

6KINC. – ENVIRONMENTAL JUSTICE FACT SHEET

Introduction

6KInc. (6K) operates a microwave-induced plasma material processing facility located at 25 Commerce Way in North Andover, Massachusetts ("Facility"). The Facility is subject to the Massachusetts Air Pollution Control Regulations 310 Code of Massachusetts Regulations (CMR) 7.00 and is operating with an air quality approval/permit. The Facility is applying for an updated air quality permit.

6K 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, 6K will engage with neighboring North Andover communities to provide further information about the project and seek input from the public. Members of the public who would like to learn more about the proposed project or be added to the distribution list for an informational meeting are encouraged to contact the facility representative listed at the end 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, 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

6K manufactures specialized battery cathode powder material used to make batteries for industrial and consumer applications. In the first step, raw materials are fed into reactors called UniMelt™ systems, which use a high temperature, plasma-based process to transform liquid salt solution into fine metal oxide powder. This step produces exhaust gases, including nitrogen oxides (NO_x), an air pollutant.

In the second step, the powder goes through a finishing process called calcination, where it's heated in ovens (kilns) to very high temperatures to prepare it for use in batteries. The offgas of this process is also NO_x. After several additional steps, the material produced is an active cathode battery powder, being developed for use in industrial and consumer applications.

Project Information

6K has already been operating the above process and scrubbing system under MassDEP permits since 2022.¹ This process has potential to emit the following air pollutants: NO_x, particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}) and hazardous air pollutants (HAPs).²

The NO_x producing operations include:

- ▶ UniMelt systems – chambers equipped with a microwave-induced plasma energy source.

¹ NE-22-023, superseded by NE-23-013

² The material classified as HAP (and the potential particulate matter) are nickel compounds, under which classification 6K's product falls. Source: <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications>

- ▶ Roller Hearth Kilns – high temperature furnaces capable of > 10 kg of material per day
- ▶ Tube Furnaces – high temperature furnaces capable of < 10 kg of material per day

All NO_x containing gas streams are treated by a scrubbing system which removes most of the NO_x before it's released through a stack to the atmosphere.

The PM₁₀/PM_{2.5} and HAP producing operations include:

- ▶ UniMelt systems – chambers equipped with a microwave-induced plasma energy source.

All PM₁₀/PM_{2.5}/HAP containing gas streams from the UniMelt systems pass through a baghouse designed to collect the metal oxide powder product.

The site also has the following equipment that is exempt from plan approval:

- ▶ Spray Dryers and Jet Mills
- ▶ Laboratory Fume Hoods
- ▶ Internal Particulate Control Equipment
- ▶ Cleaning Solvent Use
- ▶ Emergency Generators

The NMCPA application and CIA are being submitted to modify the existing permit with improvements in the scrubbing technology and to accommodate additional capacity (additional Unimelt systems and kilns) in response to increased demand for 6K's battery cathode material product. The proposed project emission limits are shown below in Table 1.

Table 1. Proposed Emission Limits

Emission Units		PM₁₀	PM_{2.5}	NO_x	HAP
Facility-wide ³	(tons per year)	0.20	0.03	19	0.20
	(tons per month)	0.03	0.004	3.2	0.03

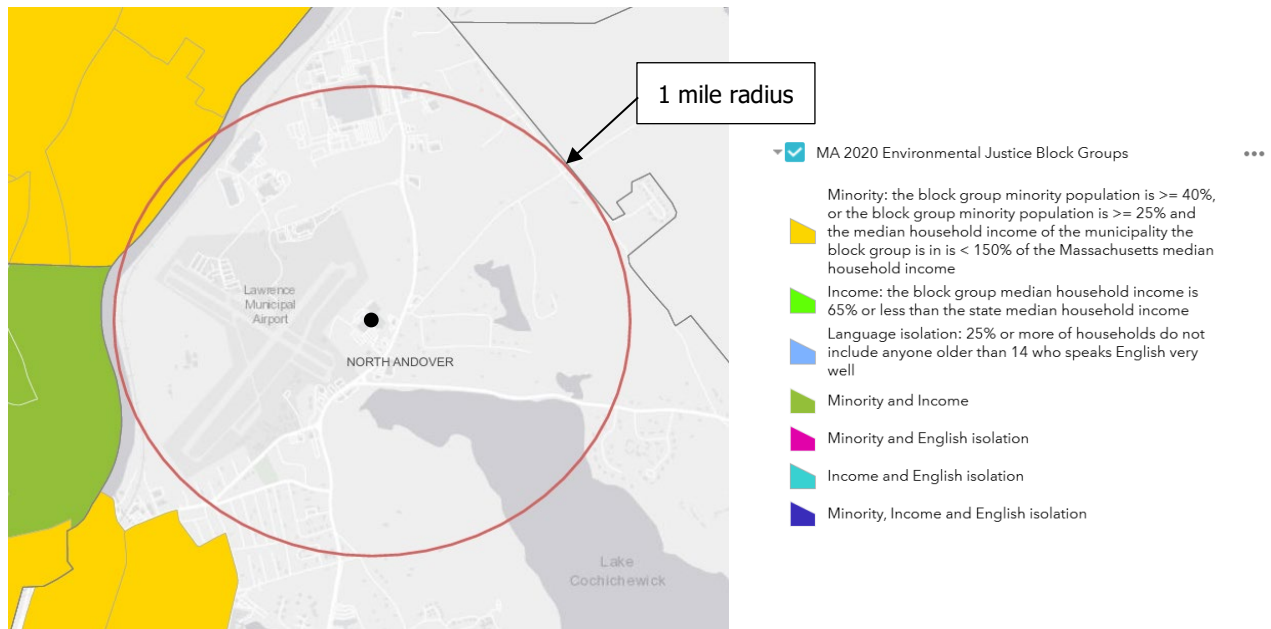
Environmental Justice Populations

The population is in the city of North Andover, which is in the county of Essex. A map of the EJ areas within one mile⁴ of the facility is shown in Figure 1.

³ Proposed facility-wide emission limits do not include exempt emission sources. Based on 300 days of operation.

⁴ Source: <https://www.mass.gov/info-details/massgis-data-2020-us-census-environmental-justice-populations>

Figure 1. EJ Populations within 1 Mile of Facility



6K is located near one EJ population as defined by the State of Massachusetts, specifically the following Census Tract:

- Block Group 4, Census Tract 2526.01, Essex County (Minority)

Cumulative Impact Analysis Information

If you have questions or would like more information about the permit application or agency review process, please contact the MassDEP personnel listed below.

Contact Person: Edward Braczyk
 Massachusetts Department of Environmental Protection, Northeast Regional Office
 Bureau of Air and Waste, Air Permits
 Phone: 978-604-7401
 Email: edward.braczyk@mass.gov

Applicant Contact Information

Questions regarding this project can be directed to:

Contact Person: John Colwell
 Title: Vice President, Process Engineering
 Phone: 978-238-0945
 Email: John.Colwell@6kinc.com