

E-Coustic Solutions

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February 25, 2013

Robert Eben
Superintendent
Southern California Agency
Bureau of Indian Affairs
1451 Research Park Drive
Riverside, CA 92057

Subject: Shu'Luuk Wind DEIS Comments: Noise and Its Potential for Adverse Health Effects From Shu'Luuk Wind Project

Dear Mr Eben:

Please accept my comments on the DEIS for the Shu'Luuk Wind Project. The are submitted on behalf of the following:

- The Protect Our Communities Foundation.
- Backcountry Against Dumps, and
- Ms. Donna Tinsdale,

who are acting as interveners in the application process for the subject wind energy project.

I have commented on several prior projects in the San Diego County area including cumulative impact projects: Tule Wind, ECO Substation, Energia Sierra Juarez and Gen-Tie projects. This document is attached. It addresses the deficiencies in the noise impact assessments conducted for those projects which are functionally the same for the noise assessment reported in the DEIS for Shu'luuk. These deficiencies include errors committed in computer modeling leading to severe underestimates of the sound that will be received at properties adjacent to and in the footprint of the Shu'luuk project. They include a failure to properly consider the impact on quiet rural/ wilderness communities that results from nighttime noise 20 decibels or more above the pre-existing background sound levels. Sleep disturbance potential and loss of amenity for people who experienced a quiet community prior to the introduction of wind turbine noise. They include a failure to consider the specific characteristics of infra and low frequency sound emitted by industrial scale wind turbines that has been identified as plausible cause of adverse health effects related to vestibular disturbances. I would respectfully request that all of the criticisms and concerns raised in my review of the Tule and other projects be accepted as relevant to the discussion of the Shu'luuk project. The report with my review of that project is attached as an exhibit to this letter.

Since the time when the Tule report was written there have been a number of new papers and presentations, many that are peer reviewed, of research showing that modern industrial scale upwind wind turbines of the type being considered for the Project have the potential to cause adverse health effects if sited to close to residential or other occupied properties. The wind energy system developers and wind turbine manufacturers have discounted these concerns based on a belief that wind turbines do not produce sufficient acoustic energy in the infrasound region to cause physiological effects. That is, they may or may not agree that infrasound could cause the symptoms being reported by people living in or near wind energy utilities around the world, but they are convinced that modern upwind wind turbines do not produce infrasound at a significant level to be the plausible cause of the reported symptoms. I would like to focus on one of the newest research projects that has established that significant levels of infrasound are emitted from modern industrial

scale upwind wind turbines and that this infrasound can saturate the inside of homes for distances of at least 7000 feet. This study was commissioned by the Wisconsin Public Service Commission as part of a hearing on a proposed project using Nordex N100 2.5 MW wind turbines. The host community was concerned that these wind turbines would cause sufficient adverse effects on some members of the host community and supported that concern by a series of affidavits from families living in the footprint of the Wisconsin Shirley Wind Project which was using the same make and model wind turbine. In the Shirley project area three homes had been vacated, one at about 1200 feet, another at 3300 feet, and a third at 7000 feet from the nearest wind turbine. The County Board of Health has reviewed the complaints and concluded that they are valid and related to long term exposure to wind turbine infra and low frequency sound. The affected family members testified before the Wisconsin Commission in the Hearing for the proposed project. The concern that the proposed project might result in similar adverse impacts on people in that community.

As a result the Wisconsin PSC commissioned a special study of the three vacated homes in the operating project area. The study was conducted by five (5) acousticians representing four (4) firms. The firms included one company that specialized in recording infra and very low frequency sound whose equipment would allow recording of the acoustic energy inside the homes at infrasound frequencies below the range of most professional grade sound measurement equipment (down to 0.1 Hz). Dr. Paul Schomer was present to act as an independent observer. Dr. Schomer is an independent acoustician and also the Chair of the Acoustical Society of America's Standards Committee. As such, he was to confirm that all tests were valid and that the procedures met professional standards. One of the other firms represented acousticians who generally work for the wind industry. And the fourth firm generally works for communities and affected individuals on wind energy noise cases. This Team entered into a Memorandum of Understanding to blend their talents to the goal of obtaining the highest quality audio samples of sounds inside homes during a time when the occupants who owned the vacated homes were present and "feeling" the symptoms that led to them not being able to live in the homes.

This study evaluated all three vacated homes during periods when the wind turbines were operating at less than full load. Yet, infrasound was present in all three homes at levels that exceeded the thresholds for vestibular response established recently by Dr. Alec Salt and his colleagues by over 30 to 40 dB in the frequency range below 1 Hz. The infrasound during some of the tests saturated the homes from the top floor to the basements with little variation across any of the floors. The home at 7000 feet was tested during a time when the nearest wind turbines were operating at about 10% of the capacity in a light wind and even with that condition infrasound was measured inside the homes at levels above the vestibular thresholds. Peak sound pressure levels during periods with wind turbines operating at 50% or more of capacity were observed to routinely exceed 95 dB and periodically 100 dB. I have attached a copy of the Wisconsin PSC Team Report and a copy of a table summarizing the tests that shows the unweighted (dBZ) sound pressure levels of 95 dB and higher.

Significant weight should be given to these findings. Infrasound at the measured levels meets the definition for "audible" set by even the most conservative wind industry experts, such as, Dr. Leventhall. Thus, the Shirley wind infrasound tests have demonstrated that not only do wind turbines produce significant levels of infrasound, they also produce it in a frequency range below the ability of most professional acoustical instruments to accurately measure. This is an important finding since it explains why other studies of wind turbine infrasound have failed to identify similar high levels.

The Team report included a theory for why the symptoms reported by the people who owned the homes were similar to motion sickness. Studies of human response to these low frequencies have been conducted since the early 1970's, generally by military and NASA groups attempting to identify people who might be more sensitive to motion sickness and thus not good candidates for jet fighters or moon shuttles. Dr. Schomer introduced the theory that the infrasound from the Shirley wind turbines was in that frequency range known for nauseogenicity. This region is below 1 Hz, but that is also the region where the highest infrasound pressures are measured. That region can be predicted for a wind turbine by calculating the wind turbine's blade passage frequency (BPF). The BPF for a GE 1.5 SLE turning with a hub speed of 20 rpm is 1 Hz. For a larger wind turbine, such as the 2MW and larger turbines being deployed in many wind energy projects the BPF is below 1 Hz. I have attached another chart showing the BPF for a range of common wind turbine makes and models. The chart shows the range for nauseogenicity and the range for each wind turbine's BPF from the slowest to fast hub rpm.

Based on the finding from the Shirley Wind infrasound study the Team members issued a joint conclusion. That conclusion, given at the end of Section 4 on page 7 of the Team Report is excerpted below:

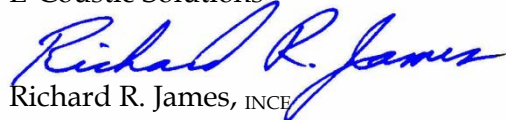
"The four investigating firms are of the opinion that enough evidence and hypotheses have been given herein to classify LFN and infrasound as a serious issue, possibly affecting the future of the industry. It should be addressed beyond the present practice of showing that wind turbine levels are magnitudes below the threshold of hearing at low frequencies."

There is no reason to believe that the wind turbines proposed for the Shu'luuk Wind Project pose any less of a risk to the people in the host community. The size of the wind turbine puts the BPF in the same range as that of the Nordex N11 models that are associated with the adverse health effects in the Shirley Wind project.

The Shirley Wind infrasound study has demonstrated that industrial scale wind turbines can be linked to the reports of adverse health effects classified under the term "Wind Turbine Syndrome" and several new studies are being conducted to reproduce the results found by the independent Team that conducted the Wisconsin Public Service study.

It would be prudent include this new research into the EIS and to consider the conclusion of the Team that "LFN and infrasound (is) a serious issue, possibly affecting the future of the industry." Until the relationship between the reported adverse effects and wind turbine operation is better understood it would be prudent to follow the Precautionary Principle and withhold approval of any projects were people are located within 1.25 miles of the boundary.

Sincerely,
E-Coustic Solutions



Richard R. James, INC.