Navy Scoping 2013
NAS Whidbey
Prepared by **NAME REMOVED DUE TO NAVY REDACTING NAMES ON ALL SCOPING COMMENTS**

The following comments are addressed to the U.S. Navy Environmental Impact Statement (EIS) scoping for the EA-18G Growler Airfields Operations at Naval Air Station (NAS) Whidbey Island.

I am a practicing physician in Washington State and trained in acoustic sciences as well as environmental safety among other things. All my comments are based on scientific studies or references to scientific journal articles. All citations are supported and included in the text and/or the bibliography.

I have included 18 areas of concern that I believe should be addressed in the EIS. I have discussed these issues extensively with many members of the community and have found unanimous support.

I have no issues with the mission of the US military. I have proudly served in the U.S. Navy myself during a previous war. My thoughts and comments are merely concerns for the safety and welfare of the total community relative to naval flight operations at NAS Whidbey.

1. The Environmental Impact Is Ignored

Prior EIS reports regarding flight operations at NAS Whidbey identified significant environmental impacts on civilian communities by flight operations emanating from Ault Field and OLF Coupeville. These impacts are discussed in detail below and consist of health impacts from aircraft noise and safety concerns with loss of life and property from an aircraft accident.

The writers of these previous EIS reports say that there is no environmental impact when comparing their various alternatives. This is circular reasoning to justify actions already taken.

Clearly, an environmental impact is taking place. In the current study additional Growler aircraft are proposed to be stationed at NAS Whidbey. The environmental impact may again be shown not to have "significantly" changed from operations without these additional aircraft. But once again a serious environmental impact will be demonstrated in spite of no change. Going from serious environmental impact to "no further significant change" does not obviate the fact that there is a serious environmental impact already in existence.

There are still residents of Whidbey, Fidalgo, Camano, and Lopez Islands who lived here prior to any naval aircraft operations at NAS Whidbey. These people can and have attested to the significant impacts that have occurred due to naval aviation.

An alternative plan that includes movement of many flight operations to an outlying field such as Quillayute, Moses Lake, or some other facility located in a relatively sparsely populated area should be considered. This would significantly reduce the environmental impact of noise, negative health effects, and accident potential over the higher population area surrounding NAS Whidbey and OLF Coupeville.

Conclusion

An environmental impact is demonstrated clearly by the data in prior EIS studies for NAS Whidbey and should be addressed in the DEIS. Alternatives should include development of a supplemental practice field as well as a reduction of flight operations in numbers and impact.

2. Average Noise Measurement (Ldn) is Inadequate

The use of average noise measurements as exemplified by the Ldn is useful for comparative purposes in some situation. Their use for aviation noise is limited unless special assumptions and criteria are used. There are several reasons.

First, the "Shultz synthesis" must be considered. Shultz collected data from many environmental noise studies and claimed to show a consistent relationship between Ldn and community annoyance. Based on his findings, several federal agencies have adopted standards of permissible Ldn levels for various activities related to highways, waterways, and airports.

Since Shultz originally published his synthesis in 1979, many authors have contested his findings. Griffiths(1) severely criticizes the methodology and hence validity of Schultz in deriving his annoyance curve. Bullen(2) cites Shultz's use of a subjective verbal response "highly annoyed" in his synthesis. Using a linear, non-subjective scale, Bullen shows that Shultz underestimates community response to aircraft noise with his Ldn curve. Hall(3) criticizes Shultz for collecting his data in different countries over many years. Hall studied community response in Toronto to aircraft noise vs. highway noise and concluded there is a difference between the community response to aircraft noise and to road noise when each is measured

by Ldn. For the same noise level, a greater percentage of people are highly annoyed by aircraft noise. This difference in annoyance at the two sources is not constant, but increases as Ldn increases. The difference is equivalent to roughly 8 dBA at an Ldn of 55 dBA, increasing to roughly 15 dBA at an Ldn of 65 dBA. The Navy in various communications regarding aircraft operations at NAS Whidbey has stated that Ldn values of 65 dBA are of concern and values above 75 dBA are incompatible. The results of Hall and others show that these values should be adjusted downward by approximately 10 dBA for aircraft noise. If Ldn values are to be used, community annoyance will occur at 55 dBA from aircraft noise and severe community response are predicted above 65 dBA. This is in agreement with a previous community study performed by FISE (Fidalgo Islanders for a Sound Environment.

Second, FISE completed 5,578 hours over 261 days of noise monitoring in 14 communities during 1988-1989 when Prowlers were deployed at NAS Whidbey. Two Quest Sound Level Meters were utilized (Models M-27 & M-28). These are "level 2" sound meters that are certified and calibrated to standards traceable to the Federal Bureau of Standards. A PhD in acoustics trained FISE members in the instrumentation and supervised the project. The instruments record sound continuously for 24 hours and give hard copies of average noise as well as statistical distributions of individual events. Logs were kept at each site to record Navy flight activity and its impact on the residents at the site. (3,000 pages of data are available for inspection.)

The results of the FISE noise measurements are shown in Table 1. The Ldn exceeded 55 dBA in most communities studied. In two communities, Guemes Island and Campbell Lake, Ldn was less than 55 dBA yet both were significantly annoyed by the aircraft noise. For example, some residents around Campbell Lake found that the aircraft noise occurred at night (during summer months) and interfered with sleep. Even though Ldn was 53, the noise that occurred came at bedtime. One physician called frequently to complain that sleep disturbances threatened his functioning in early morning surgery at Island Hospital. Measurements made at the physician's house showed loud noises at bedtime hours despite low noise averages (Figure 1).

Conclusion

On the basis of more current information, the Shultz Synthesis should be abandoned and an Ldn criterion of 55 dBA adopted as significantly impacting communities, hospitals, and schools and an Ldn of 65 dBA adopted as incompatible with residential existence.

Ldn measurements of 55 dBA and greater should be plotted. In addition to the flight pattern curves, continuous community studies in outlying areas should be included as listed in Table 1.

Furthermore, Ldn should not be utilized as the only criterion for community annoyance and compatibility with flight operations. The Ldn should be used in conjunction with frequency and intensity of single aircraft events as described in the next sections.

3. Noise Methodology Flawed

The methodology used for noise evaluation in the EIS consists of measuring noise for a typical aircraft operation and then multiplying that noise energy by the number of such flight operations according to Navy flight logs. A significant problem occurs when either component is inaccurate. Examples of both types of inaccuracies have been found in previous NAS Whidbey EIS studies as well as in community observations. Errors in noise measurement were made by not making measurements on the San Juan Islands, especially Lopez Island where personal testimonial and community noise measurements demonstrated significant impacts (Table 1). In addition, measurements by the EIS study made at several sites during inappropriate times: Admirals Cove measurements made during use of runway 32 and not runway 14; Guemes Island during quiet, limited flight activities.

Errors in relying on Navy flight logs occur because pilots frequently stray from published procedures. This has been a recurrent theme throughout many years of public complaint and study of this issue. Even prior EIS studies unknowingly documents examples of this. For example, modeled Ault Field Daylight and Darkness FCLP tracts depict no tracts over Dewey Beach or Rosario Bluff yet residents of both have reported such activity on numerous occasions.

Conclusion

The noise data methodology in the past was flawed since it was based on some measurements made at inappropriate times or based on inaccurate and incomplete flight logs. The methodology should have

included multiple continuous community measurement technique with observed flight activity logs. Such techniques were utilized by FISE and demonstrate significant adverse environmental and health impacts.

4. Use Frequency of Maximum Noise Levels in Addition to Ldn
Some authors have disputed the utility of Ldn measurements compared to measurement of maximum noises. Both Borsky(4) and Stephens(5) show that maximum dBA readings are better indicators of community annoyance. Generally frequent maximum sounds of 70 dBA or greater correlate in a linear fashion with community annoyance. Results from the FISE noise studies show that three communities stand out with incompatible frequency of maximum noise occurrences: Coupeville, Shelter Bay, and Deception Pass (Table 2). At those locations maximum noise frequently exceeds 90 dBA and often exceeds 100 dBA. Most other communities are seriously impacted with maximum noises often exceeding 70 dBA.

Conclusion
The frequency and loudness of maximum noise events generated during flight activities should actually be measured in homes, schools, and hospitals in the EIS study area. These should be correlated with community annoyance.
An alternative should be developed to reduce frequent maximum sound during flying to dBA's <80.

5. Use of Relative Loudness
Since Ldn adds a decibel penalty for noise between 2200 and 0700, it doesn't reflect the noise actually heard. The use of Leq and relative loudness obviates this deficiency. Leq is a measure of the noise actually heard and averaged over 24 hours. Acoustic physics have shown that for every increase in 10 dBA of sound measured, the human hears a doubling in loudness. For example, 60 dBA is twice as loud as 50 dBA and 70 dBA is four times as loud as 50 dBA. For noise associated with intermittent events such as aircraft overflight, relative loudness changes that exceed a doubling are increasingly annoying to people. During the FISE noise study, Leq was measured during flying and no flying periods in all communities. These values are shown in Tables 3 & 4. Five communities experienced 2-3 fold increases in loudness during flying (Lopez, Shelter Bay, Oak Harbor, North Whidbey, and Oak Harbor). Three communities experienced intolerable increases in loudness with 3-8 fold changes (Rosario Bluff, Deception Pass, and Coupeville).

Conclusion
The use of relative loudness by comparing Leq while flying and not flying should be studied in all communities in the study area. An alternative should be included that reduces flight operations when loudness increases above 2-3 fold occur.

6. Health Effect – Startle Reaction
One medical effect of aircraft overflight occurs when people are exposed to loud peak dBA from low aircraft overflight or sonic booms. This can cause a startle reaction. When exposed to peak dBA in the 100-113 range, researchers measured increases in heart rate and avoidance behavior in subjects. There was no habituation to these effects over three days of study(6)(7). Data from FISE noise studies, Tables 2, shows potential problems with startle reactions at Coupeville, North Whidbey, Deception Pass, and Shelter Bay where all have maximum dBA's above 100 during flying.

Conclusion
The EIS should address the issue of startle reactions. Frequency of maximum dBA's should be documented and medical surveys completed in affected communities.

7. Health Effect – Loss of Control
Study subjects who could chose the level of noise (70-105 dBA) had less subjective discomfort and lower excretion of cortisol and catecholamines during noise exposure(8). Another group demonstrated decreased performance and ability to make decisions during loud noise when they had no ability to stop the noise(9). Surveys show that loss of control over one's life is one of the most disturbing effects of low level military overflights and/or sonic booms on rural Americans(10). FISE noise studies, Tables 2 & 3, show that noise levels of 70-105 dBA were achieved in all communities during flying. Clearly residents have no control over the level of noise.

Conclusion
The EIS should address the issue of community residents experiencing a sense of loss of control during military jet flying.

8. Health Effect – Pediatric Behavior
In Canada, Innu children are very distressed by low military jet overflights(11). In Germany extensive studies have revealed the following behavior in children associated with low overflights: terror, panic, screaming, freezing in place, palpitations, shaking, dizziness, bed wetting, sleep disturbances, nail biting, anxiety, slowed motor response, elevation of blood pressure and blood cortisol levels(12). No habituation was observed. In one study, blood pressure and hormonal response occurred after just mentioning that a low flight was coming in those who preciously experienced them(13).

Conclusion
The DEIS does not but should address the issue of low level and loud military jet aircraft on children in affected communities. A survey should document the number of children in each community in the study area. Parents and children should be questioned about behavioral responses to overflights.

9. Health Effect – Psychiatric Effects
Two studies done around Heathrow Airport in London showed increased incidence of "nervous breakdowns" and admissions to psychiatric hospital in areas subjected to loud aircraft noise compared to those in quiet areas(14,15). A medical survey completed by residents near OLF Coupeville, Table 5, shows that many residents exposed to low level Navy jet overflights experience significant psychiatric symptoms. Several people reported hospitalization for stress related illnesses associated with aircraft overflights.

Conclusion
The EIS should complete medical surveys in all communities involved to document psychiatric and other medical effects of low level Navy jet operations.

10. Health Effect – Sleep Disturbances
Sleep can be disturbed in many ways by loud environmental noise. Single events of loud peak dBA are better predictors of disturbance than averaged values such as Leq and Ldn. Periodic noise is more disturbing than continuous noise. The indoor threshold is considered to be 35-40 dBA for falling to sleep. Arousal from deep sleep (NREM, stage 4) requires louder noise in the 70 dBA range. The usual cycles of sleep and EEG patterns are affected occasionally (10%) at 40 dBA and often (60%) at 70 dBA. Children are less susceptible and the elderly more susceptible to noise induced disturbances. These disruptions can lead to symptoms of fatigue, lethargy, decreased efficiency, anxiety, and desiring to be left alone, and can lead to health disorders or interfere with convalescence from illness (16-22).
FISE noise studies show that periodic peak dBA's during jet flying are routinely above 70 and often above 90 in many communities (Tables 2 & 3). These are outdoor measures which will translate to indoor measures of approximately 10 dBA less with windows open and 20-25 with windows closed. Therefore, sleep disturbing levels are frequently found in the study area during flying. Simultaneous indoor/outdoor studies utilizing two sound meters were made near OLF Coupeville, (Figures 2 & 3). Results document that indoor levels with windows closed are well above those expected to prevent sleep. A medical survey completed by residents near OLF Coupeville, Table 5, shows that many residents exposed to low level Navy jet overflights experience significant sleep disturbances.
Some residents around Campbell Lake found that the aircraft noise occurred at night and interfered with sleep. Even though Ldn was 53, the noise that occurred came at bedtime. One physician called frequently to complain that sleep disturbances threatened his functioning in early morning surgery at Island Hospital. Measurements made at that physician's house (Figure 1) showed loud noises at bedtime hours despite low noise averages. These substantiated his claims of sleep interference.

Conclusion
The EIS should address the issue of sleep disturbance by making indoor measurements of maximum dBA in affected communities during flying. A survey of residents in the study area should document the extent

of this problem. An action alternative that removes FCLP and approach practice at Ault Field and OLF Coupeville between 2200 and 0800 should be developed, studied, and implemented.

11. Heath Effect – Speech Interference
Speech interference will generally occur with background noise exceeding 60 dBA, especially when it exceeds 80 seconds/hour(23). The USAF has published a table of speech interference with noise and distance. It shows that background noise of 60-70 dBA will generally interfere with telephone usage and speech at a 3-6 foot distance(24).
FISE noise studies, Table 3, show that average dBA exceeds 70 during many minutes a day during outside measurements in most sites studied. Indoor measurements at Coupeville, Figures 12-13, show speech to be impossible for long time periods during flying. In addition, resident logs kept during flight activities frequently mentioned interference with speech, telephone, and listening to music or television.

Conclusion
The frequency and duration of noise generated during flight activities should actually be measured inside and outside homes, schools, and hospitals in the EIS study area. These noise levels should be correlated with speech interference testing.

12. Health Effect – Performance Interference
As noise increases, both reaction time and number of errors increase, especially for more complex tasks. These effects are seen at continuous levels above 90 dBA or at lower levels that have a high frequency component (jet engine), intermittency, are unexpected, or are uncontrollable. These performance effects may last after the noise stops especially when the noise source is unpredictable or uncontrollable(25-27).
FISE noise studies, Tables 3, show that measurements expected to interfere with performance are often encountered. In addition, resident logs kept during flight activities frequently mentioned interference with speech, telephone, and listening to music or television, reading, writing, thinking, and sleep.

Conclusion
The frequency and duration of noise generated during flight activities should actually be measured inside and outside homes, schools, and hospitals in the EIS study area. These noise levels should be correlated with performance interference testing.

13. Health Effect – Noise Induced Hearing Loss
Exposure to loud noise, either periodic or continuous can produce a temporary threshold shift (TTS). With further exposure a permanent noise induced hearing loss (NIHL) occurs. Thresholds have been measured in various circumstances: 105 dBA for multiple single aircraft overflights or 115 dBA for a single overflight in a day, 102 dBA for impulse noise and 107 dBA for steady noise. Several studies have shown that aircrew or airport workers can have TTS with short exposures to 117-128 dBA and NIHL with 10 years of exposure in the 86-92 dBA range during an eight hour work day. The USAF set work place noise exposure standard at 30 min for 100 dBA, 13 min for 105 dBA, 5 min for 110 dBA, and 2.2 min for 115 dBA. When referring to averaged noise measures, experimental data suggests a threshold at Leq = 70 dBA and the EPA has adapted this value as a level of protection with a margin of safety(28-34).
FISE noise studies show that three areas, Coupeville, Deception Pass Park, and Shelter Bay (Table 2) experience noise exposure that puts them at the threshold of nearing damage. Personal testimonial indicates that Dugualla Bay area residents and workers are also excessively exposed although measurements are not available. In a medical survey completed by residents near OLF Coupeville, (Table 5), 53% said they believed they were losing their hearing over and above the normal aging loss.

Conclusion
Noise measurements documenting frequency and maximum intensity during flying should be made as part of the EIS in critical areas such as around OLF Coupeville, Dugualla Bay Farms and residences, Shelter Bay residences, Deception Pass State Park and surrounding residences. These measurements should be correlated with the thresholds for hearing loss listed above. The EIS should complete medical surveys in all communities involved to document hearing loss. Audiograms should be offered to affected citizen to document hearing loss. Where possible, the audiograms should be compared to previously recorded ones.
14. Health Effect – Medication Usage

A study in one community showed that the use of prescription drugs for sedatives, hypnotics, antacids, and antihypertensives increased significantly after opening a runway that resulted in loud aircraft overflight(35).In general the physiologic and psychological responses to loud environmental noise increase requirements for medical care and medications A medical survey completed by residents near OLF Coupeville, Table 5, shows that many residents exposed to low level Navy jet overflights experience stress induced illness requiring treatment by a physician.

Conclusion
The EIS should complete medical surveys in all communities affected by flying to document stress induced illnesses and the use of medications to treat them.

15. Health Effect – Hypertension
Experimental studies have shown: (1) increases of systolic and diastolic blood pressure with exposure to 85 dBA for 8 hours(36) and (2) increases of blood pressure and blood cortisol during playback of military jet overflights with 100-125 dBA(37). In patients with essential hypertension, exposure to noise at 105 dBA for 30 min further increased blood pressure and peripheral vascular resistance(38). Epidemiologic studies have shown elevated blood pressure and hearing loss in many of 433 children exposed to military jet overflights at 75 meters compared to Controls(39). Eighty five workers exposed to 85 dBA showed elevations of systolic and diastolic pressures compared to age matched controls not exposed. A review of 40 studies showed a consistent correlation of prolonged high intensity industrial noise and hypertension(40).
FISE noise studies, Table 2, show that many communities are exposed to noise at or above the thresholds cited in studies to induce hypertension. A medical survey completed by residents near OLF Coupeville, Table 5, shows that many residents exposed to low level Navy jet overflights experience stress induced illness requiring treatment by a physician.

Conclusion
The EIS should complete medical surveys in all communities affected by flying to document the incidence of hypertension and compare it to the expected incidence in
communities not exposed to the noise and stress associated with military jet operations.

16. Safety and Aircraft Crash Potential
This section addresses a primary concern of FISE regarding the safety of operation of Navy jet aircraft in the vicinity of NAS Whidbey. The immediate area of NAS Whidbey include overflight of three of the fastest growing counties in Washington (Island, Skagit, and San Juan), six major communities (Oak Harbor, Coupeville, Deception Pass State Park, Shelter Bay, Guemes, and Anacortes), and two oil refineries.
In a previous evaluation Navy data revealed that in flight operations around NAS Whidbey, 29 aircraft crashed between1967-1990. Of those crashes, 11 occurred within 15 miles of Ault Field at NAS Whidbey. Within this 15 mile radius are located five civilian areas of concern.
(a) OLF Coupeville is a small naval auxiliary airfield surrounded by a residential community. Annually 20,000-30,000 FCLP operations are carried out, mostly at night. The civilian residents of the area are subjected to frequent noise, vibration, and anxiety about crashes as a result of these operations. A large community organization WISE has often complained about this situation. The Navy has continued operations under “waivers” at this site due to runway inadequacies and has persisted in operation despite repeated warning from local residents and government officials.
(b) Shelter Bay is a community located at LA Conner, 6.9 miles east of Ault Field directly off the approach/departure corridor for runway 25/07. It experiences frequent overflights of low level jet traffic and is subject to considerable noise impact and risk of civilian casualty.
(c) March Point is a small peninsula on Fidalgo Island 11 miles northeast of Ault Field. The peninsula is the site of two major oil refineries as well as several smaller chemical industries. Several of the routine approaches to NAS Whidbey bring jet aircraft on a ground track over March Point. These include HI TACAN 7 & 13, GCA 7 & 13, as well as many vectored and visual approaches. The refineries contain billions of pounds of explosive and toxic substances. Among these are substances which have a potential for support of fires (4.4 billion pounds), explosive pressure release (160 million pounds), chemical

reactivity (400,000 pounds), acute health effects (4.7 billion pounds), and chronic health effects (4.4 billion pounds).
In communicating with both refineries, it is apparent that their disaster plans are poorly conceived and don't include the possibility of a navy jet having lost control and crashing into multiple containment facilities for these toxic substances. In fact, during February of 1991, a small scale disaster occurred at Texaco wherein a pump casing exploded and a large quantity of unrefined oil escaped onto land at the refinery. Some of this oil subsequently entered Puget Sound. Texaco's response was characterized by slowness and chaos. Texaco seemed unsure how to proceed with water cleanup and animal rescue procedures. Community concerns were raised about the effectiveness of either company responding to a large scale disaster.
(d) Guemes Island is located 13.9 miles north of NAS Whidbey and one mile north of Anacortes. Prior to 1988, this small island community was rarely overflown by A-6 traffic. In 1988 NAS Whidbey arbitrarily made a decision without following the NEPA process to place a radar turning point at Cap Sante and vector aircraft away from Anacortes and over Guemes.
Since that time Guemes has been subjected to exponential increases in noise energy and accident potential. The Guemes Island Environmental Trust (GIET) was formed and filed suit against the Navy, claiming a violation of their rights under The National Environmental Policy Act. In early 1991, the commanding officer of NAS Whidbey announced to the GIET that the radar turning point would be removed from Cap Sante. Subsequently, A-6 traffic has flown over Anacortes, avoiding Guemes. As the noise and safety issues increase over Anacortes, similar thoughts of lawsuit are entertained by residents of Anacortes for yet another violation of the NEPA process.
(e) Oak Harbor is a small city located two miles south of Ault Field. It is located directly off the approach/departure corridor of runways 31/13. Because of its proximity to NAS Whidbey, Oak Harbor's business and residential community is particularly at risk of damage from an accident. NAS Whidbey has the smallest land base associated with jet operations of all Naval facilities (<5,000 acres.) No new Navy land of significance has been purchased since the 1940's. The Navy's aviation operations have encroached significantly on the surrounding communities since 1985. Island County is one of the fastest growing populations in the state and is composed of many retirement and recreation oriented people.
Local citizens groups including FISE have repeatedly offered solutions to mitigate many of the factors contributing to safety dangers. The cost of them might be high in absolute terms but reasonable in relative terms compared to potential property damage and liability claims in legal actions arising out of a disaster at Coupeville, Oak Harbor, or the oil refineries on March Point.
(a) Building an alternate landing field at a remote site such as Quillayute on the Olympic peninsula some 84 miles from NAS Whidbey would allow FCLP and other operations to occur away from populated areas and continue all night if desired. Cost estimates of $25 million have been alleged for restoring the existing field to Navy standards. Additional costs would include the added time of flight of approximately $840/round trip (25.2 minutes @ 400 KTS $2,000/hr.)
(b) The cost of relocating operations to Lemoore, CA or Oceana, VA may be significantly less when all factors are considered. These sites have existing facilities and surrounding property that buffers them from noise and safety considerations.

Conclusion
Significant navy jet related accident potential exists within 15 miles of NAS Whidbey. A-6's have often crashed due to materials failures that result in loss of ability to control the aircraft. Due to the small size of Navy land holdings and the growing civilian residential, business, and industrial communities surrounding NAS Whidbey, a navy jet crash will eventually cause a community disaster. The EIS should address the issue of jet flight operations encroachment on the surrounding communities.
The Navy should abandon its philosophy of designating accident zones in community property and replace it with one of eliminating the accident risk by purchasing the areas at risk or removing flight operations to areas where they own the land at risk. Flight operation over particularly sensitive area should be eliminated. One of these is the March Point refinery complex on Fidalgo Island.
The EIS should include an alternative that removes flights from the populated areas in the EIS study area to a remote area where encroachment by the Navy on the community is reduced or removed. A cost analysis of implementing such an alternative should be included in the EIS.

Bibliography 1. Griffiths, ID, Review of Community Response to Noise, in Noise as a Public Health Problem,Proceeding of the 4th International Congress, Giovanni Rossi, MD, editor, Milano, Italy, VolumeII, pp. 1031-1048, 1983.
2. Bullen, RB, Rede, AJ: Reliability & Validity of Reaction Variables in Community Noise Research, in Noise as a Public Health Problem, Proceeding of the 4th International Congress, Giovanni Rossi, MD, editor, Milano, Italy, Volume II, pp. 105-1114, 1983.
3. Hall, FL, Birnie, SE, Taylor, SM, Palmer, JE: Direct Comparison of Community Response toRoad Traffic Noise and to Aircraft Noise, J Accoust Soc Am 70:1690-1698, 1981.
4. Borsky, PN: Integration of Multiple Aircraft Noise Exposure Over lime by Residents Living Near US Air Force Bases, in Noise as a Public Health Problem, Proceeding of the 4thInternational Congress, Giovanni Rossi, MD, editor, Milano, Italy, Volume II, pp. 1049-1060,1983.
5. Stephens, DG, Powell, CA: Human Response to Aircraft and Other Noise Events, in Noise as a Public Health Problem, Proceeding of the 4th International Congress, Giovanni Rossi, MD, editor, Milano, Italy, Volume II, pp. 1061-1072, 1983.
6. Kryter K: Physiological, Psychological, and Social Effects of Noise (pub 1115), National Aeronautics and Space Administration, Washington, pp. 535- 545, 1984.
7. Hall, FL., Birnie, SE, Taylor, SM, Palmer, JE: Direct Comparison of Community Response to Road Traffic Noise and To Aircraft Noise, J. Acoust. Soc. Am. 70:1690-1698, 1981.
8. Lundberg U, Frankenhaeuser M: Psychophysiological Reaction to Noise as Modified by Personal Control over Noise Intensity. Biol Psychol, 6:51-59, 1978.
9. Singer JE, Acri JB, Schaeffer MH: Cognitive Changes from Noise Exposure. In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume I of proceedings of the 5th international congress on noise as a public health problem, held in Stockholm, Aug. 21-25, 1988), Swedish Council for Building Research, Stockholm, pp 401-410, 1990.
10. Bargen R: Airspace Blues, Airspace, Gabbs, Nev, p 424, 1989.
11. Goldman B: Sheshatshit, Labrador A Town without Hope. Can Med Assoc J, 141:602-605,1989.1162 (b)(6) Page 13 of 23.
12. Bartels K: Medizinische/psychosomatische Auswirkung von lieffluglarm. In Kinder und Tiefflug. Dokumentation des Expertenforums zu den Auswirkungen des Tiefffluglarms auf Kinder, Bonn, June 12, pp 18-22, 1989.
13. Preuss S: Militarischer Jiefflug Und Seine Psychischen Auswirkun gen Auf Kinder. In Kinder und Tiefflug. Dokumentation des Expertenfonims zu den Auswirkungen des Tiefffluglarms auf Kinder, Bonn, June 12, pp 3-8, 1989.
14. Curio I, Ising H: Gesundheitliche Auswirkingen Des Militarischen lieffluglarms-vorstudie, Umweltbundesamt, Berlin, 1986.
15. Kyrter, KD: Association of Heathrow Airport Noise with Psychiatric Admission, Psychol Med 20:1022, 1990.
16. Abey-Wickrama, I, et al: Mental Hospital Admissions and Aircraft Noise, Lancet 2:1275, 1969.
17. Noise Effects Handbook, A Desk Reference to Health and Welfare Effects of Noise, Office of the Scientific Assistant, Office of Noise Abatement and Control, U.S. Environmental Protection Agency, 1981.
18. LeVere T, Morlock G, Hart, F: Waking Performance Decrements Following Minimal Sleep Description: The Effects of Habituation during Sleep, Physiological Psychology, 3:147-174, 1975.
19. Kryter, Ran D., Analysis of Laboratory and Field Data on Awakening from Noise, 1988.
20. Lukas, J., Measures of Noise Level: Their Relative Accuracy In Predicting Objective and Subjective Responses to Noise During Sleep. EPA-600/1-77-0 10, U.S. Environ. Prot. Agency, Feb. 1977.
21. Griefahn, Barbara. Research on Nose-Disturbed Sleep since 1973. In Proceedings of the Third International Congress on Noise as a Public Health Problem. ASHA Report No. 10, April 1980.
22. Gniefahn, B Muzet, A: Noise Induced Sleep Disturbances and Their Effects on Health. Institut Feur Arbeits und Sozialmedizin, Universitaet Mainz, West Germany and Centre d'Etudes Bioclimatiques due CNRS, France.
23. Ohrstrom, E: Primary and After Effects on Noise during Sleep With Reference to Noise Sensitivity and Habituation in Laboratory and Field. In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume I of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, 1:121, 1988.
24. Cohen, A: Effects of Noise on Task Performance. J Safety Res, 8:146, 1976. 1162 (b)(6) Page 14 of 23.
25. US Air Force. Design Note 3F1. January 1974.

26. Miller IP: The Effect of Noise on People, J Acoust Soc Am, 56:729-764, 1974.
27. Harris CS: The Effects of Different Types of Acoustic Stimulation on Performance, in Proceedings of the International Congress of Noise as Public Health Problem, Dubrovnik, Yugoslavia, May, pp 398-407, 1973.
28. Gulian E: Noise as an Occupational Hazard: Effects on Performance Level and Health – A Survey of Findings in the European Literature, May 20, 1974. 29. Glass DC, Singer JE: Urban Stress Experiments on Noise and Social Stressors, Academic Press, New York, 1972.
30. Spreng, M: Effects of Noise from Low-level Flights on Humans. In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume I of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, 1988), Swedish Council for Building Research, Stockholm, pp 293-304, 1990.
31. Laroche C, Hem R, Poiner S: The Growth and Recovery From TTS In Human Subjects Exposed to Impact Noise. J Acoust Soc Am, 85:1681-1690, 1989.
32. Wu Y, Liu X, Wang B, Wang, X: Aircraft Noise-Induced Temporary Threshold Shift, Aviation, Space, and Environmental Medicine, 60:268-70, 1989.
33. Lipscombe, D: Considerations of Community Noise Impact on Hearing Health, in Community Noise, Peppin, RJ & Rodman, CW (ed), American Society for Testing & Materials, Philadelphia, pp 73-79, 1979.
34. U.S. Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, 1974.
35. U.S. Air Force. Design Note 3F1, January, 1974.
36. Merluzzi F, Orsini S, Dighera A: The Risk of Occupational Hearing Loss to Airport Workers, In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume 1 of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stock holm Aug. 2 1-25, p53, 1988.
37. Knipschild P, Oudshoorn N: Medical Effects Of Aircraft Noise: Drug Survey. Int Arch Occup Environ Health, 40:197-200, 1977.
38. Kryter K: Physiological, Psychological, and Social Effects of Noise (pub 1115), National Aeronautics and Space Administration, Washington, p. 380, 1984. 1162(b)(6) Page 15 of 23.
39. Westman JC, Walters JR: Noise and Stress: A Comprehensive Approach. Environ Health Perspect, 41:291-309 1981.
40. Ising H, Michalak R: Effects of Noise from Military Low-level Flights on Humans [part II]. In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume 1 of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, 1988), Swedish Council for Building Research, Stockholm, pp 305-314, 1990.
41. Lennart A, Eggertsen R, Svensson A: Noise and Essential Hypertension, In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume I of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, p 83, 1988.
42. Ising H, Spreng M: Effects of Noise from Military Low-Level Flights on Humans, In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume 1 of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, p 84, 1988.
43. Suvorov GA: Extra-Aural Effects of Noise, In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume 1 of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 2 1-25, p84-5, 1988.
44. Milkovic-Kraus S: Effects of Noise on Blood Pressure, In Bergland B, Lindvall T (eds): Noise as a Public Health Problem. New Advances in Noise Research (volume I of Proceedings of the 5th International Congress on Noise as a Public Health Problem, held in Stockholm Aug. 21-25, p 93, 1988. 1162 (b)