What Powers You

May 4th, 2022

Melanie Bachman, Esq.
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: PETITION NO. 1503 - Bloom Energy Corporation petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a customer-side 750-kilowatt fuel cell facility and associated equipment to be located at Milford Hospital, 300 Seaside Avenue, Milford, Connecticut.

Dear Ms. Bachman:

Please see the attached responses to the interrogatories provided to Bloom Energy on April 18th, 2022.

Respectfully,

Kristen Grillo
Senior Permitting Specialist | East Coast Field Office
Customer Installations Group | North America
(917) 803-4511
Kristen.Grillo@bloomenergy.com

Petition No. 1503
Bloom Energy Corporation
Milford Hospital – 300 Seaside Avenue, Milford
Interrogatories

1. What is the estimated cost of the proposed project?

   Response: The estimated cost of the project is $1,021,650.00.

2. Referring to Petition, p. 10 has the City and/or abutters provided comments to Bloom since the Petition filing? If yes, summarize the comments.

   Response: No comments have been provided by the City and/or the abutters notified.

3. Referring to Petition p. 4, identify the media to be used for pipe cleaning procedures at the proposed facility in accordance with Public Act 11-101, An Act Adopting Certain Safety Recommendations of the Thomas Commission and Connecticut General Statues § 16-50ii.

   Response: The media to be used for the pipe cleaning procedures at the proposed facility would be compressed air.

4. Are bollards or other vehicle impact protective measures proposed along the north side of the facility adjacent to the hospital driveway? If yes, revise the site plan to include such measures. If no, what vehicle impact protection measures are proposed for this area?

   Response: No other vehicle impact protections are proposed. The systems are sufficiently set back greater than 3' from a 6" raised curb. The curb acts as a means to deflect or deter vehicles from further accidental impact with the fuel cells themselves and the energy server systems are located outside of a vehicle's normal travel path or designated drive aisles, all in accordance with sections 303.4 of the 2021 International Mechanical Code (IMC) and 303.4 of the 2021 International Fuel Gas Code (IFGC).

5. Would the proposed fuel cell facility include foam noise dampening material at the fuel cell doors and exhaust ports? If yes, was the 5dB reduction included in the noise level calculation? If not, would Bloom be willing to install the foam dampening material? What is the extra cost for fuel cell units with the foam dampening material?

   Response: The proposed fuel cell facility will include foam noise dampening material at the fuel cell doors and exhaust ports. The noise dampening material is standard in the Bloom energy servers and there is no associated extra cost.

   In light of the proximity of residential receptors to the proposed fuel cell facility, Bloom retained Veneklasen Associates to provide a property line noise analysis for the proposed facility. Their report, provided as Attachment #1, assumes inclusion of the noise dampening material and determines that the noise levels at all adjacent properties are compliant with the State regulations.

6. Referring to Petition p. 8, provide the calculation supporting the reduction in carbon emissions by more than 25%.

   Response: The characterization of reduction in carbon emissions on page 7 of the Petition inadvertently overstated the reduction due to use of outdated eGrid value comparisons. The most

recent (2020) eGrid values reflect the increasing use of cleaner generation. The decrease in the 2020 input numbers results in a decrease from approximately 25% to 13%.

The updated emission calculation is as follows:

<u>Input variables:</u>

- **NPCC New England subregion, Non-baseload output emission rates CO2e = 886.9 lb/MWhr, Grid Gross Loss = 5.3%**
- **Bloom Average emission rate CO2e = 818 lb/MWhr**
- **(((886.9 * 1.053) – 818)/886.9) * 100 = 13% CO2e improvement when choosing Bloom power over the non-baseload grid power.**

Attachment 1: Sound Study Report prepared by Veneklasen Associates

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

April 27, 2022

Bloom Energy
4353 North 1st Street
San Jose, California 95134

Attention: **Brandon Leaverton | Supply Chain Specialist – Construction**

Subject: **YNH002.0 300 Seaside Ave, Milford, Connecticut**
Property Line Noise Analysis
Veneklasen Project No. 4631-029

Dear Brandon:

Veneklasen Associates, Inc. (Veneklasen) was contracted to evaluate noise impact of proposed fuel cells for the subject project in Milford, Connecticut. This report includes predicted noise levels at adjacent property lines and an evaluation of necessary mitigation, if warranted, to comply with the local noise ordinance in the surrounding community. This report documents our acoustical comments.

Noise Criteria

The City of Milford, Connecticut does not have a defined noise ordinance. The State of Connecticut provides property line noise limits for various zoning types. Statutes Chapter 442 "NOISE POLUTION CONTROL", Section 22a-69-3.5 provides the following noise limits per zone type summarized below in Table 1. Specific zoning definitions are provided in Sections 22a-69-2.3, 22a-69-2.4, and 22a-69-2.5. In general, Class A is defined as residential land, Class B is defined as commercial land, and Class C is defined as industrial land.

Table 1. State of Connecticut Noise Limits

Emitter Class	Receptor			
	C	B	A (Day)	A (Night)
Class C Emitter	70 dB(A)	66 dB(A)	61 dB(A)	51 dB(A)
Class B Emitter	62 dB(A)	62 dB(A)	55 dB(A)	45 dB(A)
Class A Emitter	62 dB(A)	55 dB(A)	55 dB(A)	45 dB(A)

Additionally, Section 22a-69-3.6 states the following:

> *In those individual cases where the background noise levels caused by sources not subject to these Regulations exceed the standards contained herein, a source shall be considered to cause excessive noise if the noise emitted by such source exceeds the background noise level by 5 dBA, provided that no source subject to the provisions of Section 3 shall emit noise in excess of 80 dBA at any time, and provided that this Section does not decrease the permissible levels of the other Sections of this Regulation.*

Veneklasen assumes proposed fuel cells will run 24-hours per day. There are both residential and commercial properties nearby the proposed fuel cells. In the following analysis, fuel cell noise levels are compared to the applicable limits described above.

Existing Ambient Noise

To determine the existing ambient noise levels at the site due to existing traffic sources, Veneklasen has utilized the Traffic Noise Model computer software program developed by the FHWA (Federal Highway Administration TNM 2.5) in order to predict vehicular noise levels at nearby sensitive receptors. Traffic counts for the nearby roadways were provided by the Connecticut Department of Transportation (CTDOT). The primary noise source is vehicular traffic on Seaside Avenue. CTDOT only published traffic count data for Seaside Avenue and not for any nearby local roads.

The FHWA software utilizes traffic count data, as well as other attributes of the roadway, to calculate average daytime, evening time, and nighttime noise levels. Since the fuel cells will operate 24-hours per day, Veneklasen calculated the daytime and nighttime noise levels at each sensitive receptor, as applicable. These are summarized below in Table 2. If existing ambient noise levels modify the property line noise limits as defined above, these are also included in the table below.

Table 2. Average Daytime/Nighttime Ambient Traffic Noise Levels

Receptor Location	Receptor Type	Calculated Daytime Average Level, dBA	Calculated Nighttime Average Level, dBA	Revised Noise Limit, dBA
27 Cricklewood Rd	Residential	N/A	39	N/A
4 Lakeside Rd	Residential	N/A	40	N/A
18 Cricklewood Rd	Residential	N/A	41	N/A
262 Seaside Ave	Residential	N/A	50	55
267 Seaside Ave	Residential	N/A	58	63
271 Seaside Ave	Residential	N/A	58	63
281 Seaside Ave	Commercial	66	N/A	71

Property Line Noise Analysis

Drawings dated March 9, 2022 indicate that proposed fuel cells will be installed in the south parking lot of the existing property. Proposed fuel cells are shown in green in Figure 1 below. Additionally, the nearest receptors are annotated in blue.

The current fuel cell installation method includes a foam dampening material that is installed at the doors and exhaust to the fuel cells. Measurement data of these units when compared to units without foam indicate that the foam compound reduces noise levels produced by the fuel cells by approximately 5 decibels. See Appendix A below for fuel cell sound power data and foam compound reduction data used in the following analysis.

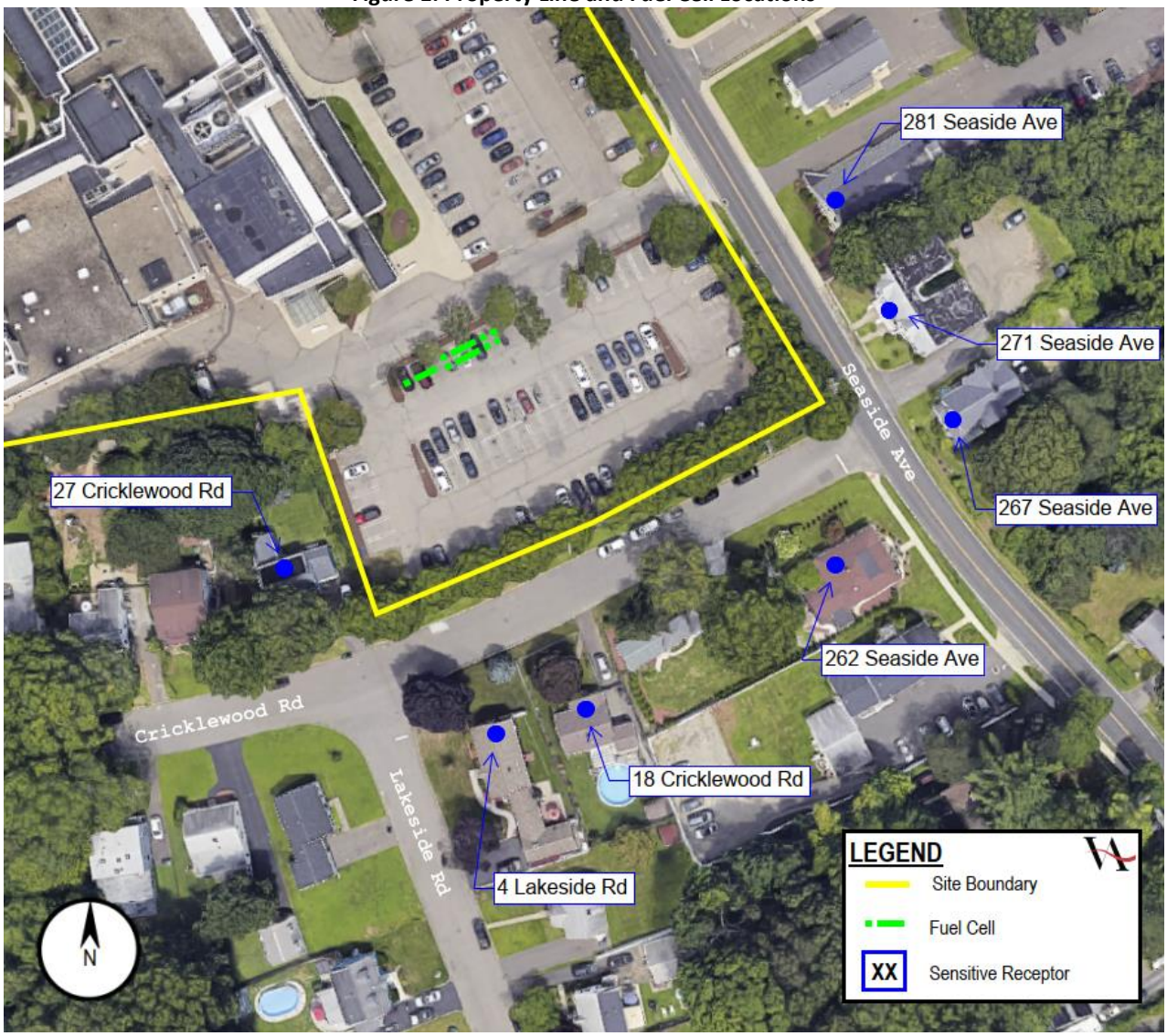
The calculated fuel cell noise levels as compared with State noise level limits are presented in Table 3 below. Note that the reported distances between property lines and the fuel cells are taken from the closest face of the fuel cell nearest to the associated property line.

Table 3. Fuel Cell Property Line Noise Levels: No Mitigation

Sensitive Receptor	Distance from Fuel Cell, ft	Applicable Noise Limit, dBA	Calculated Fuel Cell Noise Level, dBA	Code Compliant?
27 Cricklewood Rd	87	45	45	Yes
4 Lakeside Rd	155	45	43	Yes
18 Cricklewood Rd	155	45	43	Yes
262 Seaside Ave	180	55	42	Yes
267 Seaside Ave	235	63	39	Yes
271 Seaside Ave	200	63	42	Yes
281 Seaside Ave	175	71	41	Yes

Calculated fuel cell noise levels to all adjacent receptors are compliant with State requirements as currently designed.

Figure 1. Property Line and Fuel Cell Locations



Summary

Veneklasen has reviewed the subject project proposed fuel cell property line noise levels as they pertain to the applicable design goals. There are no city noise regulations, therefore Veneklasen utilized the State of Connecticut noise limit requirements. Adjacent properties include both residential and commercial.

As currently designed, fuel cell noise levels are compliant at all adjacent properties. Therefore, no mitigation is necessary to comply with State noise limits.
If you have any questions, please do not hesitate to call.

Sincerely,
Veneklasen Associates, Inc.

Kevin Patterson
Associate

John LoVerde, *FASA*
Principal

Appendix A – Sound Power Levels

Sound power data was taken from the Mei Wu Acoustics (MWA) Report titled "Bloom Energy – ES5 Linear Sound Power Measurement", dated June 21, 2016. These reported levels were measured without the sound dampening foam described above.

Table 4. Fuel Cell Measured Sound Power Levels

Dampening Product Installed?	Measured Sound Power Level [dB] – 1/1 Octave Bands							
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	LwA
No	77.9	80.9	84.1	82.3	80.5	76.9	69.4	84.9
Yes	77.9	80.9	81.0	77.9	73.7	67.2	64.8	79.3

In a study conducted at an existing installation of the fuel cell systems, measurements were taken of the fuel cell banks with and without the dampening product. The Noise Reduction (NR) of the dampening product was calculated by taking the difference of these measured values at octave band frequencies. Note that no significant reduction was shown at the 63 Hz and 125 Hz bands. The modified sound levels for the fuel cells that were utilized in calculations shown in this report are shown in Table 4.

Table 5. Measured Sound Dampening Foam Mitigation

Condition	Measured Sound Pressure Level [dB] @10ft – 1/1 Octave Band				
	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
No Foam	70.8	66.8	65.5	62.4	53.6
Foam	67.8	62.5	58.7	52.8	49.0
Difference (NR)	3.1	4.4	6.8	9.7	4.6

Appendix B – Calculation Methods

Sound level attenuates over distance by a factor of -6 dB per doubling of distance. For example, if a sound source was measured to be 60 dBA at a distance of 10 feet, the measured sound level at 20 feet would be 54 dBA. Sound level reduction due to distance is calculated according to the following equation:

$$L_p = L_w + 10\log_{10} Q - 20\log_{10} d - 0.7$$

Where:
d = The distance between the center of the fuel cell unit to the property line in feet.
L_p = The sound pressure level at a distance *d* in decibels.
L_w = The sound power level from the fuel cell. Sound power levels are reported above in Appendix A in decibels.
Q = The directivity factor which dictates how sound radiates outward from the source. See Figure 2 below from the 2015 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Handbook, Chapter 48 describing *Q* factors and their associated sound radiation patterns.

Figure 2. ASHRAE Handbook: Q Factor Sound Radiation Patterns

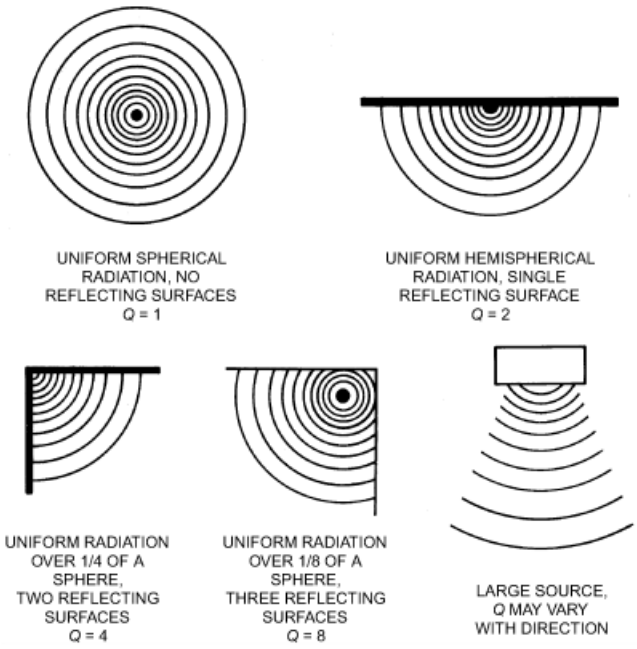


Fig. 30 Directivity Factors for Various Radiation Patterns

In the equation above, the greater the distance away from the sound source (*d*), the lower the sound level. This is intuitive and most people would consider this common knowledge.

In general, the more reflecting surfaces there are adjacent to a noise source, the more sound will bounce off these surfaces and radiate outward. In other words, larger *Q* factors will increase the noise level. For example, a fuel cell sitting on the ground, with nothing else around, would have a *Q* factor of 2 because the ground that the fuel cell is sitting on acts as a single reflecting surface. Another example would be a fuel cell sitting on the ground with a retaining wall on one side of it; this system would have a *Q* factor of 4 because both the ground and the retaining wall act as reflecting surfaces. A doubling of the *Q* factor increases the receiver noise level, L_p, by 3 dB.