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Memorandum

Date: May 5, 2020

To: NHSEC – Pamela G. Monroe, Brennan Lenehan - Michael J. Iacopino

From: TransAlta - Jean-François Latour

Re: Antrim Wind Energy (AWE) – Information request on the Aircraft Detection Lighting System (ADLS)

Please find our responses to the Information Request received from Mr. Michael J. Iacopino on April 30, 2020.

Item	Questions	Response
1	Can we confirm that the February 15 – 18 problem was not the result of ice?	The ADLS outage causing the aerial obstruction light to be turned on between February 15 and 18 was caused by the motor of the 30m radar that tripped.
2	Was the radar motor that tripped in February ever replaced?	After inspection by the ADLS manufacturer, the 30m radar motor drive was replaced on March 6.
3	What is the FAA support for the proposition that the 24-72 hours is standard for the lights to remain on? See March 4, 2020 correspondence from Transalta.	Per Federal Aviation Administration (FAA) requirements, Advisory Circular (AC) 70/7460-1L, section 14.2.5.1: *In the event of an ADLS component or system failure, the ADLS should automatically turn on all the obstruction lighting and operate in accordance with this AC as if it was not controlled by an ADLS. The obstruction lighting must remain in this state until the ADLS and its components are restored.* The March 4, 2020 letter provided an expected timeline of 24-72 for system restoration following typical causes of *component or system failure*, such as icing event[1], temporary loss of Permanent Echo[2], radar fault (e.g. motor tripping), etc. These causes render the ADLS unable to confirm that the sky is clear and turns on the lights as required by FAA established standards.

[1] Ice that builds-up on the radar itself temporary preventing its proper operation.
[2] The system performs continuous checks on the persistence of distinguishable permanent/fix echo.

Item	Questions	Response
4	Were there new Determinations after the certificate issued? Were they filed with the Committee?	One FAA's Determination of No Hazard (DNH) has been issued post-certificate and has been provided to NHSEC (https://www.nhsec.nh.gov/projects/2015-02/post-certificate-filings/2015-02_2019-10-17_faa_determ_met_tower.pdf). Latest FAA Marking & Lightning Recommendation (MLR) for the met towers at Antrim, respectively 2019-WTE-5540-OE and 2019-WTE-5541-OE were also provided recently to NHSEC (April 29, 2020). At the same time, the turbines MLR were also resubmitted for NHSEC's convenience (2016-WTE-6204-OE, 2016-WTE-6205-OE, 2016-WTE-6206-OE, 2016-WTE-6208-OE, 2016-WTE-6209-OE, 2016-WTE-6210-OE, 2016-WTE-6211-OE, 2016-WTE-6212-OE, 2016-WTE-6213-OE).
5	Need explanation of the communication fault/issue described in the April 23, 2020 email.	On April 21 4:08 am the ADLS experienced a continuous communication/control error between system components. The aerial obstruction lights were turned on as required by FAA section AC 70/7460-1L, section 14.2.5.1. The continuous communication error was investigated by the ADLS manufacturer and resolved in the afternoon of April 22. As described in the April 23 email, following the resolution of the continuous communication/control error, it was found that intermittent occurrences of punctual communication faults/errors remained after April 22 (few seconds each minutes or hours, not consistent). During those occurrences, the aerial obstruction lights were/are turned on as required for few seconds at a time. See below for more details.

Item	Questions	Response
6	Status of repairs to the communications error?	The continuous communication/control error between system components noticed on April 21 4:08 am was investigated by the ADLS manufacturer and resolved in the afternoon of April 22. Since April 22, the ADLS manufacturer investigated the intermittent occurrences of punctual communication faults/errors. After analysis, the ADLS manufacturer found the following and executed the actions as indicated: - 2s communication faults/errors: These communication faults/errors are causing the aerial obstruction lights to be turned on during 2s. After investigation and corrective actions, these were resolved on April 24 (per confirmation by ADLS manufacturer on April 29); - 10s communication faults/errors: These communication faults/errors are causing the aerial obstruction lights to be turned on during 10s. A first fix was rolled out on April 23. However, the fix seems to have corrected the situation only in part. The analysis continues and preparation of a second fix is currently ongoing by the ADLS manufacturer (Estimated Time of Delivery: unknown).
7	Have the lights been operational since the 4/22 problem? If so in what mode?	Since the afternoon of April 22, the ADLS is back to its normal operation mode in the sense that it was and is turning on the lights as required (moving object detected within the Detection Zone, lost/uncertainty 30 mins timer, fault/error). The occurrence of illumination due to punctual communication faults/errors were reduced following the deployment of the fixes described above, but an additional fix is pending to resolve it completely.
8.a	In the April 17 correspondence you state: "*In addition, optimization is also undergoing to enhance the permanent echo detection which will reduce the occurrence of uncertainty due to temporary loss of permanent echo as explained in our March 4, 2020 letter to your attention.*" Was a loss of permanent echo detection a contributor to the February situation where the lights were observed to be on for an extended period of time?	The loss of Permanent Echo detection was not a contributor to the February 15-18 situation.

Item	Questions	Response
8.b	What is the current status of the optimization efforts?	The two main optimizations are the adjustment of the Non-Tracking Zones and the enhancement of the detection of the Permanent Echo. - The adjustment of the Non-Tracking Zones aims at reducing the detection by the ADLS of moving objects unrelated to air traffic, such as car traffic and movement in tree canopy. Before any adjustment can be made, careful review and analysis are required to assure that the adjustments still allow for the proper detection of any and all aircrafts inside the Detection Zone. The operational data is under review at this moment by the ADLS manufacturer and further data acquisition may be required to assure the safety of any aircraft inside the Detection Zone. - The operational data for the Permanent Echo has been reviewed by the ADLS manufacturer. Various strategies for Permanent Echo detection enhancement are currently explored as existing tall objects in the vicinity of AWE provide limited stable/persistent echo for the radars. The analysis of these strategies is currently ongoing.

We believe the responses provided herein should address all items raised in the Information Request received by email from Mr. Michael J. Iacopino on April 30, 2020.

Regards,

TRANSALTA CORPORATION

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