Commonwealth Fusion Systems

RESEARCH PROJECT - FACT SHEET

Air Quality Permit and Cumulative Impact Analysis

INTRODUCTION

Commonwealth Fusion Systems (CFS) is proposing to build a new temporary research facility at its campus located at 117 Hospital Road, Devens, Massachusetts. The purpose of this new facility, called the fusion power systems research center, is to demonstrate key technology needed for fusion power plants. This facility will supplement our ongoing work on SPARC, CFS' fusion energy machine, which is currently under construction at our Devens campus.

The fusion power systems research center will utilize a heater package consisting of three (3) natural gas-fired heaters. The heaters will simulate fusion power within the facility so that key components that will be used in our ARC power plant can be tested under the right conditions.

The research facility is subject to the Massachusetts Air Pollution Control Regulations, and requires an air quality permit for the natural gas-fired heaters due to the emissions of normal products of combustions (e.g., nitrogen oxides and carbon monoxide). CFS will submit a non-Major Comprehensive Plan Approval (NMCPA) application, which will include a Cumulative Impact Analysis (CIA), to ensure that the project does not result in a disproportionate adverse effect on neighboring Environmental Justice (EJ) populations. As part of the CIA, CFS will engage with Devens and neighboring communities to provide further information about the project and seek input from the public. CFS encourages members of the public who are interested in learning more about the proposed project or who wish to be added to a distribution list for an informational meeting to reach out to the CFS contact or use the QR code, available at the bottom of this Fact Sheet.

The Massachusetts Department of Environmental Protection (MassDEP) will review the permit application, including the CIA, according to applicable regulations. After completing its review, the MassDEP will issue a proposed decision to approve or deny the permit application, and at that time will provide a 60-day public comment period on its proposed decision.

COMPANY INFORMATION

CFS is a fusion energy company that spun out of the Massachusetts Institute of Technology (MIT) in 2018 with the goal of leveraging decades of proven fusion science, combined with the innovation and speed of the private sector, to commercialize fusion energy on the fastest path possible. CFS is now the largest private fusion energy company in the world with over 1000 full-time employees, and more than $2 billion in private funding from the world's leading investors in clean energy.

Fusion is a fundamentally new source of clean energy. It's a zero carbon, baseload energy source that is inherently safe and economically competitive, with no major barriers to massive scale-up. Fusion is the process that powers the stars. In stars, hydrogen nuclei fuse together into helium nuclei, releasing enormous amounts of energy in the process. Commercial fusion systems will harness this process on a much smaller scale and create a heat source that will be converted into electricity. Fusion stands to be the last new energy source the planet needs, providing a clean and essentially limitless source of power.

In Devens, Massachusetts, at our fusion energy campus, CFS is currently building SPARC, a fusion machine that will demonstrate commercially relevant fusion energy for the first time in history, using CFS' proven magnet technology. CFS' Devens campus will be the birthplace of commercial fusion energy and includes the SPARC facility, CFS' magnet manufacturing facilities, our new fusion power systems research center, and CFS corporate offices.

The learnings from SPARC and from our new fusion power systems research center will pave the way for the design and development of the first fusion power plant, called ARC, which will be sited in Chesterfield County, Virginia. Our path to commercialization anticipates our first ARC will be on the grid in the early 2030s, with further growth at rapid scale thereafter.

PROJECT INFORMATION

Our new temporary research facility will utilize natural gas-fired process heaters with a total heat input of 225 million British thermal units per hour (MMBtu/hr). The process heaters will be used to emulate fusion heat at the temperatures expected in a future ARC power plant. This will allow for the evaluation of technologies needed to enable power extraction from fusion energy. The project's maximum potential annual emissions, which are below MassDEP's major source thresholds, are shown in Table 1. Actual emissions may be less. The heaters will emit products of combustion, including particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), volatile organic compounds (VOC), hazardous air pollutants (HAPs), ammonia (NH_3), and greenhouse gases represented as carbon dioxide equivalent (CO_2e). CFS has established thresholds on the maximum operating time of the facility to limit the emission of greenhouse gases and plans to operate the burners for only the length of time necessary to meet our research and development mission.

Table 1 – Estimated Project Emissions (tons per year)

PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	VOC	HAP	NH_3	CO_2e
1.7	1.7	0.50	9.3	12.7	12.7	1.6	3.8	99,100

As required under state regulation, CFS will utilize best available control technology to reduce emissions from the natural gas-fired heaters. It is currently projected that the research facility will not run continuously and that it will only be operational intermittently from 2027 through 2033, as needed to achieve our research goals.

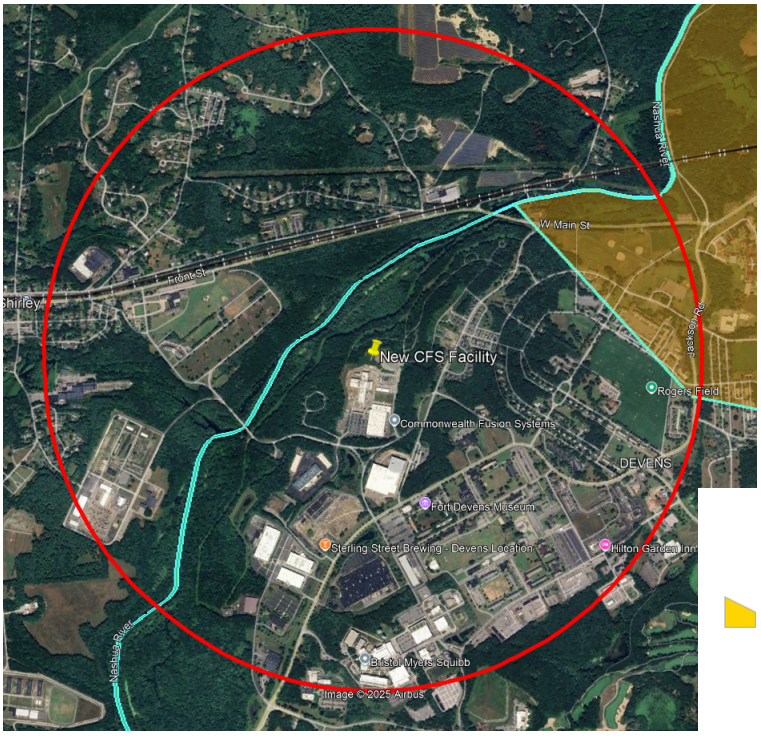
ENVIRONMENTAL JUSTICE POPULATIONS

The fusion power systems research center is located within 1 mile of an Environmental Justice population as defined by the Commonwealth of Massachusetts. The location has been identified as the Block Group 5, Census Tract 3251.02, Middlesex County, and has been described as an environmental justice population based on the following criteria:

- Minority population is greater than or equal to 40%, and
- Minority population is greater than or equal to 25% and the median household income is less than 150% of the Massachusetts median household income.

The population is in the Devens Regional Enterprise Zone (Devens) within the historic boundaries of the Town of Ayer, according to the Census Tract. A map of the environmental justice area within one mile of the Facility is included in Figure 1. Considering that the CFS fusion campus is located in Devens, and given the proximity to Ayer, Harvard, and Shirley, we will continue to broadly engage our neighboring communities, including the environmental justice population in Devens within the historic boundaries of Ayer to provide information about our proposed research project. This communication will build on CFS' existing robust community engagement efforts and programs.

Figure 1. EJ Population within 1 Mile



CUMULATIVE IMPACT ANALYSIS INFORMATION

Questions about MassDEP's role in the CIA process can be directed to Joanne Morin, Deputy Director, Bureau of Air and Waste, at Joanne.O.Morin@mass.gov .

APPLICANT CONTACT INFORMATION

Questions regarding this project can be directed to:
Contact Person: Jessica Strunkin
Title: Community Relations and Local Government Affairs Principal
Email: jstrunkin@cfs.energy
or through the below QR code and provided Inquiry Form:

This fact sheet is available in alternative formats, including translation into a non-English language, upon request. To request an accommodation please contact Jessica Strunkin at jstrunkin@cfs.energy and use the subject FACT SHEET.

Esta hoja informativa está disponible en formatos alternativos previa solicitud. Para solicitar una adaptación, enviar Jessica Strunkin via jstrunkin@cfs.energy y indique en el asunto HOJA INFORMATIVA.