



Connecticut Department of

**ENERGY &
ENVIRONMENTAL
PROTECTION**

**BUREAU OF AIR MANAGEMENT
NEW SOURCE REVIEW PERMIT
TO CONSTRUCT AND OPERATE A STATIONARY SOURCE**

Issued pursuant to Title 22a of the Connecticut General Statutes (CGS) and Section 22a-174-3a of the Regulations of Connecticut State Agencies (RCSA).

Owner/Operator	Beacon Falls Energy Park, LLC
Address	769 Newfield Street, Middletown, CT 06457
Equipment Location	Beacon Falls Energy Park, Between Connecticut Route 8 and Railroad Avenue, Beacon Falls, CT 06403
Equipment Description	Nominal 63.3 MW Base-load Fuel Cell Energy Park Consisting of 5-Fuel Cell Energy, Inc. HEFC Fuel Cell Plants (each approx. 3.7 MW) and 15-Fuel Cell Energy, Inc. DFC3000 Fuel Cell Plants (each approx. 2.8 MW)
Town-Permit Numbers	006-0009
Premises Number	38
Stack Numbers	1-35
Permit Issue Date	
Expiration Date	None

Michael Sullivan
Deputy Commissioner

Date

This permit specifies necessary terms and conditions for the operation of this equipment to comply with state and federal air quality standards. The Permittee shall at all times comply with the terms and conditions stated herein.

PART I. DESIGN SPECIFICATIONS

A. General Description

Beacon Falls Energy Park, LLC owns the Beacon Falls Energy Park (BFEP), a nominal 63.3 MW base-load fuel cell energy park consisting of 5-Fuel Cell Energy, Inc. HEFC fuel cell plants (each approximately 3.7 MW) and 15-Fuel Cell Energy, Inc. DFC3000 fuel cell plants (each approximately 2.8 MW) in Beacon Falls, Connecticut. The BFEP occupies approximately eight acres of a 25 acre plot of land owned by O&G Industries.

Each of the 20 fuel cell plants contains two (for the DFC3000 fuel cell plant) or three (for the HEFC fuel cell plant) “fuel cell modules”. Each fuel cell module consists of four “fuel cell stacks.” Each fuel cell stack consists of several individual fuel cells arranged vertically one atop another. Each fuel cell plant is equipped with an air heater, which operates only when the fuel cells are idle or not operating at a sufficient power level to maintain the required minimum temperature. The BFEP uses natural gas exclusively as fuel.

B. Equipment Design Specifications

Table I.B Equipment Design Specifications

Equipment	Number of Units	Fuel Type	Maximum Fuel Consumption Rate (per unit) (MCF/hr)	Maximum Gross Heat Input (per unit) (MMBtu/hr)
Fuel Cell Energy, Inc.- Model: HEFC	5	Natural Gas	26.3	27.08
Fuel Cell Energy, Inc.- Model: DFC3000	15	Natural Gas	22.9	23.59
Fuel Cell Energy, Inc.-Air Heaters	20	Natural Gas	10.9	11.2

C. Stack Parameters

1. Fuel Cell Energy, Inc.-Model: HEFC

Table I.C.1 Stack Parameters (Model: HEFC)

Description	Minimum Stack Height (ft)	Minimum Exhaust Gas Flow Rate (acfm)	Minimum Stack Exit Temperature (°F)	Minimum Distance from Stack to Property Line (ft)
Fuel Cells to Stack	32	13,897	430	81
Air Heaters to Stack	32	24,677	1,004	81

PART I. DESIGN SPECIFICATIONS

- Fuel Cell Energy, Inc.-Model: DFC3000

Table I.C.2 Stack Parameters (Model: DFC3000)

Description	Minimum Stack Height (ft)	Minimum Exhaust Gas Flow Rate (acfm)	Minimum Stack Exit Temperature (°F)	Minimum Distance from Stack to Property Line (ft)
Fuel Cells to Heat Recovery Stack	32	10,497	212	48
Fuel Cells to Bypass Stack	32	18,118	700	48
Air Heaters to Bypass Stack	32	24,677	1,004	48

PART II. OPERATIONAL CONDITIONS

Table II Maximum Fuel Consumption

Equipment	Maximum Fuel Consumption over any Consecutive 12 Month Period
	MMscft/yr
Fuel Cell Energy, Inc.-Model: HEFC	230.80
Fuel Cell Energy, Inc.-Model: DFC3000	201.00
Fuel Cell Energy, Inc.-Air Heater	95.43

PART III. ALLOWABLE EMISSION LIMITS

The Permittee shall not cause or allow this equipment to exceed the emission limits stated herein at any time.

A. Criteria Pollutants

- Fuel Cell Energy, Inc.-Model: HEFC

Table III.A.1 Model HEFC Emissions

Pollutant	lb/hr (for five units)	lb/MW-hr per calendar month	tons per consecutive 12 months (for five units)
PM	4.21E-04		1.85E-03
PM ₁₀	4.21E-04		1.85E-03
PM _{2.5}	4.21E-04		1.85E-03
SO ₂	0.08		0.37
NO _x	0.21		0.92
VOC	0.42		1.85

PART III. ALLOWABLE EMISSION LIMITS, continued

CO	2.11		9.23
GHG/ CO ₂	15,842	751	69,386

2. Fuel Cell Energy, Inc.-Model: DFC3000

Table III.A.2 Model DFC3000 Emissions

Pollutant	lb/hr (for 15 units)	lb/MW-hr per calendar month	tons per consecutive 12 months (for 15 units)
PM	8.77E-04		3.84E-03
PM ₁₀	8.77E-04		3.84E-03
PM _{2.5}	8.77E-04		3.84E-03
SO ₂	0.22		0.96
NO _x	0.44		1.92
VOC	0.88		3.84
CO	4.39		19.21
GHG/ CO ₂	41,389	884	181,283

3. Fuel Cell Energy, Inc.-Air Heaters

Table III.A.3 Air Heaters Emissions

Pollutant	lb/hr (for 20 units)	lb/MMBtu per calendar month	tons per consecutive 12 months (for 20 units)
PM	1.70		7.46
PM ₁₀	1.70		7.46
PM _{2.5}	1.70		7.46
SO ₂	0.14		0.61
NO _x	3.81		16.68
VOC	3.14		13.73
CO	6.27		27.47
GHG/CO ₂	26,227	120	114,874

PART III. ALLOWABLE EMISSION LIMITS, continued

4. Total

Table III.A.4 Total Emissions

Pollutant	tons per consecutive 12 months
PM	7.46
PM ₁₀	7.46
PM _{2.5}	7.46
SO ₂	1.32
NO _x	16.68
VOC	13.73
CO	28.44
GHG/CO ₂	250,669

B. Hazardous Air Pollutants

This equipment shall not cause an exceedance of the Maximum Allowable Stack Concentration (MASC) for any hazardous air pollutant (HAP) emitted and listed in RCSA Section 22a-174-29. [STATE ONLY REQUIREMENT]

C. Opacity

This equipment shall not exceed 10% opacity during any six minute block average as measured by 40 CFR Part 60, Appendix A, Reference Method 9.

D. Demonstration of compliance with the above emission limits may be demonstrated by calculating the emission rates using emission factors from the following sources:

- PM, PM₁₀, PM_{2.5}, SO₂ and NO_x: Manufacturer's Data
- VOC and CO: California Air Resources Board (CARB) Certification of DFC3000 Fuel Cell
- GHG/CO₂: 40 CFR Part 98 Subpart C, Table C-1

The commissioner may require other means (e.g. stack testing) to demonstrate compliance with the above emission limits, as allowed by state or federal statute, law or regulation.

PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

A. Monitoring

1. The Permittee shall continuously monitor fuel consumption using a non-resettable totalizing fuel meter for each group of equipment (i.e., Fuel Cell Energy, Inc.-Model: HEFC, Fuel Cell Energy Inc.-Model: DFC3000 and Fuel Cell Energy, Inc.-Air Heaters).
2. The Permittee shall continuously monitor electrical output using a meter for each fuel cell plant.

PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS, continued

B. Record Keeping

1. The Permittee shall keep records of monthly and consecutive 12 month fuel consumption for each group of equipment (i.e., Fuel Cell Energy, Inc.-Model: HEFC, Fuel Cell Energy Inc.-Model: DFC3000 and Fuel Cell Energy, Inc.-Air Heaters). The consecutive 12 month fuel consumption shall be determined by adding the current month's fuel consumption to that of the previous 11 months for each group of equipment. The Permittee shall make these calculations within 30 days of the end of the previous month.
2. The Permittee shall make and keep records of daily electricity production in MW-hr.
3. The Permittee shall calculate and record the monthly and consecutive 12 month PM, PM₁₀, PM_{2.5}, SO₂, NO_x, VOC, and CO emissions in units of tons for each group of equipment (i.e., Fuel Cell Energy, Inc.-Model: HEFC, Fuel Cell Energy Inc.-Model: DFC3000 and Fuel Cell Energy, Inc.-Air Heaters). The consecutive 12 month emissions shall be determined by adding (for each pollutant) the current month's emissions to that of the previous 11 months for each group of equipment. Such records shall include a sample calculation for each pollutant. The Permittee shall make these calculations within 30 days of the end of the previous month.
4. The Permittee shall calculate and record the monthly GHG/CO₂ emissions in units of lb/MW-hr (fuel cells) and lb/MMBtu (fuel cell heaters) as specified below. Such records shall include a sample calculation for each pollutant. The Permittee shall make these calculations within 7 days of the beginning of the month.
 - a. The monthly emissions (lb/MW-hr) shall be determined by dividing the sum of the daily emissions in pounds for the previous month by the sum of the daily electricity production in MW-hr for the previous month for each group of fuel cells (i.e., the 5 HEFC units and 15 DFC3000 units).
 - b. The monthly emissions (lb/MMBtu) shall be determined by dividing the sum of the daily emissions in pounds for the previous month by the sum of the daily fuel consumption by all heaters in MMBtu for the previous month.
5. The Permittee shall calculate and record the consecutive 12 month GHG/CO₂ emissions in units of tons per year. The consecutive 12 month emissions (tons) shall be determined by adding the current month's emissions to that of the previous 11 months for each group of equipment. Such records shall include a sample calculation for each pollutant. The Permittee shall make these calculations within 30 days of the end of the previous month.
6. The Permittee shall keep all records required by this permit for a period of no less than five years and shall submit such records to the commissioner upon request.

PART V. STACK EMISSION TEST REQUIREMENTS

Stack emission testing shall be performed in accordance with the [Emission Test Guidelines](#) available on the DEEP website.

PART V. STACK EMISSION TEST REQUIREMENTS, continued

Initial stack testing shall be required for the following pollutant(s):

- PM PM₁₀ PM_{2.5} SO₂ NO_x CO₂
 VOC Opacity Other (HAPs):

The Permittee shall conduct initial stack testing within 60 days of achieving the maximum production rate, but not later than 180 days after initial startup. The Permittee shall submit test results within 60 days after completion of testing.

Stack test results shall be reported as follows: CO₂ in units of lb/hr

PART VI. OPERATION AND MAINTENANCE REQUIREMENTS

- A. The Permittee shall operate and maintain this equipment in accordance with the manufacturer's specifications and written recommendations.
- B. The Permittee shall properly operate the control equipment at all times that this equipment is in operation and emitting air pollutants.

PART VII. SPECIAL REQUIREMENTS

- A. The Permittee shall not cause or permit the emission of any substance or combination of substances which creates or contributes to an odor beyond the property boundary of the premises that constitutes a nuisance as set forth in RCSA Section 22a-174-23. [STATE ONLY REQUIREMENT]
- B. The Permittee shall operate this facility at all times in a manner so as not to violate or contribute significantly to the violation of any applicable state noise control regulations, as set forth in RCSA Sections 22a-69-1 through 22a-69-7.4. [STATE ONLY REQUIREMENT]

PART VIII. ADDITIONAL TERMS AND CONDITIONS

- A. This permit does not relieve the Permittee of the responsibility to conduct, maintain and operate the regulated activity in compliance with all applicable requirements of any federal, municipal or other state agency. Nothing in this permit shall relieve the Permittee of other obligations under applicable federal, state and local law.
- B. Any representative of the DEEP may enter the Permittee's site in accordance with constitutional limitations at all reasonable times without prior notice, for the purposes of inspecting, monitoring and enforcing the terms and conditions of this permit and applicable state law.
- C. This permit may be revoked, suspended, modified or transferred in accordance with applicable law.

PART VIII. ADDITIONAL TERMS AND CONDITIONS, continued

- D.** This permit is subject to and in no way derogates from any present or future property rights or other rights or powers of the State of Connecticut and conveys no property rights in real estate or material, nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the facility or regulated activity affected thereby. This permit shall neither create nor affect any rights of persons of municipalities who are not parties to this permit.
- E.** Any document, including any notice, which is required to be submitted to the commissioner under this permit shall be signed by a duly authorized representative of the Permittee and by the person who is responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under Section 22a-175 of the Connecticut General Statutes, under Section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute."
- F.** Nothing in this permit shall affect the commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for violations of law, including but not limited to violations of this or any other permit issued to the Permittee by the commissioner.
- G.** Within 15 days of the date the Permittee becomes aware of a change in any information submitted to the commissioner under this permit, or that any such information was inaccurate or misleading or that any relevant information was omitted, the Permittee shall submit the correct or omitted information to the commissioner.
- H.** The date of submission to the commissioner of any document required by this permit shall be the date such document is received by the commissioner. The date of any notice by the commissioner under this permit, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three days after it is mailed by the commissioner, whichever is earlier. Except as otherwise specified in this permit, the word "day" means calendar day. Any document or action which is required by this permit to be submitted or performed by a date which falls on a Saturday, Sunday or legal holiday shall be submitted or performed by the next business day thereafter.
- I.** Any document required to be submitted to the commissioner under this permit shall, unless otherwise specified in writing by the commissioner, be directed to: Office of Director; Engineering & Enforcement Division; Bureau of Air Management; Department of Energy and Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.