BIOENERGY INNOVATION CENTER
SEAFORD, DELAWARE

CONCEPTUAL CLOSURE PLAN AND FINANCIAL ASSURANCE

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Prepared for:

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1.0 INTRODUCTION

This closure plan describes the activities that Bioenergy DevCo (formerly Bioenergy Development Group) will need to employ to close the Facility consisting of the composting and anaerobic digesters operations located at 28338 Enviro Way Seaford, DE 19973.

The Conceptual Closure Plan will be conducted in a manner that: (1) removes the potential environmental and safety impacts of the facility during closure and then subsequently on the surrounding area, (2) ensures the removal of onsite product and recyclable material inventories; and (3) minimizes the need for ongoing maintenance and management of the facility.

Health and safety of BDC employees as well as that of the surrounding community, insurance ramifications and existing long term contract language between providers of waste material as well as off takers of organically derived renewable natural gas requires BDC to ensure the orderly closure of an Anaerobic Digestion (AD) facility. This orderly process removes risk to current employees, the surrounding community, and the environment. The gas closure process takes 60-90 days and BDC will notify DNREC as well as our designated third-party management team about initiation of closure process.

Additional closure steps will include remote monitoring by science and engineering staff located within our global headquarters to ensure this plan is following an orderly process.

It should be noted that this orderly process is not different than if for some inexplicable reason DNREC would be forced to manage the closure of one of the State's gas producing landfills. This plan includes a closure cost estimate based on the third-party management of activities identified below through shutdown and the removal and final management of the material at the site and will follow this orderly shutdown of the facility. The plan establishes the steps forward and financial requirements that will be established to ensure that the elements of this plan can be appropriately implemented. Letter(s) from vendors supplying services identified in the Plan will be provided by BDC.

2.0 PROCEDURES FOR FACILITY CLOSURE

The closure plan for the facility involves the orderly shutdown of the biogas and gas cleaning facility, the processing of the recyclable feedstock material, material in the composting process, materials in the anaerobic digestion process, the finished products that are stored on site and the biofilter media. The plan assumes that no new feedstocks would be delivered to or processed at the facility during shutdown and pre-closure and that the biological process for the anaerobic digesters functions until it no longer supports the sustainable production of biogas. The plan also assumes that compost in the curing process will remain on-site until it meets regulatory standards for offsite use.

As mentioned above, BDC simply abandoning the facility is not a realistic, practical, or business savvy option as safety concerns and insurance requirements mandate that the company follow a prescribed series of steps that minimize environmental impacts and protect public health and

safety. These requirements stand even under circumstances that result in an unexpected closure or a catastrophic event.

The following describes the materials in question and the basis for calculating the volume of material that must be removed in the event of an unexpected close of the Facility.

For purposes of the plan the following capacities, based on expected permit limits, have been used in development of this plan:

(4) Digesters 1,838,113.25 gallons = 7,352,453 gallons

(3) Pre-tanks 378,297.35 gallons = 1,134,892 gallons

(1) Compost process-water tank = 10,000 gallons

Mixed in process and finished compost = 15,000 tons

Feedstocks in compost mixing building = 377 tons

Wastewater treatment system

(1) Anoxic reactor tank = 283,192 gallons
(2) Oxic reactor tanks 309,609 gallons = 619,218 gallons

3.0 THE RECEIVING BUILDING

Anaerobic digestion as an organics recycling facility means that feedstock delivered to the Receiving Building is immediately processed and pumped as received to completely enclosed tanks either the pre-tank storage and/or direct to the digesters. Each day's volume of fresh input is delivered and processed, insuring there is no material in storage in the receiving building to be processed.

For calculating closure costs, it is assumed that the poultry litter and DAF materials associated with one day of receiving feedstock has been processed and is in the pre- tanks and digesters when the need for closure has been determined.

Hatchery waste received for the composting operation would likewise have been incorporated into the compost piles.

The daily tonnage for these wastes is as follows:

Material Type	Tons Received

- DAF material: 465.88 tons

- Hatchery waste: 30.14 tons
- Litter: 82.21 tons.
  Total 578.23 tons

Please note: The 199,504 tpy identified in the Engineering Report is representative of material going to the ADs (DAF and litter). The 11,000 tpy is representative of the material going to the compost (hatchery waste). The 578.23 tpd is a combination of the material going to AD (548 tpd per Table 1 of the Engineering Report) and 11,000 tpy (30 tpd hatchery waste) of material sent to compost operation. Feedstock processing is based on 7 days per week, as noted in Section 3.0 and closure costs are based on processing 7 days/week.

4.0 FEEDSTOCK HANDLING AND PROCESSING EQUIPMENT (PRE-DIGESTER)

All feedstock receiving, preparation, and pumping equipment include the liquid sludge receiving station, lines, tanks, and pumps, and will be flushed to remove residual materials. Flush liquid will be processed through the anaerobic digesters, dewatering, and wastewater treatment process.

5.0 PRE-TANKS

During normal operations the pre-tanks will contain approximately 1.14 million gallons of feedstock and prepared digester feed slurry.

In the event of a 60-90 day shutdown implementation, the pre-tanks will continue to discharge to the digesters in the normal feeding cycle during the shutdown period. In the event of closure, it is assumed all pre-tanks are full and the 1.14 million gallons of material amounts to roughly seven (7) days' worth of digester input at average feeding rate.

6.0 ANAEROBIC DIGESTERS

During normal operations the digesters will contain up to 7.3 million gallons of feedstock in the process of organic conversion to biogas. During the shutdown process, the digestion process will continue to produce biogas and will be monitored to ensure all safety procedures and practices continue. Material remaining in the pre-tanks will be fed to the digesters and emptied.

Digester effluent will be treated through the dewatering disc press and membrane bioreactor/ultrafiltration/reverse osmosis, (MBR-UF-RO), wastewater plant. The final discharge liquid will be transferred to the City of Seaford wastewater treatment plant for disposal. A pump and haul agreement will be in place. Treatment of the pre-tank contents and digester slurry is estimated to take 60--90 days through an orderly closure. Should the pre-tanks be empty, the digestion process will cease within the 60-90 days.

As the biological process slows to a point that sustaining production levels of biogas is no longer achieved, volumes in the digesters will drop to a level at which material will need to be removed and treated. This volume is expected to be approximately 220,000 gallons for one (1) foot of digester height per tank will remain inside the tank and will be removed and disposed by a permitted hauler with an agreement with BDC for removal and disposal.

Biogas produced during this period will be safely flared according to applicable permitting requirements and is further discussed in Section 7.0.

7.0 BIOGAS UPGRADE FACILITY

In the event of closure, biogas still being produced must be either flared safely without impacting air permit requirements or processed through normal operation of the biogas upgrading facility. This process takes approximately 60-90 days and must meet insurance and additional national and local safety statutes. In this shutdown process, once biogas production levels fall to a predetermined level, the raw biogas would be diverted to the flare for destruction. The raw biogas will be scrubbed of H2S and VOCs, which will require a portion of the gas upgrading skid equipment to continue to run. The flare, along with the H2S and VOC removal equipment, would remain in operation to be able to continue to dispose of the raw biogas until biogas production ceases.

Once the entire volume of raw biogas from the AD process is being routed to the flare, ensuring environmental health and public safety, the biogas upgrading system is depressurized, and any remaining gas in the system is recycled back to the digesters. Once the system is free of gas, all equipment downstream of, and including, the biogas compressor is isolated from the AD Facility.

The upgrade system is then purged with nitrogen and the piping and vessels are leak tested from smaller to larger piping. Special attention will be paid to any pocket or trap that could potentially contain hydrocarbons. Any rotating equipment that uses lubricating oil will be flushed to prevent any accidental spillage during the decommissioning phase.

All non-hydrocarbon liquids and/or condensates will be manually directed to the on-site wastewater treatment plant for processing. This will include any liquids that have been used for flushing or cleaning pipework or vessels. If there is any possibility of solids being entrained within the liquid stream, then that particular stream will be manually run through a filter or centrifuge to remove any solids before being transferred to the wastewater treatment plant.

Once purging is completed and the system is declared clear of hydrocarbon gas, all catalysts and media used within the process will be removed from the various process vessels and disposed of methodically.

All media will remain segregated and disposed of safely following federal, state, and local regulations.

8.0 BALANCE OF DIGESTION FACILITY, DIGESTED SOLIDS CAKE AND BIOREACTOR SLUDGE

Digested solids cake from the solids-liquid separation process and sludge from the wastewater treatment plant bioreactor should be treated as fresh feedstock for composting and taken to a nearby composting operation for processing such as McGill Compost in Waverly, VA, Enviro-Organic Technologies in New Windsor, MD or Synagro among others.

During the 60-90 days of continued processing to empty the digesters, it is estimated that the digestate solids cake produced averages 80 tons per day and the bioreactor sludge averages about 100 tons per day as the basis for calculating the cost of closure.

Any hazardous waste will be tracked using the hazardous waste management system that will track the waste bound for off-site treatment, recycling, storage, or disposal; and will have the appropriate signatures and approvals of all parties involved in the disposal process. This will ensure the critical accountability in the transport and disposal process. Once the waste reaches the final destination, the receiving facility returns the completed signed copy.

Electrical disconnection for all rotating equipment will be carried out using the electrical breakers within the switch house to prevent the inadvertent startup of the unit.

All instrument connections to the existing HMI within the control room will be removed while the local indications will remain in operation. This will ensure that the required checks can be completed under the detailed decommissioning program.

9.0 PROCESS WATER

The Facility will include a storage tank with a capacity of 10,000 gallons for process water.

This material will be mixed into new batches of compost to increase moisture of the mixed material. In the event of closure, it is expected that any remaining material that is not used through the 60-90-day shutdown period would be processed through the on-site wastewater treatment plant and discharged by transfer off-site to a permitted treatment and disposal facility.

10.0 WOOD CHIPS

Wood chips for use as a bulking agent are purchased and stored adjacent to the Receiving Building. The wood chips are purchased from land clearing companies and producers of mulch products. The wood is delivered to the site sized for use in the compost process. This material is purchased at an expected cost of $15 to $25 per ton. For the purpose of calculating a closure cost, mulch producers will be offered to come to the site and pick up the wood at no cost. The closure cost estimate will include the cost of loading the wood on to trucks which come to pick up the material.

11.0 BIOFILTER MEDIA

The biofilter contains 1,500 cy (800 tons) of compost mixed with wood chips. The most efficient and environmentally prudent means of managing this material is to mix it with the compost in the covered aerated static piles. With the expected expansion of permitted composting limits to 54,000 tons and no new feedstock coming to the compost operation, the facility is expected to have ample space at the current location to accommodate material being directed to compost in the covered piles.

12.0 COMPOST IN PROCESS

The most efficient and environmentally prudent means to manage the material that is composting is to allow the composting/curing process to continue until a finished product is produced. The facility is designed with 18 covered aerated static piles (CASP). The maximum amount of compost in the CASP varies from 650 to 11,700 tons. In addition to the material under cover, the facility has a maximum of 9,150 tons of material in windrow composting or in the finished product storage area. At no time will more than 15,000 tons of material be in process.

A finished product is produced in 13 weeks. A loader and a screen would be required to manage the composting material for 13 weeks until a finished product is made from all the material composting. This product will either be offered to Blessings Compost, Synagro, Ellis Farms or Denali for disposal.

13.0 FINISHED PRODUCT

The finished product consists of a high-quality compost and little to no contamination with plastic or other contaminants. This product is normally sold to compost bagging operations, landscapers, and agricultural users. For this closure plan, it is assumed that this product will not produce any revenue. Within our estimated 60–90-day closure, this finished material will be offered to existing customers at no cost based on ability to pick up the materials.

There are many agricultural uses in the area that would accept the final product for direct land application. BDC has consulted with the Delaware Department of Agriculture (DDA) regarding the availability of significant quantities of compost in the event of an unexpected closure. DDA has provided a letter (Exhibit 1) outlining the mechanisms it has in place to address such a situation to allow amendment of nutrient management plans and afford landowners an opportunity to utilize available material.

A loader and loader operator would be required to load trucks receiving this material. The maximum amount of finished compost to be removed from the site will include the compost produced from the biofilter material, the compost produced from the material in covered aerated static piles, and the material in windrow composting and in the finished product storage area. The total amount of compost to be loaded on to out bound trucks would be 15,800 tons. The estimated time to load trucks to move this material off site is 90 working days. This product will be offered to our current compost clients, Scotts, Coast of Maine, H&H at no cost.

14.0 FACILITY CLOSURE MISCELLANEOUS REQUIREMENTS

Certain closure activities for the entire facility include removal of all chemicals whether in bulk, tote, or small quantity, electrical system de-energized and locked out, stormwater pond closure or drained, and rolling stock re-located or sold.

15.0 FINANCIAL ASSURANCE

The total cost of an unexpected closure of the compost facility was previously calculated to be $176,246.10 in January 2020. The revised cost calculated of both the compost facility and the

expanded AD facility inclusive is $991,600 with the calculations and summary provided in the following sections.

BIC will establish an appropriate financial assurance mechanism for the closure in the amount of $991,600. The financial assurance mechanism will be consistent with the requirements specified in Section 1301 of the Delaware Regulations Governing Solid Waste.

The total closure costs will be updated annually for inflation or whenever a change in the Closure Plan occurs.

16.0 COST CALCULATIONS

16.1 RECEIVING BUILDING

Anaerobic Digesters -- Because feedstock is processed on a daily basis and moved from the receiving building to the pre-tanks, digesters and the composting operation, there is not expected to be any material that will need to be disposed of from the receiving building.

Compost Operations – The daily tonnage for materials coming to the Compost Operation mixing building is estimated to be:

Material Type	Tons on in Receiving Building
DAF material	59.5 tons
Hatchery waste	17.5 tons
Total	**77 tons**

In the event of a shutdown, it is expected that one-day's material will need to be managed through the 60-90 day shutdown period with no new feedstock being delivered during the shutdown period. This material will be processed and cured at the facility until it meets specifications for use in the market as described in Sections 12 and 13. This process will be managed under third party agreement.

Estimated cost: Cost Included in labor costs

16.2 FEEDSTOCK PRE-TANKS

During normal operations the pre-tanks will contain approximately 1.14 million gallons of feedstock and prepared digester feed slurry. These materials would be processed through the anaerobic digesters during the 60-90 day closure period.

Estimated cost: 0

16.3 FEEDSTOCK HANDLING AND PROCESSING EQUIPMENT (PRE- DIGESTER)

Flush liquid treatment through the feedstock receiving equipment and piping to pre-tank storage.

Estimated cost: $15,000

16.4 ANAEROBIC DIGESTERS

The digester will continue to generate biogas and the process will be monitored to ensure all safety procedures and protocols continue over the duration of 60-90 days while the biological process ceases. There is expected to be approximately 220,000 gallons of material remaining per tank once the biological process ends (1 foot of digester height per tank). This material will be transported to a permitted facility for disposal at a cost of $0.07 for 880,000 gallons totaling $61,600 and transportation costs estimated at $0.09 per gallon.

Estimated cost: Total disposal and transportation costs are estimated at $140,800.

16.5 BALANCE OF DIGESTION FACILITY, DIGESTED SOLIDS CAKE AND BIOREACTOR SLUDGE

During the 60-90 days of continued processing to empty the pre-tanks and digesters, it is estimated that the digestate solids cake produced averages 80 tons per day. Digestate solids cake will be recycled back into the compost operation. The bioreactor sludge which averages about 100 tons per day will be recycled back into the digesters and the volume will diminish as the digesters' biological activity winds down. Costs for continued operations are included in labor costs for 90 days.

Estimated cost: Included in other labor costs for CASP and Labor for Operations.

16.6 BIOGAS UPGRADING FACILITY

The estimated closure costs for the biogas upgrading facility are based on full media bed removal, valve checks, and system blanketing.

Estimated cost: Less than $150,000

16.7 WASTEWATER

With no new feedstocks being received at the facility during a shutdown, wastewater flows will diminish over time. For purposes of estimating costs for wastewater, flows during the shutdown period are estimated to be:

Days 1-35 – 60,000 gallons per day average
Days 36-60 – 35,000 gallons per day average
Days 61-90 – 10,000 gallons per day average

Total wastewater flows during the shutdown period of up to 90 days are estimated to be 3,230,000 gallons. Estimated costs for treatment of wastewater at predicted average flows and a charge of $0.04/per gallon is $129,200. Estimated transportation costs to haul to a treatment facility is based on an estimated charge of $0.09/per gallon which totals $290,700. The combined treatment and transportation cost is estimated at $419,900.

Additionally, approximately 10,000 gallons of process water would be processed through the wastewater treatment facility with a charge of $0.04/per gallon for $400. Transportation costs are estimated at $0.09/ per gallon totaling $900 with combined costs of $1,300.

Estimated cost: $421,200.

16.8 BIOFILTER MEDIA

The materials will be removed from the biofilter and moved to the covered aerated static piles for composting. We estimate at total of 1,500 cy (800 tons) of this material will need to be composted which would take one day with one loader and operator, at $75 per hour, to complete.

Estimated cost: $600.

16.9 WASTEWATER TREATMENT BRINE

The brine can be composted normally once all of the wastewater has been treated and would be disposed of with other materials trucked to nearby composting facilities such as McGill Compost in Waverly, VA, Enviro-Organic technologies in New Windsor, MD or Synagro among others at an estimated cost of $50 /ton and 2000 total tons over 60 days for disposal, total cost of $100,000.

16.10 COMPOST IN COVERED AERATED STATIC PILES (CASP)

Any materials being composted in the CASP system would continue to cure in the event of an unexpected closure of the facility. It would take 13 weeks at 40 hours per week, or 520 hours total, for one loader, one screener, and an operator to compost these materials in order to meet specifications for finished product. The loader and operator, at $75 per hour, will cost $39,000. At $50 per hour, the screener will cost $26,000.

We estimate the total cost of closure for management of the materials in the CASP system at $65,000.

16.11 FINISHED PRODUCT

A loader and an operator would be required for an estimated 90 days to load trucks with outbound product which is estimated at 15,800 tons. A total of 720 hours of an operator and a loader, at $75 per hour, would be required.

We estimate the total cost of closure to move all the finished compost off of the grounds to be $54,000.

16.12 WOOD CHIPS

Any clean wood chips that may be left at the site in the event of an unexpected closure will be picked up by local mulch producers. We estimate there may be up to 600 tons of wood chips that might be on site. We estimate it would take one loader and one operator 24 hours, at $75 per hour, to load the woodchips.

We estimate the cost of closure to load the wood chips to be $1,800.

16.13 FACILITY OVERALL

The estimated cost for removal of chemicals, electrical system de-energizing and lock out (apart from critical functions such as stormwater pumping, etc.), and rolling stock removal. Majority of the chemicals would be consumed during the 90- day closure period and any left-over materials would be removed for disposal at a permitted facility. Material for disposal may include:

- Nutrient (Acetic Acid 56%)
- Caustic soda (30%)
- Antifoam (used only during the startup phase)
- Hypochlorite (14%)
- Membrane acid cleaner
- Membrane caustic cleaner
- Sulphuric acid (50%)
- Antiscalant
- Membrane acid cleaner
- Membrane caustic cleaner
- Caustic soda (30%)

Estimated cost: $50,000.

16.14 LABOR FOR OPERATIONS

Staffing will be maintained at a level designed to assure continued safe, compliant operations through the closure period of up to eight weeks. An estimated staff of five people will remain on site at an average of $20 per hour working 40 hours/week.

The estimated costs for maintaining staffing levels is $48,000 for the 12-week period.

16.15 MANAGEMENT

The estimated management fee for a third- party contractor to oversee implementation of the closure plan to be $150,000.

16.16 SUMMARY

The total cost of unexpected closure of the Bioenergy Innovation Center is summarized in the table below:

Item	**Closure Cost**
Feedstock Handling Equipment including flush of piping	$15,000.00
Anaerobic Digester Operations – transportation and treatment for remaining material in digesters	$140,800.00
Balance of digestate cake bioreactor sludge	Included in labor operation costs and CASP
Biogas Upgrading Plant Operations including media removal	$150,000.00
Wastewater treatment costs	$421,200.00
Biofilter media moved into composting	$600.00
Wastewater Treatment brine removal to third party compost operations	$100,000.00
CASP – labor costs for compost management compost to meet	$65,000.00
Finished product management – labor costs for loading compost to ship offsite	$54,000.00
Wood chips – labor costs to ship remaining material offsite	$1,800.00
Facility Overall including disposal of chemicals and rolling stock	$50,000.00
Labor for Operations	$48,000.00
3rd Party Management	$150,000.00
Total	$1,196,400.00