Subject: FAA Coordination and Timing

Scope: Prepared for Washburn Wind Energy LLC's Application for Permit at Black Hawk County, Iowa

Prepared by: Arne Nielsen, Engineer, Washburn Wind Energy LLC

Revision: Final

Date: March 26, 2018.

Summary

FAA determinations for the Washburn project were obtained last year over an extended period of time in that several delays were encountered due to the fact that Washburn Wind Energy seeks to have all FAA lights on turbines controlled by an ADLS (Aircraft Detection Lighting System). This feature will turn the FAA lights on only when an aircraft is in the area at night and at a lower altitude. Vendors of ADLS systems and their system integration are just now being type approved by FAA and our preferred vendor has been approved on a project-by-project basis. The vendor is expecting an engineering memo from FAA in the near future listing them as a general ADLS vendor. FYI, this particular vendor installs radar systems for air traffic control and air traffic control worldwide. The Washburn Project will be among the first wind projects in Iowa to have this neighbor-friendly feature that will keep FAA lights from being turned on at night almost all the time.

FAA Approval Process

FAA's approval process is rather lengthy and should be limited to two rounds per project rather than constantly requesting layout updates or turbine changes etc. Micro-siting (small coordinate changes) is no longer an option with FAA who strives at conducting aeronautical studies within 45 days although the usual study time varies between 30 and 60 days. Individual turbine lighting specifications are usually not given until requested (when the layout is final, which Washburn is now). On projects <u>without</u> ADLS, the FAA rules are outlined in "FAA Advisory Circular 70/7460-1, MARKING AND LIGHTING WIND TURBINES" which states that there should be no unlit separations larger than 1/2-mile which with today's larger turbines requires lights on almost all turbines. A slightly conservative lightning plan lighting only 3 out of 4 turbines (shown below in figure 1) has been submitted and which may be considered by FAA.

There are currently 37 "DETERMINATION OF NO HAZARD TO AIR NAVIGATION" permits covering the Washburn project as of August 2017. Approximately 4 out of 5 of these were <u>re-filed</u> on March 26, 2018 due to turbine moves and with a few more expected improvements over the last 3-4 months. Re-filing is required when turbines move more than 1 second (from pre- to post-landowner approved locations, setback and other considerations) and if the overall AMSL (site elevation + height above ground level [AGL]) increases by 1 foot or more. Final FAA determinations are expected around mid-May listing ADLS and final lighting requirements.

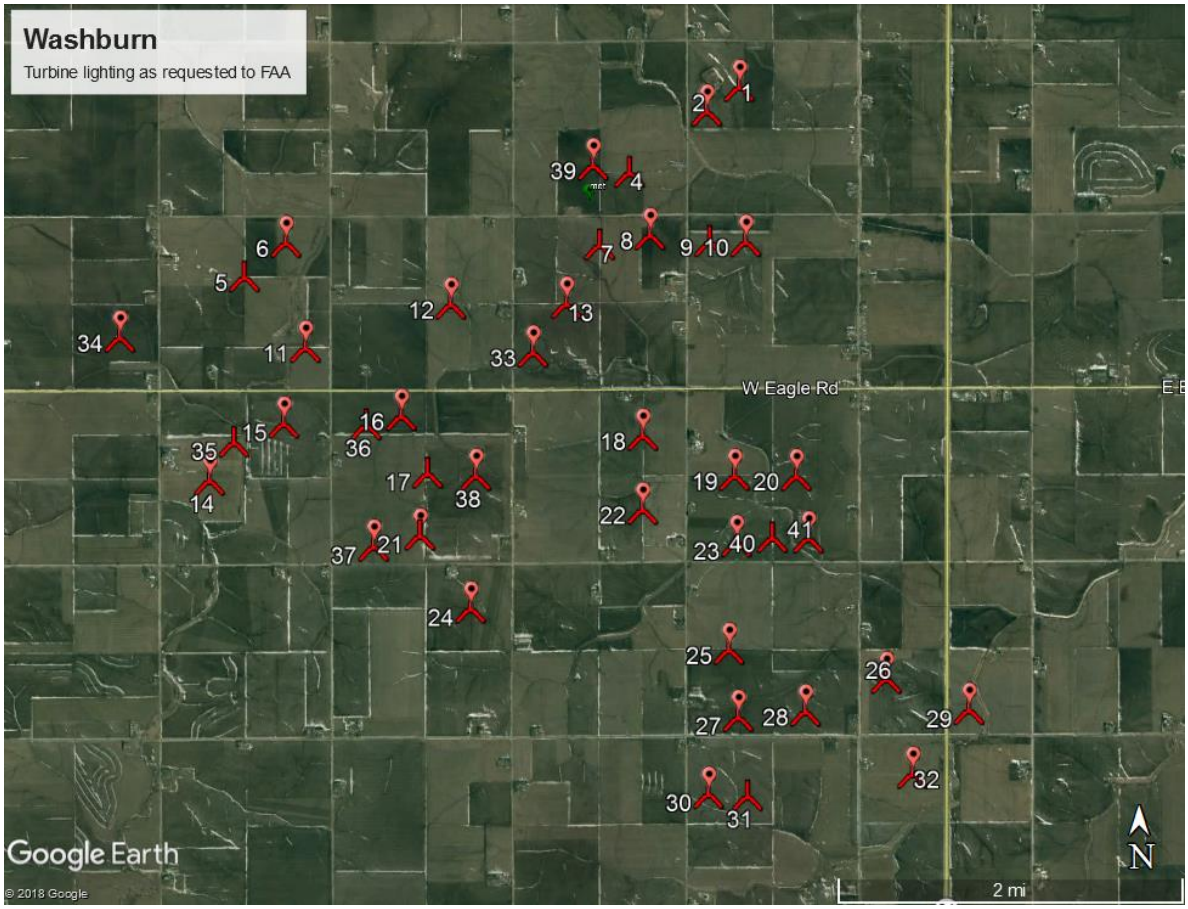

Figure 1. Slightly conservative FAA lightning plan (3 of 4 turbines lighted)

A few more than the 32 turbines shown may need lights, especially because 5 turbines will not be built (are alternates) and which will be terminated.

Figure 2 below shows the first page (of 6) of an FAA determination (Study No. 2017-WTE-6551-OE). This particular turbine is T104 and which has now been re-named to 33. The FAA determination will remain as is since FAA use the study number and the coordinates to identify the structure rather than the turbine number. T33 is one of the turbines that were not re-filed. All FAA determinations are publicly available on FAA's website where all other rules and regulations can also be viewed and downloaded.

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2017-WTE-6551-OE

Issued Date: 11/03/2017

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**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine T104
Location:	Waterloo, IA
Latitude:	42-20-38.60N NAD 83
Longitude:	92-23-39.17W
Heights:	955 feet site elevation (SE) 499 feet above ground level (AGL) 1454 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 1, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

__X__ At least 30 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.
Your request for consideration to utilize an Aircraft Detection Lighting System to operate the recommended lighting is not approved. See attached for additional condition(s) or information.

This determination expires on 05/03/2019 unless:

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Figure 2. Slightly conservative FAA lightning plan (3 of 4 turbines lighted)