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18-1607-EL-BGN Emerson Creek Wind Farm

My name is Gerard A. Wensink. I've lived in Oxford Township for sixty four years and am a third generation farmer. I am also co-owner of Wensink Farm Seeds Inc. a seed processing facility. I own farm ground in Erie, Huron, Lorain, Sandusky and Seneca counties. We have equipped our tractors, sprayers, seed production detassellers and harvest equipment with the latest RTK guidance systems. RTK is used for precision planting, spraying and variable rate lime and fertilizer placement and mapping. We have invested over \$200,000.00 on this equipment to help stop the Lake Erie algae problem. Rather than subscribing to a DGPS network system we installed our own base station. It has been located at 4704 Wood Rd. Monroeville Ohio since 2014. It is a Trimble system using call sign WQTT977 and uses an FM signal. It's broadcast antenna is located on top of our 100 ft tall grain leg.

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Apex Clean Energy and Emerson Creek Wind are proposing to build six 655 ft tall wind turbines less than two miles from our base station. After hearing of the proposed locations I contacted Greenfield Ag LLC, the dealer that installs our equipment. He is concerned we will receive signal interference from the electromagnetic fields produced by these turbines. I also contacted Trimble. The article they referred me to stated FM transmitters with antenna closer than 4 km (2.48 miles) from proposed turbines can under some conditions experience a compromised signal.

Evans Engineering Solution, the firm Apex hired to do the impact study, also stated the positional signal delivery failure can occur from obstruction to degraded line of sight to the GPS satellites and to the DGPS base station. They stated turbines could cause transient reduction or interruption of the base station signal received by the mobile unit, when one or more turbines are in the "shadow" of the base station.

I am also concerned about the building of turbines on the Karst formation in Groton Township. What impact will this have on the flooding problems in this area? I also have fields in this area affected by the flooding problems.

Bats are unheralded friends to farmers controlling insects. It is estimated bats save agriculture billions of dollars in consistent crop protection in place of pesticides

When conditions are too wet for ground spraying I need to hire an aerial flying service to apply fungicides to my small grain and soybean fields for seed quality. This process will be disrupted because of tower placement.

Infra-sound produced by large turbines have adverse health effects on animals and humans. It is dangerous to assume that wind turbines are safe for animals or humans living in close proximity. I also raise beef cattle next to my residence.

At my residence we use two outdoor antenna to receive free HD signals from Toledo and

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Cleveland. Evans Engineering Solution stated that when our signal is interrupted mitigation would include paying us \$450.00 per year for satellite television. Satellite tv in my area would cost three to four times that amount. I would only have news from one local source, not two. How is this a good deal for us?

My Farm was split by the Ohio Turnpike and the East Ohio Gas line in the 1950's. Last summer the Nexus Pipeline ripped through over two miles of our farmland. These were needed infrastructure improvements for our state and country. Monster turbines do nothing to improve our society, they only add to our problems. We do not need an industrial wind project in our community.

Apex does not have strong community or land owner support. Erie and Huron counties both voted down the tax abatement PILOT. Wind turbines do not compliment working farms. They will only slow efficiency and production.

Residents living in the footprint of a wind project should have a vote in the decision to build these turbines. Wind projects should not be allowed to cause us harm. I have gone to the Bellevue Apex office asking for GPS coordinates for the turbines next to my business and residence. They told me they do not use GPS but I could take a picture of the proposed sites on a map they had. It has spots marked with stars of the proposed turbine locations. The map had no property borders, township borders, landmarks and hardly any road names. This is to keep us in the dark.

Please consider this devastation to my neighbors and my family. We should at all costs avoid avoidable harm. Please help me in any way possible in informing the OPSB to deny approval of the Emersion Creek Wind Project. We cannot have our guidance systems interrupted by these turbines.

Sincerely,



Gerard A. Wensink

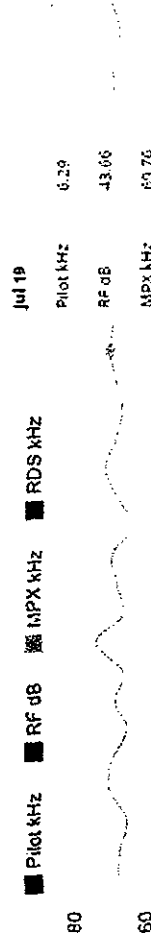
10106 Patten Tract Rd.

Monroeville , Ohio 44847

## AM and FM broadcast radio stations

A wind turbine too close to an AM transmitter, antenna or multi-antenna array can alter the signal coverage pattern from its FCC authorized pattern. The minimum distance a turbine can be to an antenna without altering the signal coverage pattern, called the exclusion distance, varies depending upon antenna type and broadcast frequency. For an AM station with a non-directional, single antenna, the exclusion distance is equal to 1 wavelength of the broadcast signal (e.g. 1½ kilometer for a station broadcasting at a frequency of 600 KHz). For an AM station with a directional, multi-antenna array, the exclusion distance is the lesser of 10 wavelengths or 3 kilometers.


The coverage of an FM station whose transmitting antenna is at a distance greater than 4 km from one or more wind turbines, is not subject to degradation by the turbines. FM transmitters with antennas closer than 4 km from proposed wind turbines can, under some conditions, experience a compromised signal. This possibility exists when FM antennas and wind turbines are located in close proximity on the same mountain ridge.



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The RTK system must lock onto at least five GPS satellites in order to precisely determine the three-dimensional position of the farm vehicle as it travels, and the base station must be locked onto the same set of satellites as the mobile unit when calculating and transmitting the position corrections. A commercial-grade GPS receiver typically can lock onto 10 or more satellites in areas where the sky is fairly unobstructed.

Farmers that use the AutoSteer system typically are provided the DGPS information on a subscription basis through a network consisting of several base station transmitting antennas that are mounted on silos and grain elevators in one or more counties. Many farms, rather than subscribing to a DGPS network service, have their own base station.

Methods of resolving GPS signal obstruction if it occurs

Positional signal delivery failure due to obstructions such as wind turbines, if it occurs, would involve the GPS/DGPS receiver in the mobile unit. The two possible modes of mobile receiver failure that potentially could be caused by obstructions are: 1) degraded line of sight to the GPS satellites, and 2) degraded line of sight to the DGPS base station.

Since GPS receivers can generally lock onto several satellites in different directions at any one time, the acquisition of GPS signals should be unencumbered by wind turbines. Tests conducted in Europe have demonstrated that GPS signals can be received without difficulty in and around wind turbine projects, and GPS receivers operate normally in such an environment. If such difficulties do occur, the scheduling for farming activities could be adjusted slightly, perhaps a few hours, to a time when the GPS satellites are in more advantageous positions in the sky. For example, John Deere has software available that will calculate the times and dates when GPS satellites are in better view at any given location.

The turbines potentially could cause transient reduction or interruption of the base station signal received by the mobile unit when one or more turbines are in the "shadow" of the base station. However, the RTK AutoSteer system is designed to function correctly for up to 15 minutes if the signal from the base station is temporarily blocked<sup>3</sup>. Even if subscriber network base station blockage becomes an intractable problem in a particular area, the affected farms could have their own base stations set up, either a permanently fixed station using an antenna mast to cover the entire farm, or one that is movable from one field to the other. If the field is in the coverage area of another network base station, the solution could be as simple as switching the mobile unit to the other base station.

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<sup>3</sup> The mobile unit must be powered for more than an hour in order to operate up to 15 minutes with full functionality in the absence of the base station signal.



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## **RTK AUTOSTEER SYSTEMS AND THEIR COEXISTENCE WITH WIND TURBINES**

*By B. Benjamin Evans  
Radio Frequency Engineering Consultant  
Evans Engineering Solutions*

This paper has been written to address concerns regarding the potential effect of industrial wind turbines on the utilization of RTK AutoSteer for farming activities. AutoSteer is a GPS-based system that allows hands-free operation of tractors and other mobile farm equipment, and that guides the vehicle along precisely determined paths with a high degree of accuracy and repeatability.

### Background

AutoSteer, first introduced in the U.S. about 2002, is being used by an increasing number of commercial farms to provide the precision needed for efficient tilling, spraying and seeding. The RTK system (which stands for real time kinematics) is the most accurate AutoSteer system available, with an accuracy of less than one inch.

The RTK AutoSteer system's main radio components<sup>1</sup> are an antenna module for the top of the farm vehicle, a processor-controller inside the cab of the vehicle and one or more radio base station transmitters, either permanently installed on a building or other structure, or portable unit. The vehicle antenna module has a GPS antenna-receiver which picks up positioning signals from GPS satellites orbiting the earth and sends them to the mobile processor, and a small whip antenna that receives signals from the base station. Like the mobile unit, the base station contains a GPS antenna and a whip antenna for sending signals to the mobile unit.

Because the global positioning data from the satellites are accurate to only within about 15 meters<sup>2</sup>, the data must be augmented by differential GPS correction (DGPS) in order to obtain the accuracy required for RTK operation. DGPS corrections are continuously updated and transmitted to the mobile unit in real time by the AutoSteer base station. The base station software calculates these corrections by comparing the known fixed location of the base station with the location as determined by the GPS satellites. These corrections, received by the mobile unit, are used to correct the farm vehicle's position.

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<sup>1</sup> The system also includes a steering controller kit, allowing hands-free operation, and, in the case of the John Deere AutoSteer system, a terrain compensation module which corrects steering on uneven terrain.

<sup>2</sup> As the GPS satellite signals travel through the earth's atmosphere, a slight error in the position calculations results. This error varies with the location on earth and with time.



In conclusion, if wind turbines are demonstrated to cause significant problems with use of the RTK AutoSteer system in a particular area, mitigation methods such as those described in this paper should resolve the problem.

Respectfully Submitted,

B. Benjamin Evans  
Radio Frequency Consultant

March 24, 2017

*THIS WAS GIVING TO me FROM Apex*