditure of Hibernating Bats

J. R. Speakman, P. I. Webb and P. A. Racey: [Effects of Disturbance on the Energy Expenditure of Hibernating Bats on JSTOR](#)

I have collected some data that shows Hum reports in proximity of many of the reported WNS cases from around 2011 when I was doing my evaluation/ hum mapping / pipeline location/ WNS cases that certainly suggest I am onto something. To the extent I could spend time on this, I found some locations of WNS that don't fit the model. In those cases, I suggest community spread from bats travelling to Hibernation sites from the original source areas to locations pristine of the Hum and pipelines. Bat Conservation International- Tuttle/ Stevenson: <https://www.batcon.org/article/how-north-america/>

The original area of focus I had was the area where the first WNS cases were reported, Halle's Cave in Schoharie County NY. What I found was the cave is straddled by two HP gas lines, including one of the same ones (IGTS) that makes its way to my neighborhood in CT.



Spelunker's report strange hums in many of the caves they go into, so we can take it from that there is LF noise, but is it natural or from a manmade source? I have searched for any study work in this regard and have found none. There are studies for anthropogenic noise and higher frequency disturbances of bats but none about these ILFN conditions:

<https://jeb.biologists.org/content/jexbio/217/7/1072.full.pdf>

Anthropogenic noise from gas wells is discussed regarding foraging, why not applicable to disturbance in the hibernacula: <https://www.sciencedirect.com/science/article/pii/S235198941400064X>

Much more expertise work needs to be done but without published knowledge of this unknown about environmental stressor no one will ever consider it in this regard

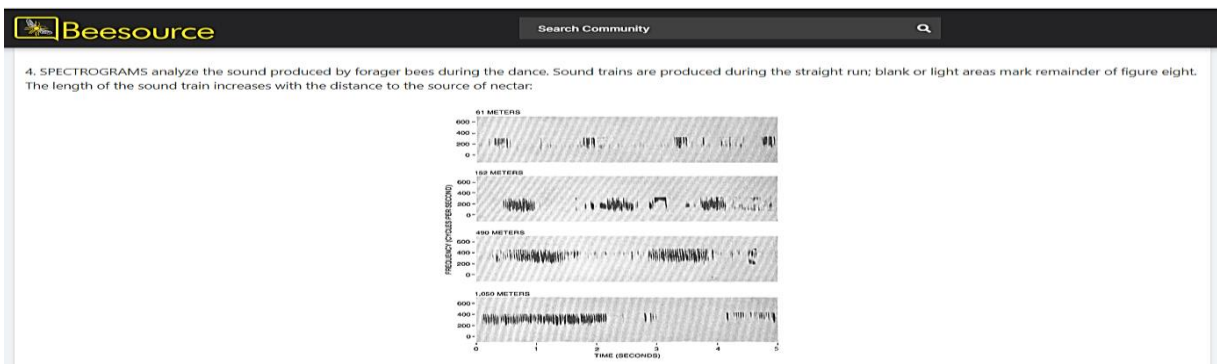


## Honey Bee CCD-

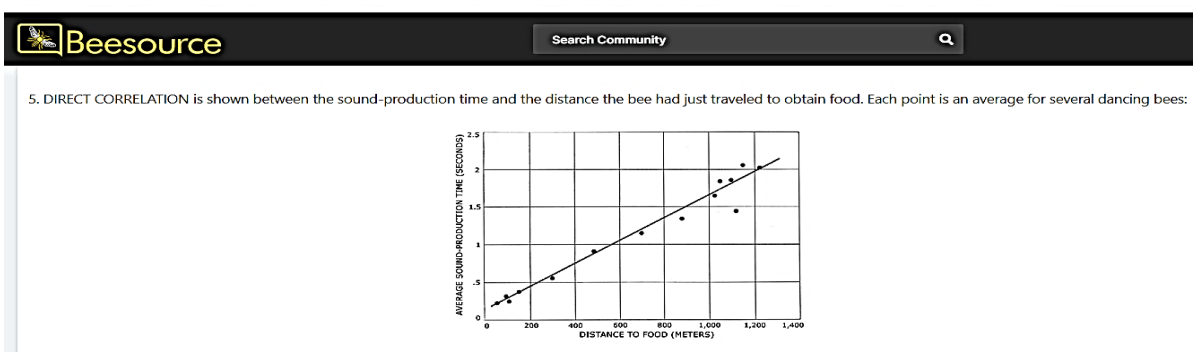
There is a growing problem where worker honey bees leave the hive and do not return called Colony Collapse Disorder. No definitive reasons have been found, but the popular belief is that pesticides and mites are the reason. With what I have learned about GPSH and an inquisitive approach I believe the researchers are potentially missing a key contributor to the problem, ILFN conditions that are causing similar conditions inside the structured hive like that in our homes. To test this hypothesis, I measured conditions inside a mockup of a structured hive and other small wood enclosures like a drawer show hum patterns just like those measured and observed in dwellings and cars. Inside the dark hive, Honey Bees communicate direction and distance to forage for pollen sources by doing a waggle dance, vibrating their thorax around 18Hz, and generate a series of intermittent sounds at 32 Hz to communicate distance using sound trains



AM Wenner found that foraging distance is communicated directly by the time length of sound trains between the bees doing foraging.



Corelation of the time of the dashes to the distance foraged



### Sound Communication in Honey Bees

<http://beesource.com/point-of-view/adrian-wenner/sound-communication-in-honeybees/>

### Sound Communication in Honey Bees- support material

(<https://beesource.com/point-of-view/adrian-wenner/sound-communication-in-honey-bees-support-material/>) (refer to illustration 4 in the linked document for the chart shown here)-.

In 1964 when this work appears to have been done there was no consideration for CCD or how external conditions from something like GPSH might affect critical life process communications in honey bees.

My theory is that acoustic conditions set up like our homes, vehicles, etc. of the hum inside the hive which interferes with the communications between bees used to communicate foraging distance. This uses a series of spaced dashes. This natural sequence is artificially over powered by continuous hum vibration and sound masking (blue arrow overlaid on the lower section of the time scale chart). This comes across to the bees inside the bee community to go forage infinitely far away from the hive, from where they don't return.

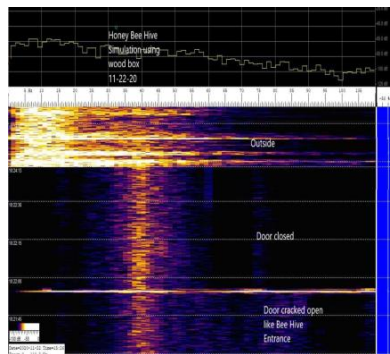
This could explain why very few bees are in the hive and why very few are found at all, not even dead near the hive. The usual culprits of vermosa mites, pesticides and climate change may be missing the key link to what is the root cause behind CCD! Sound/ Vibrations are very important aspects of the Bee colony. Bee hive health can even be monitored by vibration metering:

<http://www.beeeculture.com/catch-the-buzz-vibrations-in-a-colony-tell-a-story/> .

Detecting bee hive behavioral changes through frequency and signal audio files

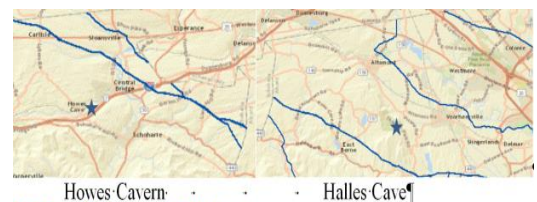
[http://libres.uncg.edu/ir/asu/f/Wilson\\_Preston\\_August%202019\\_Honors%20Thesis.pdf](http://libres.uncg.edu/ir/asu/f/Wilson_Preston_August%202019_Honors%20Thesis.pdf).

I recently redid a test to simulate a structured honey bee hive by dropping a Shure Beta 52 microphone into the box to see what the interior spectral conditions are inside something similar to what bees would experience. The hum in my home this day was around an 8 out of 10. The spectra graph shows outside conditions outside of the box, fully closed and box door cracked open similar to a bee hive entrance and Helmholtz resonator. The test again confirmed that inside the box a narrow range of sound pressure and likely a LF sound occurring inside the box like our homes.



Frustrating is the lack of importance of those this has been brought to the attention of including individuals at Bucknell, Penn State, UConn, CTDEEP, ARS.USDA, USFWS and a host of others

Anecdotally when I was discussing my idea about a link of the Hum to CCD, I mentioned that WNS was originally uncovered at Halles Cave near Howes Cavern in NY and how I felt GPSH applied to hibernacula disturbance of bats from pipelines and the IGTS line installed and put into operation around 1991. She piped up and told me she uses to summer as a kid with an uncle near Howes Cavern in upstate NY, who had honey bee hives. She remembered the uncle's hives failing and thinking it was some sort of contagion. He burnt the hives, replaced them but the bee colony never



reestablished with him giving up likely due to the continuance of the ILFN problem. I was astounded! This appears to be a good case to suggest the Hum needs to consider as a root cause in CCD.

## The Effect of Continuous Vibration on a Colony of Honey Bees (abstract only)

<https://www.researchgate.net/publication/288127914> The Effect of Continuous Vibration on a Colony of Honeybees

A good overview about Bee Acoustics from an article about monitoring a bee hive health using acoustics  
<https://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2020/4509-2020.pdf>

Acoustic analysis of bee behavior [http://www.beehacker.com/wp/?page\\_id=103](http://www.beehacker.com/wp/?page_id=103)

[Noise pollution from gas compressors changes abundance of insects, spiders – Florida Museum Science \(ufl.edu\)](https://www.floridamuseum.org/news/2022/05/noise-pollution-from-gas-compressors-changes-abundance-of-insects-spiders)

Extremely Low Frequency Electromagnetic Fields impair the Cognitive and Motor Abilities of Honey Bees: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5962564/>

Changes in Honeybee Behavior Parameters under the Influence of the E-Field at 50 Hz and Variable Intensity. Though this work is EMF based, I suggest the applicability of this applies to the sonic environment and at different frequencies that warrant study.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7909437/>

Again, much more expertise work needs to be done but without published knowledge of this unknown about environmental stressor no one will ever consider it in this regard

## Long Island Sound Lobster Population Collapse-

The eco sensory habitat of the LI Lobster was modified when Iroquois began operating their 24-inch line between CT and LI NY in 1991 and subsequently routed to the Bronx (Hells Gate/ LIC) in 2004. Operations were changed in 2009 as part as part of the expansion of the IGTS and AGT systems then that I believe brought on my onset of the conditions.



I evidenced the hum while inside the lower-level cabin of a docked yacht in New Rochelle NY in very close proximity to the pipeline section to the Bronx. Could it have been from other boats, maybe, but the sound was different than that but very similar to the Hum heard elsewhere. BTW this is one of the same gas transmission systems located near Halle's cave in Schoharie County and near my home discussed above in regard to WNS and CCD.

**Marine biologists** know that Lobsters get stressed out in the presence of these type conditions causing them to become infertile and get thinning of shells. Lobsters generate their own body LF vibration that is not understood that I suggest a disturbance of the sonic environment may affect them. Lobsters are extremely sensitive to vibrations causing effects on their statocyst according to the BOEM (bureau of oceanic energy management-see pg. 56) <https://www.cbd.int/doc/meetings/mar/mcbem-2014-01/other/mcbem-2014-01-submission-boem-04-en.pdf> .

LI Sound is not the only problem area where pipelines need to be investigated for lobster problems, another location is Buzzards Bay in MA. This incidentally is near the AGT system.

Again, more food for thought!

## Increased shoreline activity of Sharks and Whales and beaching's of Oar Fish and Dolphins-

Disruption of the sonic environment of animals/fish that use ILFN for guidance, locate prey from high sound levels of new occurrences of manmade acoustic pollution like GPSH caused Hum may be changing natures sonic balance. **The hum.info** map shows there is extensive Hum along the coast lines. As discussed in the last bullet point, the BOEM as well as volumes of other research papers talk about how Sharks are attracted by LF pulsing sound. So why wouldn't they be drawn to the same conditions we as humans are experiencing as the hum and vibrations? I could not find research specific to testing of a source of continuous ILFN like GPS.



A documentary called "Sonic Oceans" had a segment where it was suspected the ILFN beats of ceremonial drummers on a beach in South Africa may have contributed to the increase in the presence of sharks the shoreline. It is very plausible that land based ILFN conditions are acting as the "Sirens" in Greek Mythology "calling" these creatures closer to the shore where these sources are and there are plenty of reports of the Hum.

Whales and Dolphins communicate and take direction using sound. Oar fish are known to only habitat deep ocean waters but for some unexplained reason they are being found in CA shallow waters and washing up on the beaches, where again there is a massive amount of hum reports and natural gas pipeline systems that span most of the coast line.

All of these strange changes in behavior have yet to be truly explained beyond the classical villains such as global warming and pesticides.

The Discovery Channel ran an episode about "Death Metal" where LF music was used to attract Great White Sharks! Bird, Lewis and Waller found that sharks were attracted by LF irregularly pulsed sound between 20- 60 Hz was very effective attracting the species shark studied. **To that when the spectrogram of the Hum is analyzed it is very apparent the Hum sound and therefore the vibrotactical conditions are a dysrhythmic pulsation of a narrow range of LF band sound!** Effectiveness of low frequency sound attacking sharks [http://ocr.org/ocr/wp-content/uploads/Myrberg\\_Sound\\_attracting\\_sharks.pdf](http://ocr.org/ocr/wp-content/uploads/Myrberg_Sound_attracting_sharks.pdf)

[ORIENTATION BY MEANS OF LONG RANGE ACOUSTIC SIGNALING IN BALEEN WHALES - Payne - 2006 - Annals of the New York Academy of Sciences - Wiley Online Library \(archive.ph\)](#)

Quite intriguing and probably no one is aware of and it would be too out of their “lane” to consider this as the reason to the increase in sharks along many shorelines that still is not explained why by the experts! The experts are even considering how global warming of the oceans will affect acoustic propagation of sound in large bodies of water. Maybe this has some role in the changes in the actions of animals in the sea.

## Homing Pigeons, Blackbirds and Fish kill Offs

Giving everything that is unexplained and coincides with timing and location of GPSH I considered a happening that occurred in Ark. GPSH may have caused blackbirds fall from the sky and fish die offs that have not been explained. Where these occurrences are there are gas pipeline systems. There are some Hum reports also. GPS’s un-natural infrasound conditions turn up and down like a radio. Explaining why we see the randomness of the havoc to the sensory ecology. Homing pigeons have been studied where man-made infrasound confuses their navigation instincts.

<https://cerebrovortex.com/2012/11/08/pigeons-seeing-with-sound-the-perception-of-infrasound/> .

The Blackbirds falling from the sky may have been confused in Beebe Arkansas and the fish sensed the conditions and reacted in some way. These occurrences were within a day of each other and have the same pipelines in the area. Many pipelines pass through each location in droves.



## Habitat abandonment-

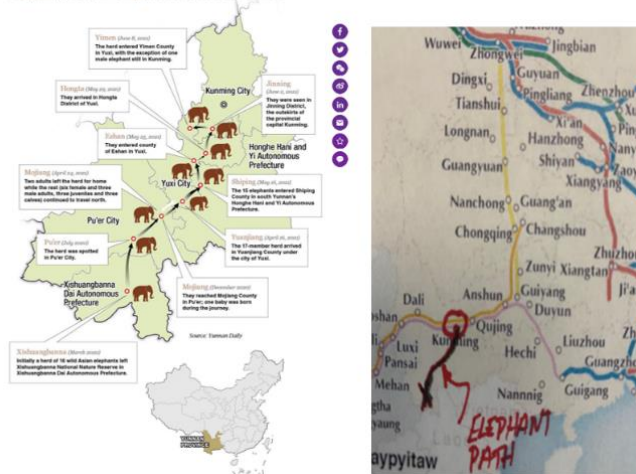
As earlier noted, our pet dog suffered severely from the Hum. Could the occurrence of coyotes leave the area and acting weird at the same time could have been a result of the increasing ILFN?





## China Elephant Journey

Elephants on 500km migration northward in Yunnan



The hypothesis is that due to the rapid expansion and combining for China's natural gas transmission pipeline system the same ILF sound and vibration discussed herein, is a newly introduced "harm to the sonic ecology" for animals that are very dependent on ILF sound. The elephants have been travelling in the direction and over the pipeline system in Yunnan Province.

Mystery of elephant infrasound revealed;

<https://www.youtube.com/watch?v=uQfDazQ9Rkg>

Studying Elephant Communication

<https://www.youtube.com/watch?v=nII9yngRuac>

## Havana Syndrome

Havana syndrome started making the news in late 2016. A year ago, I surmised as others also, that the conditions sounded like the same as the Hum. A brief explanation why these locations covered in the media fit the GPSH model, much more than impossible microwave weapons.

[https://urldefense.proofpoint.com/v2/url?u=https-3A\\_www.cbsnews.com\\_news\\_is-2Dan-2Dinvisible-2Dweapon-2Dtargeting-2Du-2Ds-2Ddiplomats-2D60-2Dminutes-2D2021-2D06-2D27\\_&d=DwIFAg&c=G-megwQ-UvwARL-JwyT44A&r=QEC7WQBw-X5P\\_tUPVSexLn-0HAj9f0upeq7DI5C5qWE&m=7jzP9uNGLmQEFcLQ-3TZEur9MTw61PZZOxKVe6\\_RvPY&s=9ukabazOF3QbMVVDdVDkL-Qzr4xPsOY49mJolnMUZDc&e](https://urldefense.proofpoint.com/v2/url?u=https-3A_www.cbsnews.com_news_is-2Dan-2Dinvisible-2Dweapon-2Dtargeting-2Du-2Ds-2Ddiplomats-2D60-2Dminutes-2D2021-2D06-2D27_&d=DwIFAg&c=G-megwQ-UvwARL-JwyT44A&r=QEC7WQBw-X5P_tUPVSexLn-0HAj9f0upeq7DI5C5qWE&m=7jzP9uNGLmQEFcLQ-3TZEur9MTw61PZZOxKVe6_RvPY&s=9ukabazOF3QbMVVDdVDkL-Qzr4xPsOY49mJolnMUZDc&e)

In 2016 the **International Tinnitus Journal** published a paper reporting that many cases of tinnitus are linked to the LFN heard around the world known as the hum or Taos Hum.

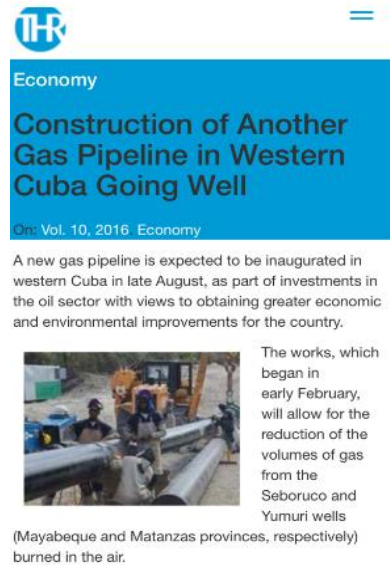
<https://www.tinnitusjournal.com/articles/manifestations-of-a-lowfrequency-sound-of-unknown-origin-perceived-worldwide-also-known-as-the-hum-or-the-taos-hum.pdf>

## Cuba

Recently, I learned from a seriously impacted GPSH (vibration) new friend in Mendon MA about articles that Cuba installed a new natural gas/ gas transmission line that went into operation just prior. [Cuba: New Gas Pipeline to Impact on Fuel Saving - Cuban News Agency \(acn.cu\)](#) .This gave

more credence to the hypothesis. I also did not buy into microwave invisible weapons like those discussed on Pelly's 60 Minute show in June 2021 and nor that it is intentional. The same story of GPSH can be made.

[Claims of Secret Microwave Weapons Causing 'Havana Syndrome' Don't Add Up Scientifically \(foreignpolicy.com\)](#)



Homeland Security News Wire

## Homeland Security News Wire

BIOMETRICS BORDER/IMMIG. BUSINESS CYBERSECURITY  
PUBLIC SAFETY PUBLIC HEALTH REGIONAL SOLUTIONS

### ARGUMENT: Microwave weapons Claims of Microwave Attacks Are Scientifically Implausible

Published 14 Mar 2021

Allegations about microwave attacks on U.S. personnel have been reported regularly, some going back decades. The recent wave of reports started in 2016, with reports from the American and Canadian diplomatic missions in Havana, hence the name "Havana syndrome." "Here's the problem," Cheryl Rofer writes. "Aside from the reported syndromes, there's no evidence that a microwave weapon exists—and all the available science suggests that any such weapon would be wildly impractical. It's possible that the symptoms of all the sufferers of Havana syndrome share a single, as yet unknown, cause; it's also possible that multiple real health problems have been amalgamated into a single syndrome."

"It's an act of war," said Christopher Miller, former President Donald Trump's last acting secretary of defense. He was talking about alleged attacks on diplomatic and intelligence personnel by an unknown microwave directed-energy weapon. Cheryl Rofer writes in *Foreign Policy*, however, that before the United States declares war on the unknown enemy wielding that weapon, we should know what it is—and whether it exists at all.

Rofer notes that allegations about microwave attacks on U.S. personnel have been reported regularly, some going back decades. The recent wave of reports started in 2016, with reports from the

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## China

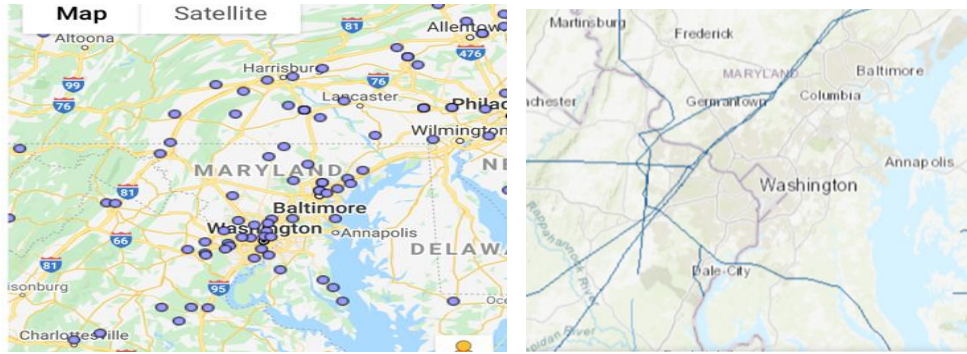
China's recent surge and massive expansion to their high pressure natural gas pipeline systems has begun to "sing" the ILFN just as it has in the rest of the world over the last couple decades. Both embassy/ consulate locations reported to have harmed diplomats in Beijing and Guangzhou. Basically, the argument that GPSH is the cause of the sonic conditions reported about in the news and for whatever reason these folks were seriously affected (valid reasons or not)

<https://asia.nikkei.com/Spotlight/Caixin/China-s-new-pipeline-network-shakes-up-its-natural-gas-dynamics> [asia.nikkei.com]



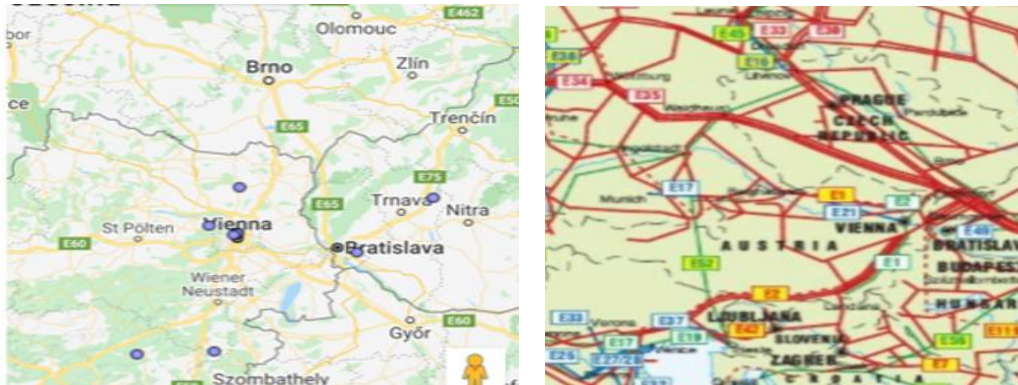
## Washington DC

The thehum.info map shows many hum reports. Washington DC has 3 sides of it passed by interstate high pressure natural gas lines. The GPSH model fits!



## Vienna

The thehum.info map shows a few hum reports. The Vienna area is saturated with high pressure natural gas lines. The GPSH model fits!



Once again, I suggest that researchers take the time and interest to understand what GPSH is and apply that learning to their study and not just randomly discard this theory since they haven't truly found the root cause to these issues!

## **Section 17\*- Could Pipeline Integrity and the Energy Balance of the Earth's Crust be Compromised**

### Questions of Consequence

This section falls into a category of “out of the box” potential of the unrealized impact that may be associated with GPS. There is enough evidence and supporting scientific research to warrant more research.

### **Possible AIV/ FIV Induced Pipeline Failures**

After the San Bruno explosion in October 2010, I had a heightened level of concern about Acoustic Induced Vibration (AIV) causing pressure containment pipeline failures. I expressed this to the gas companies who were getting annoyed with me by then. They decided to do in situ stress testing at spots in their pipelines to assure me their lines were adequately safe. Which I never asked for, but this is what they did. I suggested the acoustic conditions causing the Hum might lead to the occurrence of cyclic conditions that are known to cause fatigue fracture in metals. And this unknown was yet another reason to get to the bottom of the source of the Hum Problem is what they did does not answer the fatigue question, it only addresses the stresses of operating conditions inside the line. In order to do fatigue testing requires destructive examination by cutting out test coupons and bringing to a lab. As before Iroquois and Algonquin made it very clear they were not doing this testing because of the Hum. As expected again, it did show the pipeline was operating within allowable stress parameters.



Since I began focusing on Natural Gas Pipelines, I notice there are a lot of pipeline failures that I was never aware of. So, having been deeply involved with these systems in my career I look into the possibility that the internal conditions of the Hum might have some plausible contribution in these failures. AIV/ FIV are issues of Acoustic and Flow Induced Vibrations that lead to metal fatigue of the pressure containing vessel, in this case the pipelines. In my career I learned a lot about stress and fatigue of metals

from experts and the consequences of “cyclic service” conditions that lead to failure from something called fatigue fracture. It is so important in the design of equipment in industry that the ASME includes special design guidance in its Pressure Vessel and Piping Standards, there to avoid the disastrous consequence of fracture. This is critical with older high carbon containing steels pipes and vessels. The conundrum is these cracks occur in the absence of high stress and propagate at the speed of sound. Can the hum be a harbinger of a greater problem in the pipeline systems?





Interesting, as I began looking for information to see if the Hum was a more expansive problem than just here in CT, I came across one of the first posts from a guy in Sunnyvale CA complaining about the Hum, incidentally posted prior to the San Bruno pipeline rupture in



Figure 2-1. Accelerometers and Strain Gages on the 28 Inch Pipe



Sept 2010. I advised the NTSB, FERC and the gas companies of this correlation and the technical reasons behind such claims. At that time, I guess they were concerned to cover their liabilities and Iroquois and Algonquin Gas decided to do “stress and vibration” testing on each line. They hired Southwest Research Institute (SWRI) and Kiefer & Associates to do in situ testing of the 3 lines here in Brookfield. **Investigating about the Hum was explicitly not the purpose of the testing!** As can be expected from the type testing, they were doing everything was within acceptable limits. The problem is, even though this isn’t the acoustic investigation I was looking for, failure modes seem in many of today’s failures are fracture. To test for accumulating strains that lead to fracture requires destructive testing done by cutting sample coupons from the shell of the pipe AND has to be done where there is a concern of failure. They weren’t about to do that for many reasons. The results are meant to appease the question are they running their systems safely.

Steve,

IGTS has just finalized the details for the testing to be performed by SWRI on Iroquois' line. We are coordinating with AGT and will perform our testing in the same timeframe. Just to clarify, this data collection and analysis is being conducted to verify the safety and integrity of our system. Although we are confident that there are no integrity or safety issues, we are moving forward with this very conservative approach to alleviate landowner concerns.

The work being performed by SWRI is that of data collection only – this data will then be analyzed by industry experts. Therefore, no data will be provided until the study has been completed. While it will be necessary for you to confirm that you are experiencing the “hum” issue prior to the monitoring being initiated, we request that all questions be directed to Iroquois and/or AGT and that the consultants be left to their responsibilities.

Acoustic Induced Fatigue (AIV) <https://pipingtech.com/services/acoustic-induced-vibration-aiv/>

SWRI- Acoustic Fatigue in turbo compressor and pressure reduction systems

<https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/163410/Vol27013.pdf?sequence=1&isAllowed=y>

AIV and FIV research is ongoing in regard to process facilities including chemical, LNG plants as well as refineries. What is to say they are aren’t missing an entire industry where there is high risk and tens of thousands of miles of old Gas Transmission systems in people’s back yards. Piping susceptible to vibration: AIV/ FIV (2016): <https://www.youtube.com/watch?v=LZuPj9LfI00>. Note – in the presentation it mentions the same thing I am suggesting as one for the causes of the Hum- increased flows above the original design criteria. Another session from 2020 on the same subject (2020): <https://www.youtube.com/watch?v=mfEHS2szdXo>

Piping Systems susceptible to vibration: AIV / FIV

### Vibration induced fatigue failure in Piping

The sequence of the failure due to vibration induced fatigue is as follows:

- Vibrations cause **dynamic stress cycles** in the piping.
- The stress cycles initiate the process of a **fatigue crack**.
- Fatigue cracking, if unchecked and after a number of cycles, can lead to through **thickness fracture and subsequent rupture**.



For those looking to investigate further, access a copy of the paper referred to in the You Tube video above  
Energy Institute- Guidelines for the avoidance of vibration induced fatigue failure in process pipework  
[https://publishing.energyinst.org/\\_data/assets/file/0007/568501/Pages-from-PDFSubsea-AVIFfjk.pdf](https://publishing.energyinst.org/_data/assets/file/0007/568501/Pages-from-PDFSubsea-AVIFfjk.pdf)

The ASME Pressure Vessel Code for fabrication and modification of pressure vessels under cyclic conditions to avoid fracture potential. Section VIII, Division 2 of the ASME Boiler and Pressure Vessel Code (ASME 2010) which defines fatigue as “... conditions leading to fracture under repetitive stresses having a maximum value less than the tensile strength of the material.”

ANSI B31.3 ASME Piping Code addresses design considerations of severe cyclic conditions

### **So why isn't there sensible tactile vibration at the pipeline?**

A study by Emerson Controls at Noise Con 2005 shows how the prediction of external sound based on vibration at low frequencies is not meaningful. Conversely this means there is an absence of vibrotactile pipeline vibration where low frequency sound is radiated. This explains my observations why there were no apparent surface vibrations of test pit standing water when Iroquois and Algonquin in 2010. I did not venture into the excavation to touch the pipe. And the Hum was in my home and not sensed outside.

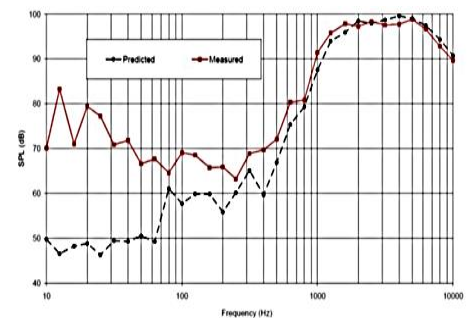
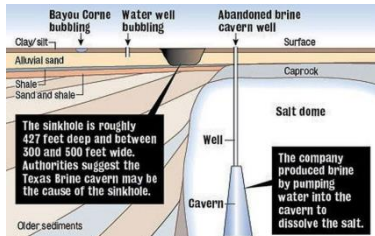


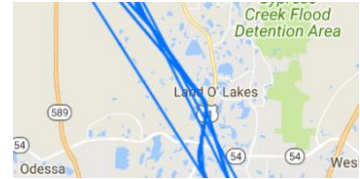
Figure 3: Comparison of the measured and predicted external sound level.

## Possible Acoustic Liquefaction of Soils

### Sink Holes, Ground Sinking



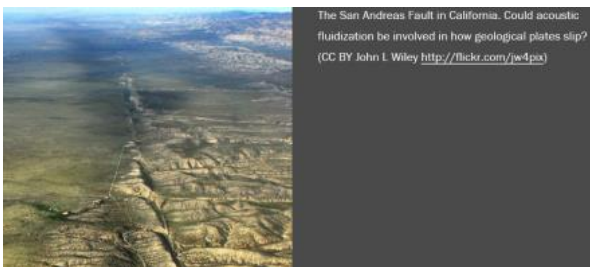
The stability of soil structure can be weakened and liquefied like working concrete using a cement vibrator in construction. On a cursory look it appears there are correlations between pipeline locations and sink holes and geology.



It appears where these sink holes are increasingly occurring there are Hum reports and pipelines. It is reasonable to think that the sound waves could be coupling with the cavities below ground and causing sufficient sound pressures to liquefy susceptible type soils. Recent cases to do additional research on are sink holes in Assumption Parish Louisiana in 2012 where a high-pressure gas line passed over gas storage salt dome and a sink hole in Lake Padgett-Land O Lakes Florida in 2017. As the map shows, this area in FL has at least 4 major natural gas lines. Consider the sound waves and the interaction with the geology to be the mechanism that causes the particles of sand to mildly vibrate in this You Tube demonstration of the effects of seismic conditions of earth quakes. Use some out of the box thinking:

<https://www.youtube.com/watch?v=Kkgt-cPjBwA>

### Possible Earth Tremors in Untypical Locations



Another question that needs to be addressed does the sound pressure of the seismic like Longitudinal/ Rayleigh/ Love waves upset the natural balance and stability of the earth? Like sensible and visible manifestations of the hum discussed in this paper, might this phenomenon play a role in earth tremors in locations generally not prone to them and the increased occurrences in places that occasionally do

experience them and popular reasoning now is it from high pressure fracking for oil and gas?

It is not beyond reason that earth tremors could be triggered by sound energy that upsets the tectonic balance leading to earth quake tremors such as those observed in areas of fracking and in areas like CT where the only sub surface operation are the high-pressure natural gas lines:

Could the acoustic conditions of the sound pressure be the catalyst behind mild earthquakes:

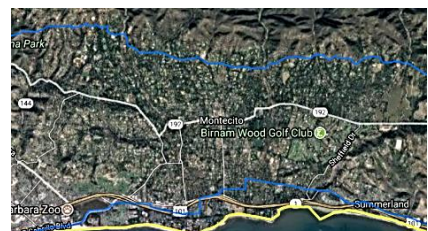
<https://physicsworld.com/a/earthquakes-could-be-triggered-by-sound-waves-that-fluidize-faults/> .

<https://www.sciencedaily.com/releases/2008/01/080103124649.htm>

[Sound Waves Can Trigger Earthquake Aftershocks -- ScienceDaily](#)

### Possible Catalyst for Landslides

The same can be said of landslides as sink holes and earthquakes. The root cause of the Hum is the vibrotactical effects of sound waves on



solids. Besides the extreme amount of rain and water another phenomenon may contribute to exasperating the problem of landslides in areas where it is suggested that GPSH is occurring. The hum.info map shows Hum is reported in the Santa Barbara area as well as Montecito where there have been news worthy slides recently.

## **In Conclusion - This is the way I see it!**

This is the way I see it. Regardless if this problem is ever addressed and mitigated, it is important in to raise awareness of the consequences of chronic exposure to the Hum and vibrotactical sensations. I have attempted to factually investigate the problem and bring forth reasons why the general public should be concerned. Some of the reasoning and conclusions are hard to grasp and at this point likely best left to accredited organizations to bring the problem to a head as it is apparent, the average citizen is not being heard!

### **Next Steps**

- Confirm repeatability of my field data and other research uncovered in my investigation

### **Key takeaways**

- Almost everywhere I have travelled in the US and Canada since 2009, I have experienced this same hum, only varying in intensity and the other conditions sensed.
- Thou people have different experiences as to the way they sense the conditions; high pressure natural gas pipeline systems are almost always in proximity.
- The claim that the Hum is different around the globe is likely incorrect. It's just that there are different observers with different physiologies.
- The conditions are measurable and manifest themselves visibly and almost always more so reported to be inside of structures like dwellings and vehicles.
- The conditions are consistently worse late at night and early in the morning where anthropogenic noise is lesser and the pipeline operators are line packing gas.
- Chronic exposure to these conditions is a human health and natural agent of harm.
- The belief that only 2-5% of the population are bothered by this is likely a misnomer.
- There is something **surreptitious** why this has been taken seriously by the government
- It is conclusive that the increased demands on gas transmission have triggered the Hum and are truly the only rational link to the global problem.
- And there is enough information to all but conclude that this is an Agent of Disease in humans and is contributing to in a sonic imbalance in nature.

### **In addition**

- It is time that the stories in the media about the Hum begin to discuss that serious research and cooperation must be undertaken in order to sort out the facts and fiction behind this.
- **Any study into sources of the hum must consider GPS**
- **Unexplainable health, mental health and un- natural occurrences in nature need to consider GPS. Examples are misdiagnosis of ear ringing, balance issues, fibromyalgia type symptoms, heart issues, ebeven cases like the unexplainable twitches in girls in Le Roy NY, Havana Syndrome, etc**

What is left at this time is to Proof Out the Theory! But before this can happen the government must admit there is a real threat to society here. And unfortunately, the fact of the matter is until the public demand's attention, nothing will get done.

## **What is Needed for a Proper Investigation?**

**Phase 1** Sufferers Initial Assessment- As explained previously, a basic acoustic mapping to do a high-level verification that the type hum is the type of GPSH and to do a high level evaluation of an attenuation pattern of ILFN spectra and sound observation of high pressure natural gas transmission pipelines (or other liquids) within 20 miles of the receptor location. Likely to be done by people who are inexperienced doing this, so some mentoring on the use of simple tools would be advised. Get engagement of a government or academia sponsor who can get the necessary resources involved for an unbiased technical team.

**Phase 2** Assemble a technical team comprised of SME's, a small group of forward looking hummers and equipment that can analyze the conditions on a 24/7 period and have recording capability for at least a month period.

**Phase 3-** Enlighten the team of what's been done and what needs to be done to factually do an Unbiased Investigation.

**Consider how many people are truly impacted using the 2-4% opinion. Then based on the Global map a conservative position is that 25% of the area in the US has the Hum. Of a population of 330 million suggests that over 1.64 to 3.28 million people are impacted! If this doesn't say "epidemic", then what does! Globally the numbers only exasperate the need for investigation!**

**Everyone needs to assess what is covered in this paper. And then ask themselves if they truly care. I suggest anyone that was affected by the actions of Adam Lanza consider this?**

*"Caught in this titanic crossfire, humanity is only beginning to feel the first deadly embrace of a world-condition which may prove to be terrible in consequence. The HUM is the first evidence of this struggle. Indeed, we are witness to dynamic energies whose essential characteristic is biological and conscious in nature. For those truly devoted to the possibility of developing a bio energized and geoconscious technology, these findings could not have arrived at a more opportune moment in history. Nevertheless, if the HUM phenomenon is not studied and comprehended from a more scientific base, then counter-measures will not develop in aid of humanity"- Gerry Vassilatos 1999 (Nocturnal Disturbances and the Infrasonic "HUM")*



## Appendix

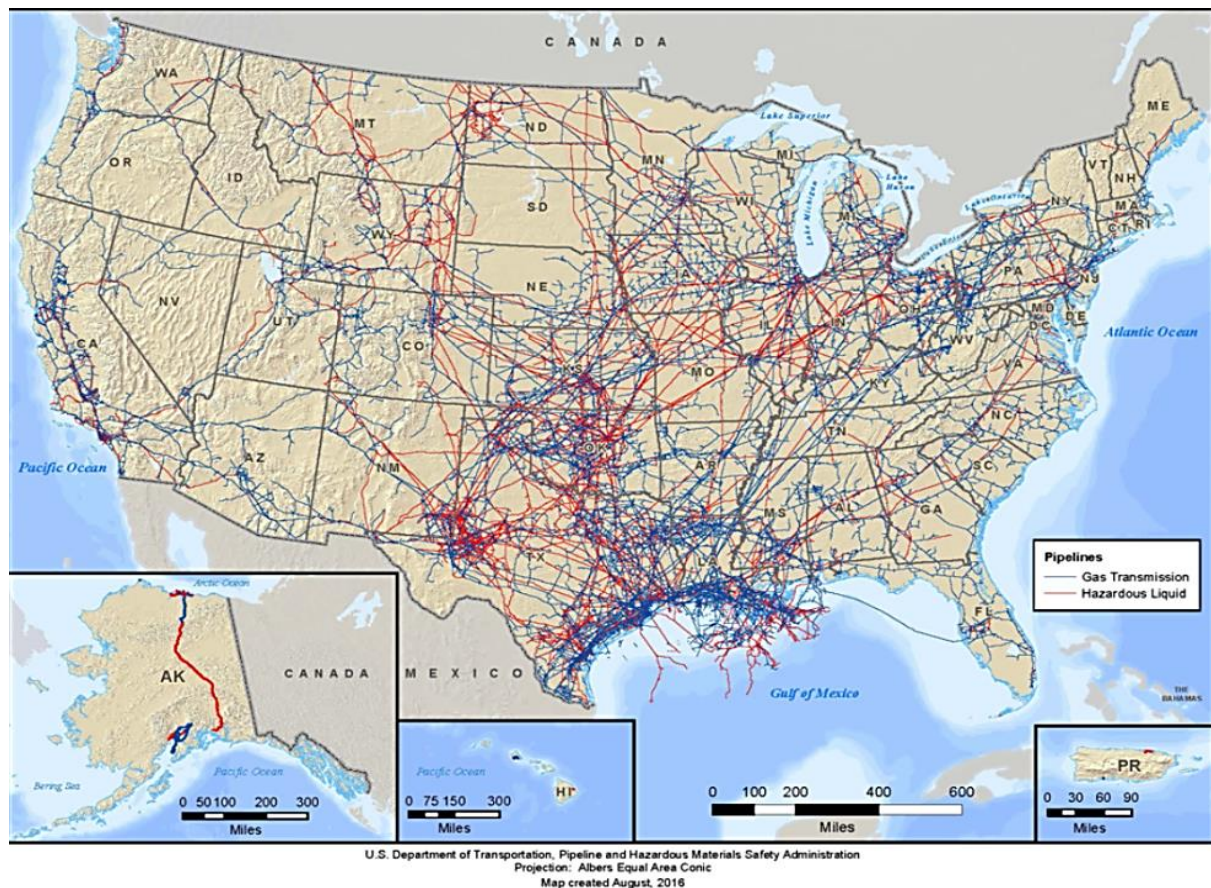
### Other supporting works

- Extensive files of acoustic field testing
- Research Paper 1
- Research Paper 2 sections 1-4
- E-Files and Hard Copy Files
- FERC/ CT Representative Filings
- Reference Maps

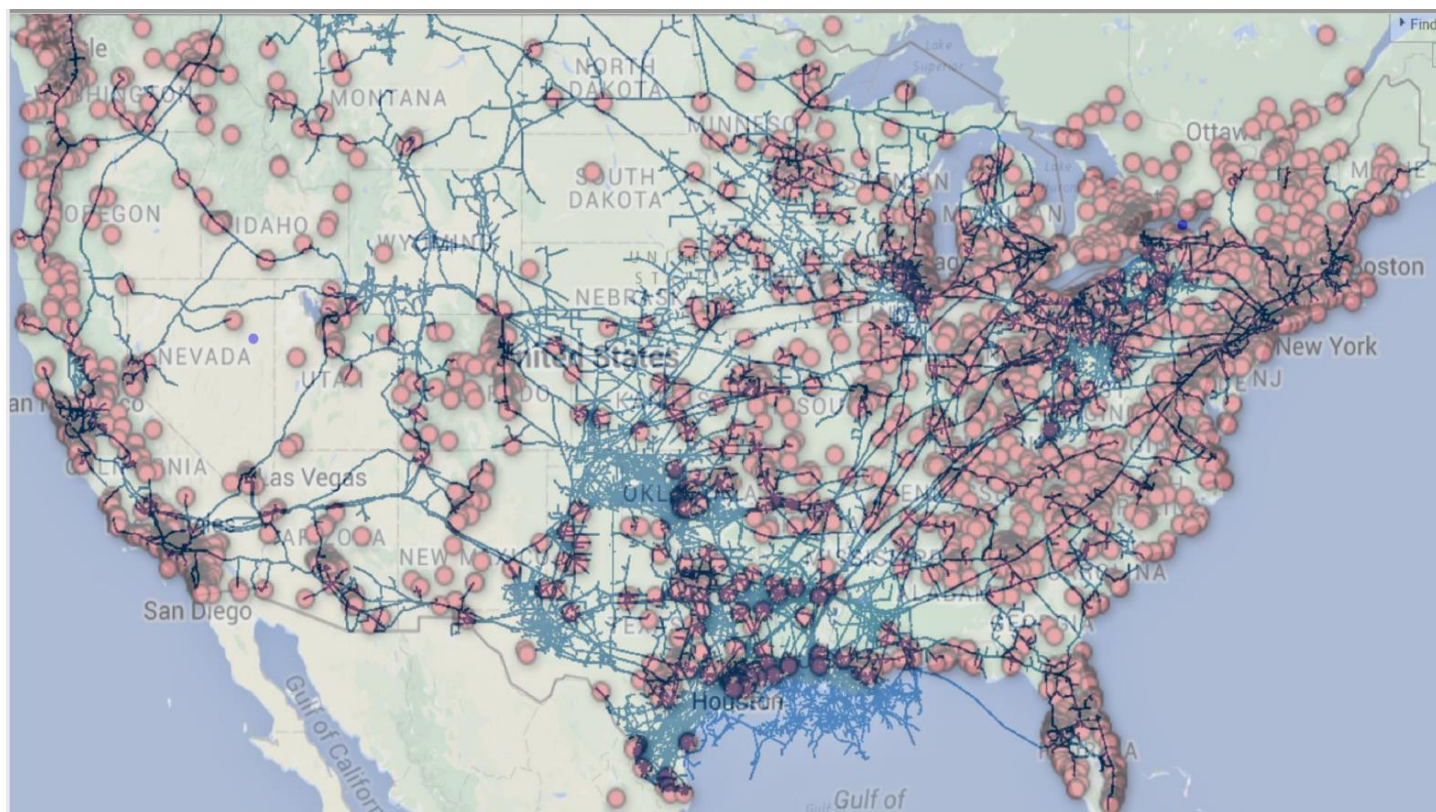
### Reference maps

Current PHMSA 2016, 2009 EIA Pipeline Map with Authors Collection of Hum Data Reports and 2009 EIA Map overlaid with thehum.info map (ver. Dec 2015)

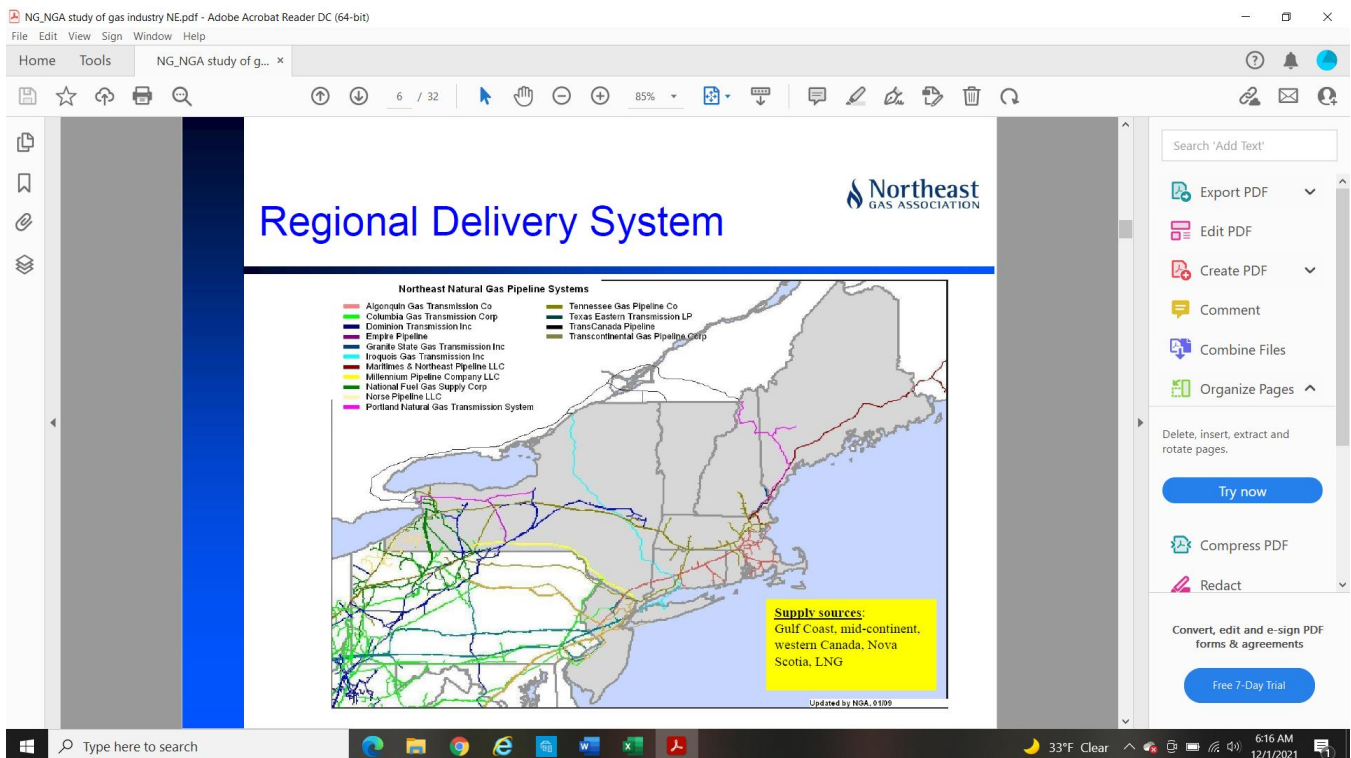
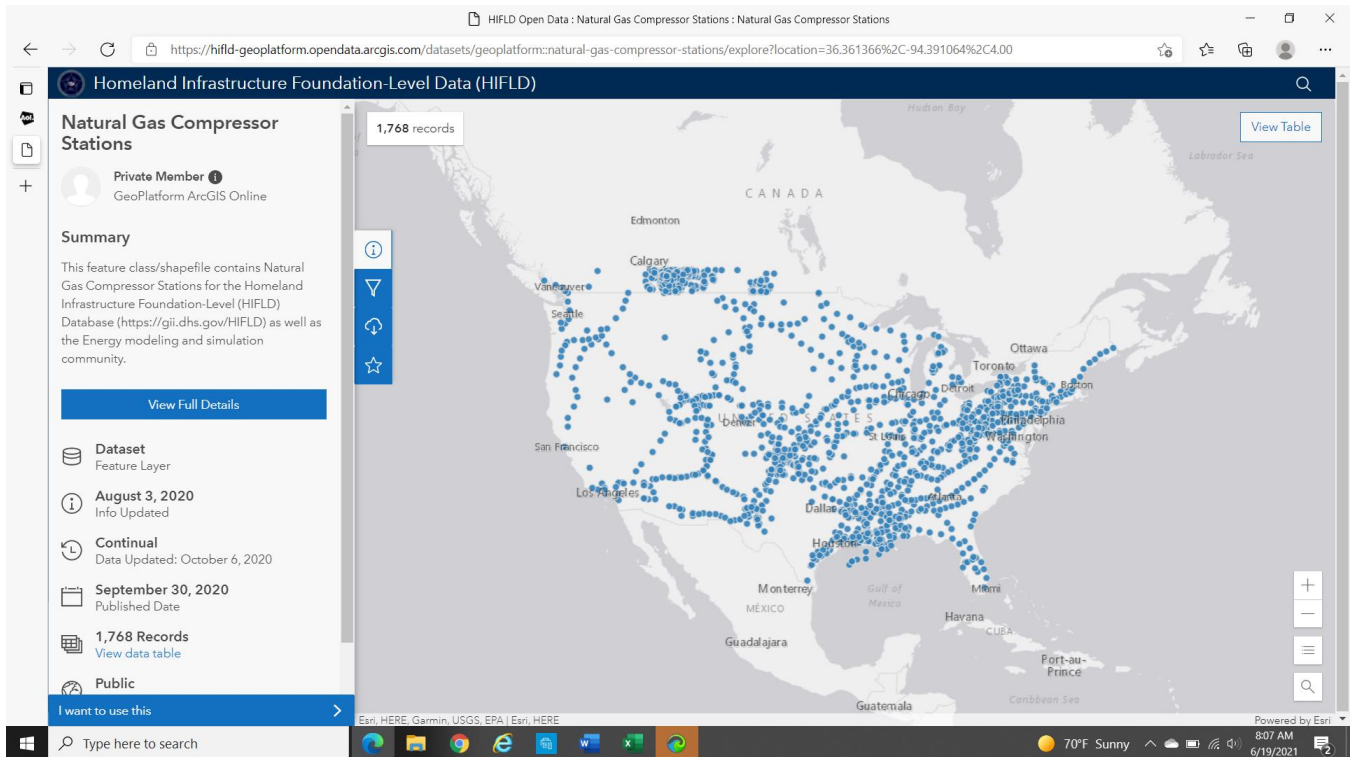
Note on 2016 PHMSA- map includes new lines installed after 2009 EIA Map- importance is Hum reports not associated with lines many are now!

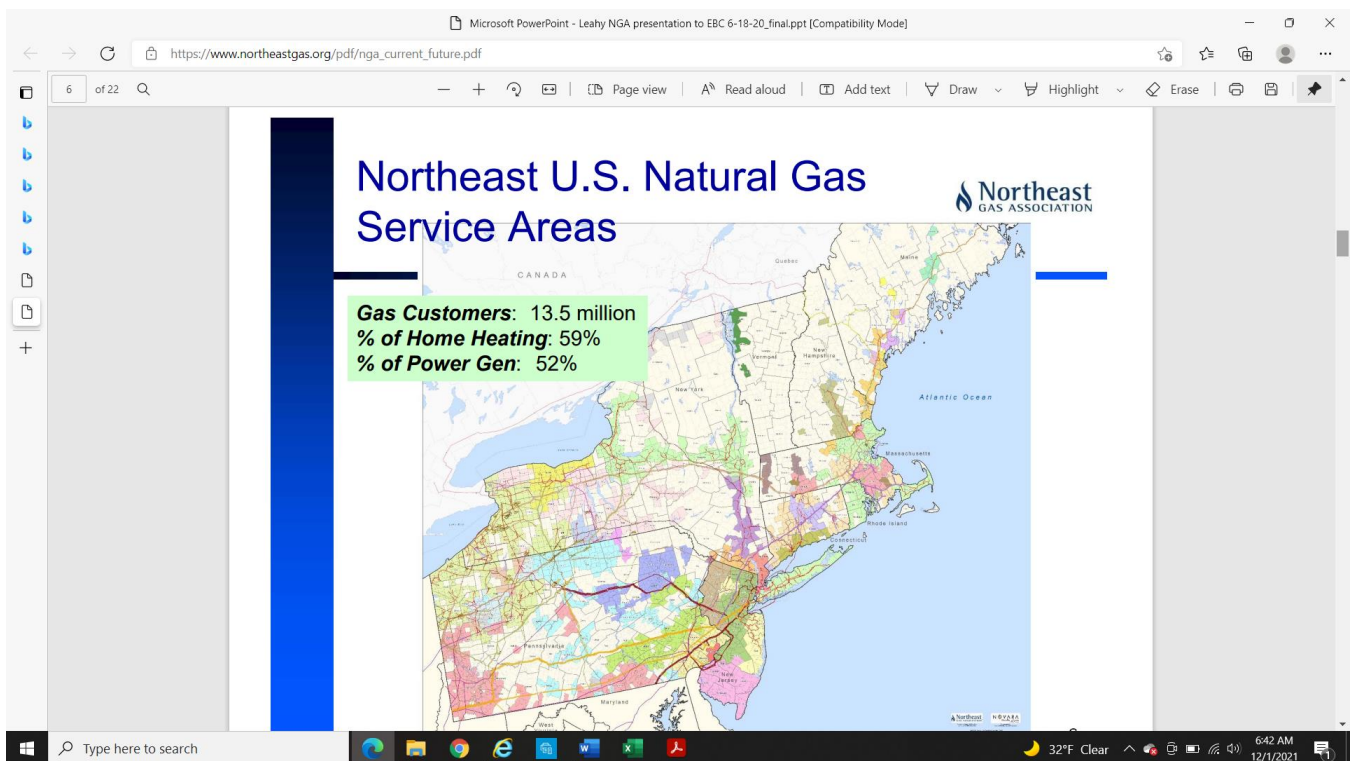
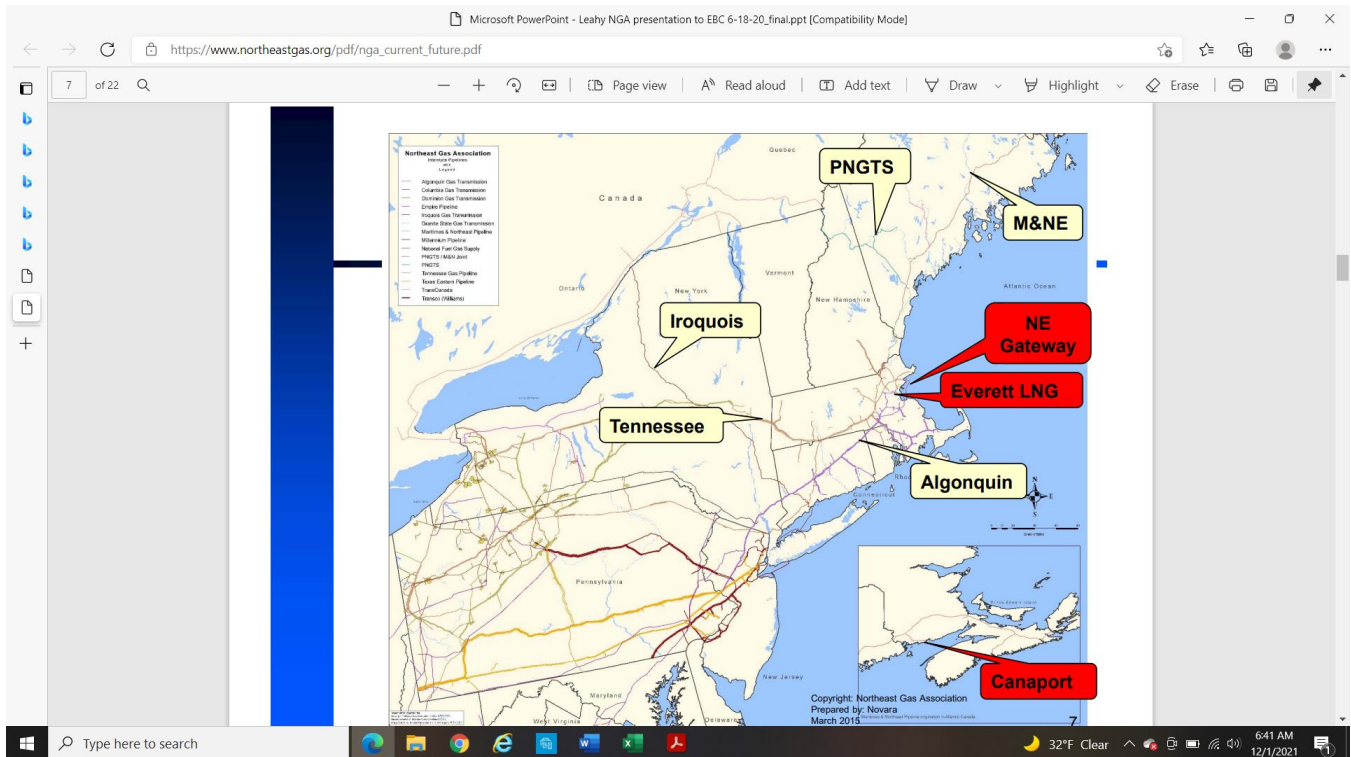


**2015 copy of thehum.info map/ overlay with US Inter/ Intra State Natural Gas Pipeline Systems**









## Centrifugal Compressor LF noise

[Compressor Noise Control \(purdue.edu\)](#)

[30818 chapter 11-LIU \(tamu.edu\)](#)

[Dynamic model including piping acoustics of a centrifugal compression system | Request PDF \(researchgate.net\)](#)

[Some results of experimental research of low frequency gas dynamic pulsations in pipelines of compressor mounts | JVE Journals](#)

[Dynamic model including piping acoustics of a centrifugal compression system - NASA/ADS \(harvard.edu\)](#)

[Generation Mechanisms of Low-Frequency Centrifugal Fan Noise | AIAA Journal](#)

[Basics of Centrifugal Compressors – What Is Piping](#)





*Red lines gas lines*

