

February 24, 2016

VIA E-MAIL AND U. S. MAIL

Ms. Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, Connecticut 06051

PETITION NO. 1214 – Groton Fuel Cell 1, LLC petition for a Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of a 5.6 megawatt fuel cell combined heat and power electric generating facility located at the Pfizer Groton campus, 445 Eastern Point Road, Groton, CT

Dear Ms. Bachman:

Enclosed on behalf of Groton Fuel Cell 1, LLC (the “Company”) are an original and 15 copies of the Company’s responses to the Council’s questions 1-20 in the above-referenced matter.

If you have any questions regarding the enclosed, please feel free to contact me.

Respectfully submitted,



Jennifer D. Arasimowicz
Vice President, Managing Counsel

Encl.

c: Robert L. Berchem, Esq., Berchem, Moses & Devlin, P.C.
Stephen W. Studer, Esq., Berchem, Moses & Devlin, P.C.

Interrogatory CSC-1

Groton Fuel Cell 1, LLC

Witness: Derek Phelps

Petition No. 1214

Page 1 of 1

Q-CSC-1 Approximately when did Groton Fuel Cell 1, LLC (GFC or Petitioner) first have discussions with Pfizer regarding a possible fuel cell at the Pfizer Groton campus?

A-CSC-1: FuelCell Energy, Inc. ("FCE"), ultimate parent of Groton Fuel Cell 1, LLC ("GFC"), first met with Pfizer at its Groton campus on Friday, May 8, 2015. It is FCE's understanding that Pfizer was in active discussions with multiple fuel cell providers at that time. Pfizer ultimately issued a Request for Proposals and the selection process identified FCE as the preferred supplier in early July, 2015. Subsequent to selection, FCE created GFC as a wholly-owned affiliate for financing purposes.

Interrogatory CSC-2

Groton Fuel Cell 1, LLC

Witness: Derek Phelps

Petition No. 1214

Page 1 of 1

Q-CSC-2: On page 2 of the Petition, the Petitioner notes that, "The City of Groton has expressed no concerns regarding the Project." If the City of Groton has expressed any concerns since the filing of the Petition, please indicate such concerns as an update.

A-CSC-2: To date, the City of Groton has never expressed any concerns of any kind to FCE/GFC. Pfizer has informed FCE that, subsequent to the filing of the Petition with the Siting Council, Pfizer received communication from Groton Utilities expressing concern about Pfizer's entry into a Power Purchase Agreement with GFC within Groton Utilities' municipal franchise territory.

Interrogatory CSC-3

Groton Fuel Cell 1, LLC

Witness: Derek Phelps

Petition No. 1214

Page 1 of 1

Q-CSC-3: Has the Petitioner received any comments or concerns from the adjacent Town of Groton?
Explain.

A-CSC-3: FCE/GFC has not received any comments or concerns from the adjacent Town of Groton.

Interrogatory CSC-4

Groton Fuel Cell 1, LLC

Witness: Derek Phelps

Petition No. 1214

Page 1 of 1

Q-CSC-4: Did the Petitioner receive a written response from the State Historic Preservation Office regarding the Project Review Cover Form that was submitted? If yes, provide a copy of such correspondence.

A-CSC-4: GFC has not yet received a written response from the State Historic Preservation Office regarding the Project Review Cover Form. GFC will supplement the record immediately upon receipt of same.

Interrogatory CSC-5

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 1

Q-CSC-5: GFC notes that the noise standards would be met at the nearest residential properties. Would the noise standards also be met at any abutting industrial properties as well to ensure compliance at all of the boundaries of the subject (Pfizer) property?

A-CSC-5: Yes, the noise standards will also be met at all abutting industrial properties.

Interrogatory CSC-6

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-6: Would the natural gas-fired start-up burner as noted on page 10 of the Petition have a negligible effect on the fuel cell facility's overall pounds of CO₂ per megawatt-hour emissions because, as a baseload unit, start-ups would be infrequent? If no, explain how it would impact the overall CO₂ emissions rate.

A-CSC-6: Yes. As a baseload unit, startups and shutdowns are expected to be infrequent and therefore the startup burner will be operated so infrequently as to have a negligible effect on the facility's overall CO₂ contributions.

Interrogatory CSC-7

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-7: On page 11 of the Petition, is the "Additional CO₂ avoided from the generation of steam using waste heat" essentially an estimate of the CO₂ that would be emitted by combustion of natural gas in a conventional natural gas-fired boiler and thus would be avoided by using the fuel cell's waste heat for steam?

A-CSC-7: Yes.

Interrogatory CSC-8

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-8: If approved, approximately when would construction commence and what would be the estimated in-service date for the project?

A-CSC-8: The current project schedule, which assumes Siting Council approval by March 31, 2016, reflects mobilization on or about May 5, 2016, with an intent to commence commissioning activities in August, 2016 (assuming an approved interconnection) and substantial completion on or before September 3, 2016. Substantial completion is defined as full load operation and demonstration of commercial performance criteria.

Interrogatory CSC-9

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-9: What is the height above ground level (agl) of the tallest structure or equipment in the project footprint? Also provide the estimated height agl of the heat recovery steam generator building.

A-CSC-9: The tallest structure, which structure is the top of the fuel cell exhaust transition that sends the exhaust to the steam generator, will be 25 feet above the top of the finished concrete pad. The heat recovery steam generator enclosure is expected to be 16 feet above the finished concrete pad at its roof peak. The power plant exhaust stacks, which will exit the roofs of their respective steam generator enclosures, are expected to be 24 feet above the top of the finished concrete pad.

Interrogatory CSC-10

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-10: Would the proposed six-foot high fence be chain link? While two-inch mesh is a common size, what mesh size is being proposed?

A-CSC-10: Yes, the proposed six-foot high fence will be chain link with two-inch mesh.

Interrogatory CSC-11

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-11: Would bollards be used to protect the fuel cell facility from being accidentally struck by vehicles or is the proposed fence intended to protect the fuel cell facility?

A-CSC-11: At this time, bollards are not being proposed. The risk of the fuel cell being accidentally struck by a vehicle is very low. The access road leading to the fuel cell is a dead end and is only used sporadically to access infrastructure at the back of the adjacent chiller building. There is no regular traffic that travels that road. Moreover, the fuel cells will be sited off of the road at a location that is elevated from the roadway. Lastly, the Pfizer campus is extraordinarily secure and through traffic is not permitted.

Interrogatory CSC-12

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-12: Does the existing grass area for the proposed fuel cell facility have any trees six inches diameter or greater that would be removed to construct the project? If yes, how many?

A-CSC-12: GFC expects that three trees greater than six inches in diameter will need to be removed to facilitate the fuel cell installation.

Interrogatory CSC-13

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-13: Is nitrogen used in the normal operation of the fuel cell, or it is only used as an emergency safety measure to fill the natural gas pressurized portions of the facility with an inert gas during an emergency shutdown? Explain.

A-CSC-13: Nitrogen is only used for storage of the fuel cells or during an upset condition. Normal operation of the fuel cells does not require nitrogen. The electro chemical process used by the fuel cells to convert hydrogen and oxygen to electricity, heat and water is sensitive to humidity. During normal operation, natural gas is humidified using purified potable water. At the elevated temperatures at which the fuel cells normally operate, such humidity is not a problem. However, during a shutdown, if the humid mixture begins to cool and condense, it could negatively impact the expected life and performance of the fuel cells. Similarly, natural humidity associated with the atmosphere could negatively impact the fuel cells. In an upset condition or during storage, nitrogen is used to purge the fuel cell modules of all humidified natural gas and prevent ambient air intrusion.

Interrogatory CSC-14

Groton Fuel Cell 1, LLC

Witness: Kirk Arneson

Petition No. 1214

Page 1 of 1

Q-CSC-14: Please identify 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.

A-CSC-14: The media to be used for pipe cleaning procedures is expected to be compressed air, however nitrogen may be used instead. All fuel pipe cleaning operations will be conducted in accordance with Public Act 11-101 and Connecticut Siting Council Docket NT-2010, as is FuelCell Energy's standard practice.

Interrogatory CSC-15

Groton Fuel Cell 1, LLC

Witness: N/A – Legal Question

Petition No. 1214

Page 1 of 1

Q-CSC-15: What statutes and or regulations govern fuel cell emissions for the proposed facility?

A-CSC-15: Section 22a-174-3a of the Regulations of Connecticut State Agencies identifies those facilities that are required to obtain an air permit from the Connecticut Department of Energy and Environmental Protection. The potential emissions from the proposed installation at the Pfizer campus are below the regulation's applicability threshold, and therefore an air permit is not required.

Interrogatory CSC-16

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 1

Q-CSC-16: Provide a table showing state criteria thresholds and projected emissions from the proposed facility for all greenhouse gasses listed in the Regulations of Connecticut State Agencies Section 22a-174-1 (49).

A-CSC-16: The criteria threshold for greenhouse gases is new stationary sources that emit, or has the potential to emit, equal to or greater than 100,000 tons/year of CO₂e *and* one hundred (100) tons per year of greenhouse gases.

Greenhouse Gas	State of CT Criteria Thresholds for GHGs		Facility Projected Emissions	
	(tpy equivalent to 100,000 tpy CO ₂ -e)	(tpy GHG)	(tpy CO ₂ -e)	(tpy GHG)
Carbon Dioxide (CO ₂) (GWP =1)	100,000	100	24,037	24,037
Methane (CH ₄) (GWP=23)	4,348	100	33	1.4
Nitrous Oxide (N ₂ O) (GWP = 296)	337	100	0	0
Sulfur Hexafluoride (SF ₆) (GWP = 22,200)	4.5	100	0	0
Any Hydrofluorocarbon (HFC) (GWP varies)	Varies; (8 – 8,333)	100	0	0
Any Perfluorocarbon (PFC) (GWP varies)	Varies; (4.5 – 18)	100	0	0
Total CO₂-e & GHG	100,000	100	24,070	24,038

Interrogatory CSC-17

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 1

Q-CSC-17: Provide information regarding available technologies to reduce greenhouse gas emissions from the proposed facility.

A-CSC-17: The fuel cell itself is considered by many to be the best available control technology on a baseload, non-intermittent basis to reduce greenhouse gas emissions from distributed or grid-provided generation to the facility. The proposed fuel cell project is projected to reduce carbon dioxide emissions by 8,241 tons per year, which is more than a 25% reduction versus current carbon dioxide emissions associated with the grid. Carbon dioxide emissions are inversely related to fuel efficiency. By using the waste heat from the fuel cell to generate steam, the fuel cell facility achieves a very high overall efficiency. Additional heat recovery from this proposed fuel cell project is not practical.

Interrogatory CSC-18

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 1

Q-CSC-18: Could offsets be used to mitigate air emissions impacts from the facility?

A-CSC-18: Yes.

Interrogatory CSC-19

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 1

Q-CSC-19: Discuss other mitigation techniques that could be used to offset air emissions from the proposed facility e.g. planting trees. If planting trees is listed as an option, estimate the number and size of trees required.

A-CSC-19: The fuel cell itself is being used to offset the air emissions of the typical and traditional methods of power generation supporting the electrical distribution system. The fuel cell power plant will generate 5.6MW of power that the Pfizer Groton campus would otherwise import from the distribution grid. Criteria emissions from the proposed fuel cell project are minimal (as such no air permit is required) and CO₂ emissions are substantially below the current emissions resulting from grid power use. Due to the proposed project's high overall efficiency, it will actually reduce CO₂ emissions by 8,241 tons per year over the current utilization of grid power. The amount of carbon dioxide absorbed by trees varies widely, however one frequently quoted figure is 2.6 tons of CO₂ absorbed per year per acre of hardwood trees. See, e.g., <https://www.ncsu.edu/project/treesofstrength/benefits.htm>. Using this carbon dioxide uptake value, calculations estimate that the operation of the proposed fuel cell project itself is equivalent to the planting of 3200 acres (5 square miles) of trees.

Interrogatory CSC-20

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 1 of 2

Q-CSC-20: Natural gas has sulfur dioxide injected as an odorant. Please submit a desulfurization plan narrative for the proposed fuel cell facility containing the following information:

- a) Chemical reaction overview concerning what substances are produced from the desulfurization process, as well as plans for their containment and transport;
- b) How much solid sulfur oxide would result from the desulfurization process, and methods and locations for containment, transport, and disposal;
- c) Whether any of these desulfurization substances are considered hazardous, and if so, plans for the containment, transport, and disposal of hazardous substances;
- d) Anticipated method of disposal for any other desulfurization substances; and
- e) Whether any gaseous substances resulting from desulfurization can be expected to vent from the fuel cells, as well as the applicable DEEP limits regarding discharge of these gasses.

A-CSC-20: The fuel cell stacks that generate the electric power can be fouled by the sulfur odorant compounds (primarily mercaptans and/or sulfides; sulfur dioxide is not used) that the gas utility company injects into the natural gas. Accordingly, FCE's fuel cell plant technology incorporates a desulfurization process that consists of two flow-through vessels configured in series filled with a specialized, proprietary desulfurization adsorption media. The sulfur removal mechanism is a physical adsorption or chemisorption process wherein the sulfur atoms are captured by the granular solid media without the release (production) of any other chemical species. In the process of removing the sulfur compounds from the gas, the capacity of the media for continued sulfur removal is diminished up until the point when it becomes exhausted and, if the media is not changed, sulfur breakthrough would occur. At this point the media is deemed to be "spent." When the spent media in the lead desulfurizer vessel needs to be replaced, the fuel gas process flow is switched to the lag vessel in order that that the spent media may then be removed from the off-line vessel and replaced with fresh media. Prior to accessing the spent media, the vessel is inerted with nitrogen to allow safe access into the vessel. During this inertion process, a small volume of natural gas is vented to the atmosphere. Subsequent to media replacement and once the vessel containing the fresh media has been inerted and purged into service, it then serves as the second (polishing) desulfurizer vessel in the process flow series.

The spent solid waste media removed from the process has been characterized at similar locations to be RCRA hazardous by toxicity characteristic for benzene (D018). The benzene,

Interrogatory CSC-20

Groton Fuel Cell 1, LLC

Witness: Mark Benedict

Petition No. 1214

Page 2 of 2

present in the natural gas in very low parts per million concentrations or less, is co-adsorbed onto the media along with the target sulfur compounds.

The waste generation quantity during any single desulfurizer media replacement event is less than 2000 pounds (900 kg) and previous operating experience throughout Connecticut suggests that desulfurizer maintenance events will be no more frequent than annually, and more likely less frequent than every two years (this varies, depending on the actual sulfur concentration in the gas locally). The monthly waste generation rate is within the range for generators that operate under Small Quantity Generator rules. GFC, as plant owner/operator, will comply with all rules for hazardous waste generators as promulgated through the regulations at Regulations Connecticut State Agencies § 22a-449(c).

The waste generated when removing the spent desulfurizer media from the process is managed by immediately containerizing and transporting the waste off-site to a licensed disposal facility. Waste will not be treated, stored or disposed of at the site. The containerized waste is shipped off-site under a Uniform Hazardous Waste Manifest under the generator's EPA RCRA identification number. A licensed hazardous waste transporter under contract to FuelCell Energy, Inc., as service provider for the fuel cell project (e.g. Clean Harbors, Triumvirate, Miller Environmental), will be contracted to collect the waste and transport it to an approved designated disposal facility. The licensed waste destination facility will be determined at the time of contracting the waste contractor firm.