



STATE OF DELAWARE
**DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL**
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OFFICE OF THE
SECRETARY

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Secretary's Order No.: 2020-CZ-0010

**RE: Application of AgroRefiner, LLC, for a Coastal Zone Act Permit to Operate
a New Hemp Extraction Facility at an Existing Warehouse located at
51 Steel Drive, New Castle, Delaware 19720**

Date of Issuance: April 6 , 2020

Effective Date: April 6 , 2020

Under the authority vested in the Secretary of the Department of Natural Resources and Environmental Control ("Department" or "DNREC") pursuant to 7 *Del.C.* §§6001 et seq., 7 *Del.C.*, Ch. 70, *Coastal Zone Act* ("CZA"), and 7 DE Admin. Code 101, *Regulations Governing Delaware's Coastal Zone* ("CZA Regulations"), the following findings of fact based on the record, reasons, and conclusions are entered as an Order of the Secretary in the above-referenced CZA permitting proceeding. The CZA regulates new manufacturing activities, or the expansion of existing manufacturing uses, within Delaware's "Coastal Zone," which is a geographical area along the Delaware Bay and Atlantic Ocean Coastlines, as defined by the CZA.

Background and Findings of Fact

The Applicant, AgroRefiner, LLC (“AgroRefiner” or “Applicant”), seeks a CZA Permit to operate a new hemp extraction facility at an existing warehouse located at 51 Steel Drive in New Castle, Delaware (“Application”). The purpose of the operation would be to extract cannabidiol (“CBD”) and cannabinol (“CBN”) from the hemp to distribute to manufacturers of various consumer goods. The activity itself is considered to be a new manufacturing facility, pursuant to Section 6.1.3 of the CZA Regulations.

The Applicant has registered as a Hemp Processor through the Delaware Department of Agriculture. The proposed process would utilize a portion of an existing warehouse, as noted above. Hemp would be delivered via refrigerated semi-trailers annually during the fall harvest in late September or early October. Some of the hemp would arrive already dried, but the rest would be dried using two natural gas-fired furnaces, which would operate a maximum of 600 hours per year. AgroRefiner estimates that the dried hemp from each harvest would take the entire year to process, for a maximum processing capacity of 78,000 pounds of dry hemp, yielding approximately 7716.2 pounds (3,500 kilograms) of CBD isolate, and 169.8 pounds (77 kilograms) of CBN. Final product distribution would be demand-driven.

The proposed CBD processing can be broken into four (4) basic parts: drying, extraction, distillation, and crystallization. Afterward, the remaining solution undergoes a process to isolate CBN. The first step in the proposed process is drying the hemp. The two dryers operate at 400,000 BTUs each, with a temperature setting of 90 degrees Fahrenheit. According to the manufacturer, combined, the dryers can process an hourly maximum of 1,000 pounds of wet material, yielding approximately 220 pounds of dry material each hour. Once dried, a cold ethanol wash is used to isolate the extract from the dried plant material, which results in a crude extract. The Applicant estimates active ethanol usage at 60 gallons per day. Approximately 85% of the ethanol is recovered in this step of the closed-loop system.

After extraction, the crude oil is heated under a vacuum for three (3) hours to remove carbon dioxide using a decarboxylation vessel. A cold trap in the vacuum line collects approximately 12% more of the ethanol. The biomass is then centrifuged in an additional effort to collect ethanol, resulting in a total ethanol recovery of approximately 97%. The other 3% remains on the plant material and is disposed of with the waste biomass. The decarboxylated crude oil is distilled in a continuous process using a wipe film distillation system.

Next, the CBD distillate is crystallized and recrystallized to refine and form the final CBD product. Pentane induces crystallization, and the product is collected in a vacuum filtration process within a fume hood. Pentane usage is approximately four (4) gallons per day with 98% recovery by roto-evaporation. There is an estimated 2% loss in the process per day from evaporation and crystals recovered in the vacuum oven. An additional product, created post-crystallization, is known as CBN. The remaining solution after the crystallization (referred to in the application as “mother liquor”) undergoes a separation and purification process involving toluene, iodine, potassium thiosulfate, anhydrous sodium sulfate, and silica gel chromatography. Production is estimated to be 0.454 pounds (210 grams) per day.

Prior to distribution, a quality assurance test is completed to test the products for purity. The finished products are packaged into plastic pails and stored in a secure inventory storage area until distributed in bulk to third-party distributors and manufacturers. It should be noted that, in the State of Delaware, hemp is considered an agricultural commodity and is defined as a grain under Title 3 of the Delaware Code. The tetrahydrocannabinol (“THC”) concentration¹ for CBD and CBN is not to exceed 0.3 percent on a dry weight basis.

¹ THC is the principal psychoactive constituent of cannabis and is the chemical responsible for most of the psychological effects of marijuana.

The Department requires a CZA Applicant to set forth in its application the proposed project's possible environmental impacts, including, but not limited to, any increased air emissions of pollutants, water quality/water quantity/water use, and the disposal of solid and hazardous wastes. Furthermore, any application for a CZA permit for an activity or facility that will result in any negative environmental impact shall contain an offset proposal. Offset proposals must more than offset the proposed environmental impacts of any proposed project.²

Pursuant to Section 8.3.2 of Delaware's CZA Regulations, the Secretary shall, in assessing CZA permit applications, consider how a proposed project will affect the following six criteria, as set forth in 7 *Del.C. Ch. 70, Coastal Zone Act*: (1) Direct and cumulative environmental impacts; (2) Economic effects; (3) Aesthetic effects (4) Number and type of supporting facilities and their anticipated impacts; (5) Effect on neighboring land uses; and (6) Compatibility with local comprehensive plans. 7 *Del.C. §7004(b)*.

In the present matter, the Applicant's proposed project would result in air emissions associated with the operation of the hemp dryers, as well as pentane evaporation during crystallization and toluene evaporation during CBN isolation. The dryers are fueled by natural gas and operate at approximately 400,000 BTUs/hour each. If the furnaces were to run for 600 hours, total emissions of sulfur dioxide (SO₂), nitrogen oxide (NO_x), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOC) would be approximately 3.523 pounds per day (0.044 tons per year). Additionally, approximately 0.146 pounds per day of pentane would be emitted in a fume hood during the CBD crystallization step described above, and approximately 0.793 gallons (5.727 pounds) of toluene per day would be used in the process of isolating CBN from the mother liquor (calculations assume 100% evaporation). Based on this information, total daily emissions would be 9.396 pounds per day, which calculates to annual emissions of 1.116 tons per year.

² 7 DE Admin. Code 101, *Regulations Governing Delaware's Coastal Zone*, Section 9.0, "Offsets"

The proposed project would operate within an existing warehouse, and would not impact stormwater, land erosion, wetlands, or habitat for flora and fauna. Furthermore, the proposed operation would not result in any changes in water use and water discharge to surface waters. Operations for the proposed project would occur entirely inside the existing warehouse, and the project location is not known by the Department's Division of Fish and Wildlife to have any threatened or endangered species present.

It is an objective of the Applicant's proposed project to reclaim and reuse as much of the solvents utilized within the process as possible. Any wastes would be tested to determine whether they should be classified as hazardous prior to disposal.

The proposed project would generate 78,000 pounds of waste biomass annually. Approximately 1.8 gallons (11.86 pounds per day) of ethanol would be disposed of with the biomass. Additionally, approximately 0.317 gallons (4.44 pounds) of thiosulfate and 13.228 pounds of silica gel waste would be generated daily and disposed of on a bi-weekly basis. It is intended for pentane to be fully recovered within the system. However, if any of the solvent is not able to be recovered, it will be disposed of lawfully, following all applicable local and state regulations.

The proposed project would not generate glare, heat, noise, vibration, radiation, or electromagnetic interference outside of the existing warehouse. Odors emitted during the drying process in September and October would be controlled through the employment of an in-duct odor mitigation system. The system generates ozone to alter the chemical structure of the odorous molecules through oxidation. The proposed system would produce approximately 0.0006 pounds per hour of ozone that would readily attach to odor molecules in the ventilation system and destroy them. If the system were to run without coming into contact with any odors during the 600 hours of dryer operation, approximately 0.36 pounds of ozone would be generated. However, a balanced system would result in net zero odor and ozone emissions.

Regarding the economic effects of AgroRefiner's proposed project, tenant improvements to the warehouse prior to the start of operations are estimated to have a total cost of \$750,000. Improvements expended locally are estimated to be \$500,000 with services such as engineering, general construction, electrical, plumbing, and HVAC upgrades. The project would employ 11 permanent workers. Total payroll for permanent employees is estimated to be \$740,000. State personal income taxes and State corporate income taxes attributable to this project are calculated to be \$65,674 and \$363,500, respectively.

The Applicant's proposed operation within an existing warehouse will not impact the aesthetics of the area. No supporting facilities are proposed. With regard to potential effect on neighboring land uses, the closest residence is approximately 360 feet away from the project location. The facility does not interfere with a person's ability to access recreational facilities or resources. Lastly, insofar as the proposed project's compatibility with current New Castle County plans, the Secretary's Environmental Assessment Report confirms that the proposed project is consistent with both County and Municipal planning.

As noted previously, the Applicant's proposed project anticipates increased air emissions. Section 9.1.1 of the CZA Regulations states that any application for a CZA permit for an activity or facility that will result in a negative environmental impact shall contain an offset proposal. Moreover, such offset proposals must "...more than offset the negative environmental impact associated with the proposed project of activity requiring a permit." DNREC Policy stipulates that negative environmental impacts resulting from projects requiring a CZA Permit be offset at a 1.3:1 ratio.

With regard to AgroRefiner's offset proposal, the Applicant has proposed to purchase three (3) tons of emission reduction credits ("ERCs") from the Delaware Division of Small Business to more than offset their 1.12 tons of annual emissions. ERCs originate from the *Emissions Banking and Trading Program* (7 DE Admin. Code 1134) and are parsed into ozone season and non-ozone season for NO_x and VOCs.

More than 98% of the emissions of this proposed activity could be attributed to NOx and VOCs. Therefore, the Department's experts within the Coastal Zone Program consider this proposal to be reasonable and practicable, given that the credits purchased should closely reflect actual emissions and time of year, to ensure that the emissions are more than offset.

Procedural History

The Department provided sufficient public notice of this CZA Application's submission, initially received by the Department on December 10, 2019. The Application was determined to be administratively complete by my signing of the Secretary's Environmental Assessment Report, on January 7, 2020. Thereafter, the Department held a public hearing on February 5, 2020 at the DNREC office located at 391 Lukens Drive, New Castle, Delaware. Proper notice of the hearing was provided as required by law.

The only comments received by the Department in this matter were those offered by Bill Dunn and Martin Willis at the time of the public hearing. While Mr. Willis expressed gratitude toward the Applicant for going through the CZA Permit Application process to bring this new manufacturing opportunity to Delaware, Mr. Dunn had a few questions with respect to the Applicant's proposed operation. The Record closed for public comment at the conclusion of the public hearing.

Following the close of the public comment period as noted above, and at the request of presiding Hearing Officer Lisa A. Vest, the technical experts in the Department's Division of Climate, Coastal and Energy prepared a Technical Response Memorandum ("TRM") to specifically address the concerns voiced at the time of the public hearing, as noted above. This TRM, dated February 25, 2020, identified and responded to those concerns, and provided the Department's reasoning for its conclusions made in this matter. The TRM was received by Hearing Officer Vest on March 2, 2020. Immediately thereafter, Ms. Vest prepared her Hearing Officer's Report ("Report") dated March 13, 2020.

Reasons and Conclusions

This CZA Application requests permission for the Applicant, AgroRefiner, LLC, to operate a new hemp extraction facility in an existing warehouse located at 51 Steel Drive, New Castle, Delaware. I find that this proposed project requires the Applicant to obtain a CZA Permit. I further find that the Applicant's proposed project is subject to various statutory and regulatory requirements, including, but not limited to, 7 *Del.C.*, Ch. 70, *Coastal Zone Act*, and 7 DE Admin. Code 101, *Regulations Governing Delaware's Coastal Zone*.

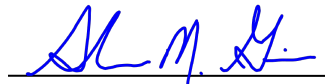
In reviewing the applicable statutes and regulations, as well as weighing public benefits of this proposed project against potential detriments, the Department's experts within the Coastal Zone Program have concluded that this Application complies with all statutory and regulatory requirements. Moreover, the Department's experts have further concluded that the Applicant's offset proposal to purchase three (3) tons of ERCs from the Delaware Division of Small Business to more than offset their 1.12 tons of anticipated annual emissions is sufficient.

I find and conclude that the Applicant has adequately demonstrated its compliance with all requirements of the applicable statutes and regulations, as noted herein, and that the Record supports approval of AgroRefiner's CZA Permit Application, as consistent with the intent of the CZA and its regulations, which is to balance the economic and environmental interests of the State of Delaware. Accordingly, the recommendations of the Hearing Officer are hereby adopted, and this Order approves the pending CZA Permit Application of AgroRefiner, LLC, to operate a new hemp extraction facility in an existing warehouse located at 51 Steel Drive, New Castle, Delaware.

Further, I direct that a Coastal Zone Act permit be issued to AgroRefiner, LLC, and that the following reasons and conclusions are entered:

1. The Department has jurisdiction under its statutory authority, as noted above, to issue a CZA Permit to the Applicant, subject to reasonable permit conditions deemed appropriate and consistent with the CZA's purposes;
2. The Department provided adequate and lawful public notice of the CZA Application of AgroRefiner, LLC, and of the public hearing held on February 5, 2020, and held said hearing to consider any public comment that may be offered on the application, in a manner required by the law and regulations;
3. The CZA permit applied for by AgroRefiner, LLC, is for production/manufacturing activities which will take place within the defined Coastal Zone of Delaware, specifically, to operate a new hemp extraction facility at an existing warehouse located at 51 Steel Drive, New Castle, Delaware.
4. The Department has carefully considered the factors required to be weighed in issuing a CZA permit, and finds that the proposed use is appropriate for the Coastal Zone at the proposed location, and that it should be permitted as set forth in AgroRefiner, LLC's Application;
5. The Department shall issue a permit to the Applicant, AgroRefiner, LLC, and said permit shall include all conditions consistent with the final Order and any other reasonable conditions that the Department includes in a CZA permit, to ensure that Delaware's environment will be protected from harm, consistent with the CZA and its regulations;
6. The Department has carefully considered all the statutory factors to be considered in making a decision on a CZA permit, and those required to be considered under the CZA and its regulations;
7. The issuance of the aforementioned CZA permit does not relieve AgroRefiner, LLC, of the legal obligation of compliance with all building permits, subdivision, and other applicable code requirements of the county or municipality wherein the permitted project is located;

8. If there are deviations from the Applicant's proposed plan and operations previously approved by the Secretary, AgroRefiner, LLC shall notify the Secretary as soon as possible. If the Secretary receives information which he or she believes may alter the scope of the project, the Secretary may revoke the permit or require AgroRefiner, LLC, to submit a new application to reflect the altered nature of the project;
9. The aforementioned CZA permit will allow the Applicant to operate its business while reducing the overall environmental impacts to the Coastal Zone area, in furtherance of the purposes of *7 Del. C. Ch. 70*;
10. The Department has an adequate Record for its decision, and no further public hearing is appropriate or necessary; and
11. The Department shall serve and publish its Order on all affected persons in a manner consistent with the service and publication of the Secretary's Order.



Shawn M. Garvin
Secretary