

**BIOENERGY INNOVATION CENTER
SEAFORD, DELAWARE**

ENVIRONMENTAL ASSESSMENT

May 2022

Prepared for:

BioEnergy DevCo, LLC
50 State Circle
Annapolis, MD 21401

Prepared by:



Duffield Associates, Inc.
5400 Limestone Road
Wilmington, DE 19808

Project No. 12393.ED

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1.0 INTRODUCTION

Bioenergy DevCo, LLC. (BDC) intends to expand operations of an existing composting facility as a new Resource Recovery Facility (RRF), and requires a permit provided by the Department of Natural Resources and Environmental Control (DNREC). The permitting process involves satisfying the permit requirements of the Delaware Regulations Governing Solid Waste. As a requirement of the regulations, an environmental assessment of the proposed facility is required, thus the following report will detail the expected potential environmental impacts that the proposed BDC Bioenergy Innovation Center (BIC) will have on the environment.

The Facility is located at 28338 Enviro Way, Seaford, DE 19973 and operates under Solid Waste Permit No. SW-18/03 issued by DNREC. The Facility is permitted to accept poultry industry materials including hatchery, liquid and solid cake dissolved air floatation (DAF), and litter. The facility has been operated by BDC since February 6, 2020.

The proposed facility will require construction and installation of new anaerobic digesters and aboveground storage tanks. BDC intends to enhance resource recovery from a greater volume of poultry industry liquid, solid cake DAF waste, and poultry litter reducing the amount of micronutrients in Delaware and on the Delmarva Peninsula under the RRF permit. The organic waste will be converted into marketable products or commodities that include commercial grade renewable natural gas and compost from blended digestate from the anaerobic digestion process and blended soil products.

The poultry industry generates large quantities of organic wastes that are currently land applied, disposed of in landfills, or transported for further use or processing. The industry is actively seeking more environmentally sustainable and less expensive alternatives for removing micronutrients from soils and reducing potential impacts to water resources.

2.0 CURRENT OPERATIONS

The property consists of approximately 225 acres of land, formerly owned and operated by Perdue Agribusiness LLC. The Property consists of three primary buildings, where the first operates as an organics composting facility which is contained on a 25-acre portion of the site. The second building contained a former pelletization plant, which was used to process chicken waste into usable end products between 1996-2017. The third structure is a house, which was converted to an office space. On the property, there also exists an office trailer and multiple smaller outbuildings which are used for the truck wash and pump houses. The property also contains storage areas for compost. The Facility is currently permitted to manage 30,000 tons per year of feedstocks for compost.

3.0 PROPOSED OPERATIONS

With the operation of the anaerobic digestion process, 48,000 to 54,000 tons of digestate annually will be generated, following dewatering, that can be used as feedstock for compost depending on market demand. The facility is designed to process up to 250,000 tons per year of poultry wastes, such that it enables the plant to generate an estimated 430,000 MMBtus per year of clean, renewable natural gas (RNG). The produced RNG will be transferred into a natural gas pipeline distribution system for resale.

4.0 ENVIRONMENTAL FACTORS

Provided below is a detailed assessment of each potential environmental factor that may be impacted by the operation of the expanded BDC facility.

4.1 AIR QUALITY

The facility currently holds an air permit with the State of Delaware, APC-2016/0093. Due to the expected operations of the new facility, new air permits will be required to accommodate new potential sources. New emission sources that will require permitting will be a standby generator fueled by natural gas, a thermal oxidation unit, and a flare which will be used as part of the biogas upgrading and conditioning system.

The gas upgrade and conditioning system will remove hydrogen sulfide, dehumidify the gas, and provide a polishing step which will remove siloxanes and volatile organic compounds (VOCs) using carbon filters. The thermal oxidizer and flare will be utilized when the biogas upgrade system is not available due to repairs or maintenance.

The standby generator will be a 2020 model year, 1082 kilowatt, 1451 horsepower unit. Total emissions of criteria pollutants are estimated at less than 3 tons per year. It will be utilized in the event of electrical power loss. Another source of emissions will be a natural gas fired boiler, which provides thermal energy to the facility. The boiler is expected to be under the threshold for permitting requirements.

The air ventilation system of the Process Building is designed to remove odors and elimination or dilution of odors prior to being released into the surrounding environment. Biofilters and dilution exhaust fans are proven technologies that are currently used in the design of the facility. The area that receives feedstocks for the anaerobic digesters will be equipped with a receiving hopper, which will reduce odors. The building will be equipped with quick acting roll-up doors, which will be used to minimize the amount of time the building is open when trucks are entering, unloading, or exiting the building. Filters and dilution

exhaust fans are proven technologies that are currently being considered for use. The facility equipment that will have process odor control are mainly the pretanks and feed-tank separators prior to the centrifuges. This equipment will have process filters to eliminate odors.

The facility maintains some asphalt pavement, which helps minimize the dust generated during truck and equipment movement on the site. Gravel roads will be wetted by trucks throughout as required during construction and operations to minimize and control dust.

The Composting Plant receives all waste into an existing building with air positively vented through an existing biofilter to capture dust, particulate and odors, Raw feedstocks are brought into the Compost Mixing Building where material is dumped onto the floor and mixed with a large wheel loader. The mixed material is transferred to one of 18 Covered Aerated Static Pile (CASP) bunkers and covered to contain moisture and odors. Composting operations will include windrows of material which are organized into three stages from initial compost to final screen product. In all stages the compost resides on impervious cover.

Digestate from the anaerobic digesters will be added to the feedstocks used in the composting operation in addition to DAF, hatchery waste and poultry litter. No additional expansion of the composting plant is expected. The existing air permit for the composting operation will be amended to include digestate as a feedstock. The facility will operate under the existing emissions limits.

Based on the above conditions, operations of the facility are not expected to have a significant adverse impact on air quality in the area.

4.2 WATER RESOURCES

4.2.1 Stormwater

The majority of the current operation occurs within an enclosed building or structure, but the compost piles are stored and sorted outdoors. These windrows of compost can be expected to be in contact with precipitation and/or stormwater runoff.

A NPDES general permit for industrial stormwater is in place for the composting facility, and BDC has submitted a Notice of Intent to implement system enhancements. BDC is implementing plans previously developed by Perdue, through its consultant McCrone, and approved by DNREC to make modifications to the outlet structure of the stormwater facility that serves the composting operation. Aerators, per the approved plan, are being installed in the stormwater pond to facilitate evaporation and enhance storage capacity with the goal of minimizing surface water

discharges. The stormwater system has an outfall located on a prong of the Gum Branch tax ditch, a tributary of the Nanticoke River.

BDC plans to undertake monitoring of the stormwater pond that collects runoff from the composting area in order to quantify concentrations of nitrogen, phosphorous and other analytes. BDC is also developing a number of proposed measures and best management practices that could serve as offsets for potential discharges from the stormwater facility which is being managed with the goal of no discharges.

The stormwater facility that separately serves the former pelletizing plant will be redesigned and reconstructed to accommodate the construction of the proposed tank farm and process equipment associated with the anaerobic digester. The existing outfall from the stormwater pond will be utilized and will continue to discharge to Gum Branch tax ditch prong. The proposed stormwater management design will utilize one proposed wet extended detention pond facility and one existing wet extended detention pond facility to reduce peak runoff from the Site. A wet pond is proposed in lieu of infiltration and bioretention practices due to a high ground water table.

4.2.2 Wastewater

Wastewater will be recycled back into the anaerobic digestion process and otherwise will be pretreated by a system using a membrane bioreactor and ultrafiltration.

The wastewater generated by the AD process will be pre-treated on-site. Initially treated wastewater will be hauled to the City of Seaford for disposal. Ultimately BDC will seek approval from Sussex County Council to form a sewer district and construct a pumping station and force main from the site directly to Seaford's wastewater treatment system. BDC has a commitment from Seaford (Appendix G in the Engineering Report) to accept up to 60,000 gpd pretreated wastewater that meets Seaford's discharge standards. The Seaford commitment is subject to an executed agreement with BDC.

The wastewater makeup from the pretreatment facility is being finalized but is expected to be consistent with the characteristics of domestic wastewater following treatment. The total discharge from the pretreatment facility is estimated to be 30,000 gallons per day when the plant is fully built out with the remaining amount recycled back into the anaerobic digestion process.

The wastewater treatment system consists of a Membrane Bioreactor System (MBR) that will include a bioreactor, ultrafiltration, reverse osmosis and nanofiltration and super concentration system. Two treatment trains are required for Phase 2 flows with one treatment train being installed initially.

All processed wastewater, including buildings and equipment drains will be collected and treated through an in-house water treatment facility for discharge to the treatment system.

Sanitary wastewater at the facility is currently treated and discharged to an on-site sanitary wastewater treatment system.

4.2.3 Groundwater

The establishment of anaerobic digesters and the ongoing composting operation are not expected to result in groundwater impacts at the Facility. The AD process is a closed system with no feedstocks or product exposed to soils where they may have an impact on groundwater. There are no new on-site wastewater discharges from the planned improvements to the site. Longer term plans call for conveying treated effluent offsite via force main to a local permitted municipal wastewater treatment plant.

The compost operation is served by a stormwater pond which is regulated under the NPDES program. Compost is stored in windrows on impervious surface to prevent infiltration.

4.3 STREAM FLOW

Stormwater retention ponds are present on the site and discharge to Gum Branch tax ditch prong, a tributary of the Nanticoke River. The existing property in the study area consists of approximately 91.22 acres. There are presently four existing ponds on the site. There is some impervious surface on the site, including the previous pelletizing facility and associated gravel and asphalt areas.

The proposed stormwater management design will utilize one proposed wet extended detention pond facility and one existing wet extended detention pond facility to reduce peak runoff from the Site. A wet pond is proposed in lieu of infiltration and bioretention practices due to a high ground water table. The stormwater management has been designed in accordance with the new regulations and will follow the DNREC Post-Construction Best Management Practices Standards and Specifications.

Hydrologic computations were completed for an analysis of pre- and post-development conditions. The comparison between the pre- and post-development calculations demonstrate that there will be no increase in peak discharge or volume at the points of analyses for the 10 and 100-year events.

Based on proposed modifications to and operations of the facility, there are not expected to be significant adverse impacts to water resources.

4.4 WATER SUPPLY

The Facility is currently served by on-site water supply wells that include an irrigation well, public wells, domestic well, and a production well that serves the facility's fire suppression system. The Facility is expected to require approximately 4 million gallons of startup water to initiate the digester process and anticipates utilizing up to 35,000 gallons per day to supply production water for operations. Accordingly, an allocation permit is not expected to be needed. A new meter is being installed to measure volumes of non-potable water to be used in the compost operation.

4.5 BIOLOGICAL RESOURCES

4.5.1 Fish and Wildlife

The facility is located in an area of mixed land use that includes agriculture, commercial, and residential. There is expected to be 5 to 10 acres of land disturbance, and the majority of the disturbed area will be related to modifying existing disturbed lands. It can be assumed that there will be negligible new disturbed areas; therefore, there are not expected to be significant adverse impacts to fish or wildlife habitats by the construction and operation of this facility.

4.5.2 Vegetation

The 225-acre property is home to large sections of undeveloped land with varying levels of vegetation. Field reconnaissance conducted on the site identified the presence of two plant communities. The plant communities were identified using National Wetland Inventory Map as Emergent Uplands and Palustrine Emergent Wetlands.

Species identified in the tree stratum of Emergent Upland included black cherry and eastern white pine. No species were identified in the shrub and sapling stratum. Species in the woody vine stratum included Japanese honeysuckle and species identified in the herbaceous stratum included ragweed, American pokeweed and dog-fennel. The vegetation in the emergent upland community was dominated by upland and upland facultative upland species.

Species identified in the tree stratum of the Palustrine Emergent Wetland included black willow and sweet gum. No species were observed in the shrub and sapling and woody vine stratum. Species identified in the herbaceous stratum included reed canary grass and common reed.

The project site is partially developed with a large building, gravel road, and three stormwater management facilities on the site. Wetland vegetation, hydrology, and hydric soils were noted in association with the

construction of stormwater facilities but were determined not to be jurisdictional.

4.5.3 Threatened or Endangered Species

In correspondence with the Delaware Natural Heritage and Endangered Species Program, it was indicated that there were no rare or federal listed plants, animals or natural communities at the site location. Provided in Appendix A is a copy of correspondence letter. The Species Conservation and Research Program (SCRCP) of the Department of Natural Resources and Environmental Control identified the successional habitat to the northwest of the proposed tank area and stormwater management area as potential habitat for the state-endangered corn snake (*Pantherophis guttatus*). There are no plans to expand the project into this area. As a result, the facility is not expected to impact threatened or endangered species.

4.6 WATER USES

The Facility is currently served by on-site water supply wells that include an irrigation well, public wells, domestic well, and a production well that serves the facility's fire suppression system. The Facility is expected to require approximately 4 million gallons of startup water initiate the digester process and anticipates utilizing up to 35,000 gallons per day to supply production water for operations.

A leachate collection system is used to capture runoff from the composting area that pumps to one of the storage tanks next to the compost receiving building. The leachate is then mixed into new feedstocks and wood. Leachate is supplemented with non-potable water from an on-site well during warmer weather. An allocation permit is not expected to be needed for either the composting or anaerobic digestion portion of the facility.

4.7 LAND USE

The property is located in an area of mixed land use that includes agriculture, commercial, and residential and is in an area zoned as Agricultural Residential District. The property nears US Route 13; therefore, there are commercial properties within a 1-mile radius of the property. The nearest residential properties are located within 1 mile of the property as well. Sussex County has issued a Conditional Use approval to facilitate the construction and operation of the proposed facility.

Due to the addition of the anaerobic digesters and accompanying above ground storage tanks, there will be new construction on the Property. Since the new

facility will be constructed using existing infrastructure, the construction is not expected to significantly affect land use, and the continuing land use associated with the operation of the site is expected to remain consistent.

4.8 AESTHETICS

The facility is located in an industrial and agricultural area and is bordered by a poultry farm, mobile home community, and undeveloped land. The composting facility will utilize the current infrastructure, which consists of two structures and a farmhouse utilized as office space. A large area is reserved for compost storage. No changes to outdoor storage areas are anticipated, but the addition of a new anaerobic digester facility is expected. The new facility aims to use the existing building structures and surrounding supportive infrastructure to develop the anaerobic digesters and above ground storage tanks. The addition of above ground storage tanks and associated equipment adjacent to existing buildings is not expected to significantly alter the aesthetics of the Property. Fencing and additional landscaping will assist in maintaining the aesthetics of the site.

4.9 TRAFFIC

The facility is located 1.5 miles south from the town of Blades, Sussex County. The roadway that leads to the entrance of the site is called Enviro Way, and it connects to Alternate Route 13, Seaford Road.

The total estimated vehicle traffic utilizing the facility, including employee vehicles and trucks delivering feedstock and hauling product, is estimated at less than 200 per day, less than the 200-trip-threshold required by the Delaware Department of Transportation required to conduct a traffic impact analysis. The facility is located in an agricultural area, where truck traffic is relatively common. It is expected that existing trip allowances are sufficient to accommodate the needs of the new project.

A Service Level Evaluation has been prepared by Delaware Department of Transportation (DelDOT) and provided to Sussex County on January 16, 2020. DelDOT has provided a Letter of No Contention and indicated that the project is eligible to obtain a permit for entrance construction.

4.10 PUBLIC HEALTH AND SAFETY

The Facility will be constructed and will operate according to any applicable requirements of the State Fire Marshall, DNREC, Occupational Safety and Health Administration, Public Service Commission and Sussex County.

Facility hazards and proper methods of control have been identified and will be incorporated into the Environmental Health and Safety Plan for the facility. An Emergency Action Plan will also be developed. Facility units will also be subject

to regular inspection and maintenance schedules according to manufacturer's specifications and industry best practice.

Specific potential safety hazards and methods of control include:

Fire and explosions due to characteristics of biogas – Assuring the proper design, operation and maintenance of the facility to prevent air/gas mixture, maintaining proper temperatures, mixing and feed rates, use of flame arrestors, explosion-proof equipment and electrical service, use of non-sparking tools in electrically classified areas, hot work program, smoking prohibitions, site signage and personnel training.

Impacts from asphyxiation or hydrogen sulfide – Requirements for confined space entry program, air quality monitoring and use of gas sensors, proper use of specific safety equipment and personal protective equipment (PPE) for work performance.

Impact from contact with trucks and mobile heavy equipment – Site signage for ingress, egress and speed. Assuring proper communication between drivers, operators and pedestrians.

Electrical Shock – Use of site signage, lock out/tag out procedures for equipment, personnel training and proper use of PPE for work performance.

Disease associated with material contact or handling -- Proper use of PPE for contact or handling of wastes, washing of hands and general housekeeping of the facility.

Impact from contact with large equipment components (tanks, conveyors) during placement -- proper planning, training, controls and communication systems among crane operators, spotters, construction team members.

4.11 CULTURAL RECREATIONAL AND NATURAL AREAS

The Property does not contain any known cultural, recreational or natural areas. Adjacent lands are privately owned and there are not any public lands containing cultural, recreational, and natural areas adjoining the Property.

4.12 HISTORIC SITES

There are no historic sites as identified on the National Historic register either on or adjacent to the facility. In addition, there are no known cultural resources to occur on the property and thus there is not expected to be a significant impact on historic sites in the area due to operations of the facility.

4.13 SOCIAL AND ECONOMIC FACTORS

A positive impact on the social and economic conditions of the surrounding community is expected with the expansion of the composting facility, as it provides the community with jobs and provides a unique energy and environmental service.

The existing compost facility currently employs 12 people with responsibilities that range from mechanic to pile turner to environmental manager. The anaerobic digester at completion is envisioned to expand staffing needs to approximately 50 individuals from the community with jobs that range from engineering and operation to trucking, maintenance, and operations.

Additionally, the site will become a learning center focused on the agricultural jobs of the future. BDC plans to partner with the University of Delaware both in extending current relationships at the Carvel campus and to bring research staff to the facility on specific projects of interest of the agricultural community. As a long-term community resident, BDC also plans to extend this academic exchange to include work with the Delaware Technical Community College and high schools within the area.

In terms of direct expense, a shovel-ready project such as proposed for this facility has a budget of over \$25 million. Roughly half of this budget is directed at local trades from construction to concrete and fencing to project design.

4.14 SOIL QUALITY

Soil borings and samples collected at the site indicate soils consisting primarily of fine sands with varying amounts of silt and clay with silt/clay lenses and intervals containing coarse sand and gravel. Soils generally coarsened with depth. A review of the Delaware Environmental Navigator (DEN) indicates that no Superfund sites, Hazardous Substances Cleanup Act sites, leaking tank sites, registered underground storage tanks, or aboveground storage tanks were mapped within 2,500 feet of the Property.

The existing site had a storage locations used for storage of compost. The facility is expanding its processes to include anaerobic digestion to produce RNG, the process of which does not produce any hazardous byproducts that could adversely impact soil quality. This coupled with the continued composting operation indicate that there is not expected to be a significant adverse impact to the soil quality on the site.

APPENDIX A

DNREC DELAWARE NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM CORRESPONDENCE



STATE OF DELAWARE
**DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL**

RICHARDSON & ROBBINS BUILDING
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

OFFICE OF THE
SECRETARY

PHONE
(302) 739-9000

8 May 2020

Emaad Fayaz
Duffield Associates
5400 Limestone Rd.
Wilmington, DE 19

Re: DUFF 2020 Sussex Renewable Energy Project; Tax Parcel # 32-6.00-95.00, 132-11.00-41.00, 132-11.00-41.02, 132-6.00-88.01

Dear Mr. Fayaz,

Thank you for contacting the Species Conservation and Research Program (SCRIP) about information on rare, threatened and endangered species, unique natural communities, and other significant natural resources as they relate to the above referenced project.

State Natural Heritage Site

A review of our database indicates that there are currently no records of state-rare or federally listed plants, animals or natural communities at this project site. As a result, at present, this project does not lie within a State Natural Heritage Site, nor does it lie within a Delaware National Estuarine Research Reserve which are two criteria used to identify "Designated Critical Resource Waters" in the Army Corps of Engineers (ACOE) Nationwide Permit General Condition No. 22. A copy of this letter shall be included in any permit application or pre-construction notification submitted to the Army Corps of Engineers for activities on this property.

Key Wildlife Habitat

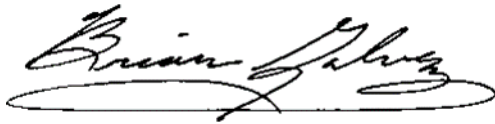
The early successional forest habitat located northwest of the proposed tank farm and SWM expansion is mapped as Key Wildlife Habitat (KWH) in the Delaware Wildlife Action Plan (DEWAP) because it is rare within the state and has the potential to harbor the state-endangered cornsnake (*Pantherophis guttatus*). KWH can support the full array of species across the landscape and the maps in the DEWAP show areas of the state where conservation efforts can be focused. Although designation as KWH is non-regulatory, these maps are intended to help guide site-specific conservation planning efforts. If the project footprint is expanded into this forested area, we recommend that a herpetological survey be conducted prior to any forest disturbance. If the disturbance of this forested area is necessary to

complete the proposed project, please contact our state herpetologist, Nate Nazdrowicz, at Nate.Nazdrowicz@delaware.gov or at (302) 735-8688 to schedule a survey date.

We are continually updating our records on Delaware's rare, threatened and endangered species, unique natural communities and other significant natural resources. If the start of the project is delayed more than a year past the date of this letter, please contact us again for the latest information.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Galvez", with a large, sweeping underline that extends across the width of the signature.

Brian Galvez
Environmental Review Coordinator
Phone: (302) 223-2446
6180 Hay Point Landing Road
Smyrna, DE 19977

(See invoice on next page)

INVOICE - PAYMENT DUE

It is our policy to charge a fee for this environmental review service. This letter constitutes an invoice for \$35.00 (\$35.00/hour for a minimum of one hour). Please make your check payable to "Delaware Division of Fish and Wildlife" and submit to:

DE Division of Fish and Wildlife
89 Kings Hwy.
Dover, DE 19901
ATTN: Brandi Henderson

**In order for us to properly process your payment, you must reference
"DUFF 2020 Sussex Renewable Energy Project" on your check.**

cc: Brandi Henderson, Fish and Wildlife Accounting Specialist; Code to 72900