

## **Sound Assessment (Supplement for Nighttime Construction)**

In March 2007, Resource Systems Engineering (RSE) completed an analysis of sound levels for the Stetson Wind Project, a proposed 57 megawatt (MW) wind energy facility to be located on Stetson Mountain in T8R3 and T8R4, NBPP, in Washington County, Maine. The Townships (T8R3 and T8R4 NBPP) fall under the jurisdiction of the Maine Land Use Regulation Commission (LURC), which has set forth land use standards for certain developments. Section F.1 *Noise* of LURC Chapter 10 *Land Use Districts and Standards* establishes noise standards by land use district for unorganized territory in the State of Maine.

The Sound Assessment presented a description of the wind project, a summary of Maine LURC noise standards, sound level estimates for wind turbine operations, and a comparison to relevant LURC sound level limits. The Sound Assessment provided an evaluation of noise from construction and operation of the wind turbines, and the associated substation. The analysis of construction noise was based on the assumption that construction activity would occur only during daytime or daylight hours, and therefore would be exempt from LURC sound level limits. The current expectation is that some construction activity is likely to occur during nighttime periods. The level of nighttime construction activity will be considerably less than planned for daytime construction.

The following provides an assessment of noise from nighttime construction activity associated with the Stetson Wind Project. This assessment determines the expected sound levels from nighttime construction, compares them with relevant noise standards, and provides recommendations for noise mitigation measures.

### **Sound Levels from Nighttime Construction**

A variety of construction equipment will be used to build the wind project including earth-moving equipment for land clearing, excavation, and site grading, and cranes to erect the wind turbines. Construction noise is both temporary and variable. Many construction machines operate intermittently and equipment varies with each construction phase. Noise sources associated with nighttime construction will consist of the following:

1. Diesel Generator – one diesel-powered generator operating in proposed construction laydown areas south of the assembly pads for Turbines 1 and 2.
2. Boom Crane – one diesel-powered lattice boom crawler crane used to erect the wind turbines and install the rotors.
3. Earth Mover – one bulldozer and one excavator for general site work. Only one of these machines will operate at one time and in a single area of the site during nighttime construction.
4. Haul Trucks – up to two 35 ton off-road haul trucks may operate at night. Only one will operate within a specific area of the site during nighttime construction.

Typical earth moving equipment and cranes generate sound levels of 75 to 88 dBA at a distance of 50 feet (ref. measurements of similar equipment by Resource Systems Engineering). Noise from generators can produce sound levels over a wider range, but generators with reduced sound levels will be selected for nighttime construction.

Sound levels from nighttime construction were estimated for nearby receiver location R5 as shown on Figure 1, Vicinity Site Plan. Location R5 represents the property boundary of the wind project nearest to

areas of nighttime construction and is approximately 1,050 feet from the center of the assembly pad for Turbine 1. The nearest laydown area is approximately 800 from location R5. The locations of the planned construction laydown areas is shown on Exhibit 1, Figure C-2. The estimated sound level during full load operation of either the boom crane, excavator, bulldozer and haul truck is 88 dBA at 50 feet. The generator will be specified not to exceed a sound level of 70 dBA at 50 feet.

The highest percentage of the time that this equipment will operate at full load in a single area is approximately 50% for the boom crane, excavator and bulldozer, and approximately 25% for the haul truck. When used, the generator will operate at a nearly continuous rate. When taken over a period of one hour, the equivalent sound level for 50% operation is reduced by 3 dBA and for 25% operation is reduced by 6 dBA.

The following noise mitigation measures will be implemented to ensure that sound level limits from nighttime construction do not exceed the LURC nighttime sound level limit of 55 dBA.

1. The generator will not exceed a sound level of 70 dBA at 50 feet.
2. Operation of the boom crane, excavator or bulldozer will not occur south of the assembly pad for Turbine 3. Thus, nighttime operation of this equipment will occur beginning at Turbine 3 and moving north.
3. Operation of the haul trucks will not occur south of the laydown area adjacent to Turbine 2.

The following Table 1 provides estimates of sound levels at location R5 with these noise mitigation measures and the noise specification for the generator. Attenuation is based on hemispherical divergence of sound over distance.

<b>TABLE 1</b>				
<b>ESTIMATED SOUND LEVELS (dBA) FROM NIGHTTIME CONSTRUCTION</b>				
<b>Source</b>	<b>Full Load Sound Level at 50 feet</b>	<b>Source Location</b>	<b>Distance from Location R5 (ft)</b>	<b>Estimated Sound Level at Location R5</b>
Generator	70	South Laydown Area	800	46
Boom Crane, Excavator or Bull Dozer	88	Turbine Pad 3	2800	50
Haul Truck	88	Laydown Area near T2 Pad	1700	51
<b>Combined</b>	<b>N/A</b>	<b>As Above</b>	<b>As Above</b>	<b>54</b>
Distance Attenuation = $20 \text{ Log } D_1/D_0$ where $D_1$ is the distance from the noise source to receiver R5 and $D_0$ is 50 feet.				

The combined sound level from nighttime construction activity at receiver location R5 is 54 dBA or 1 dBA below the LURC nighttime limit of 55 dBA. Attenuation due to terrain and vegetation were not accounted for in these sound level calculations and would lead to lower estimated sound levels from nighttime construction.

