Vanguard RENEWABLES

Organics to Energy Lifecycle

Memorandum

To: Salisbury AD 1 File

From: Maria Sol Ucciani
Engineering Project Manager
Vanguard Renewables

Date: December 4, 2018

Project: Salisbury AD 1

Re: Spill Prevention and Control Plan

Vanguard Renewables is recognized nationally for its organics-to-energy model. By the close of 2018, the firm's operating portfolio will represent the largest organics disposal destination in Massachusetts, with over 190,000 T/year of combined on-farm and off-farm organics being processed and converted to valuable energy and products for dairy and agricultural use.

In New England, the Vanguard Renewables team currently operates four successful co-digestion AD systems with a fifth starting up by the end of 2018. The robustness of Vanguard's operations is based on having detailed procedures and checklists, which have been proven to work, are based on operational experience, and are reviewed when appropriate. This Spill Prevention and Control Plan serves to provide the basic framework of Vanguard's spill prevention and control procedures, which will be updated with site specific information upon construction of the facility.

On-Site Storage Tanks

The first step in spill prevention is proper design, installation, operation, and maintenance of tanks and equipment. The Project will include the construction and use of anaerobic digester tanks, the hydrolyzer tank, a manure storage tank, and a liquid nutrient storage tank. These tanks, their storage capacity, type of liquid stored, and secondary containment measures are summarized in Table 1 below. All tank designs will be stamped by a Professional Engineer. All tanks and equipment shall be installed, operated, and maintained in accordance with the vendor specifications.

Table 1: Summary of Liquid Storage Tanks for the Salisbury AD 1 Project			
Tank	**Capacity (gallons)**	**Type of Liquid**	**Spill Prevention/Secondary Containment**
Manure Storage Tank	26,500	Manure	Concrete/engineered construction, frequent inspections, low level alarm
Hydrolyzer	264,000	Food waste	Constructed in ground - Concrete, low level alarm
Anaerobic Digesters (2)	925,430 each	Manure and hydrolyzed food waste	Constructed partially in ground, engineered construction, frequent inspections, low level alarm
Liquid Nutrient Storage tanks (2)	2,500,000 (each)	Liquid digestate (post digester and DAF solid extraction)	Engineered construction, frequent inspections, passive secondary containment

As indicated in Table 1, the manure storage tank will be a concrete tank that will store manure prior to solid separation. The tank will be similar in construction to standard farm slurry store tanks. The host farm will be responsible for transferring manure to this tank, via truck or direct pipeline from the barns, in a manner consistent with current manure transfer practices of the farm. The tank will be equipped with a low level alarm connected to a SCADA system so that Salisbury AD 1 would be notified if the tank reaches low levels. The tank will be piped to the separation building, where solids will be separated and used by the farm for bedding, consistent with current farm operations. Liquid from the separation process will be piped directly to the digester tanks.

The hydrolyzer will be a leak-proof concrete tank, constructed entirely underground. Incoming feedstock will be either piped directly into the hydrolyzer or transferred from a truck through a grate. The in-ground construction avoids the potential for an aboveground release of hydrolyzed food waste. The tank will be equipped with a low level alarm connected to a SCADA system so that Salisbury AD 1 would be notified if the tank reaches low levels. For any spills that occur atop the concrete receiving pad near the hydrolyzer, the material shall be washed down into the tanks through a drain set in the base of the concrete pad.

The Anaerobic Digester ("AD") tanks will be installed partially in-ground to provide sidewall structural support, which reduces the risk of a breach. Feedstock from the solid separator and the hydrolyzer will be piped directly into the digester tanks. The tanks are designed by CHFour Biogas ("CHFour"), construction drawings will be stamped by a VT-PE and will be installed by a qualified construction firm. CHFour and Vanguard engineers will observe the construction. CHFour has designed and installed over 25 digesters of similar design, and none have failed or leaked (uncontrollably). The AD tanks have a 20 year lifespan, and longer if properly maintained. The AD tanks will be equipped with a low level alarm connected to a SCADA system so that Salisbury AD 1 would be notified if the tank reaches low levels.

The liquid nutrient storage tanks will store the liquid digestate from the digester. Prior to entering the tanks, the digestate will go through a nutrient recovery system that will extract fine solids, resulting in the recovery of phosphorus and other nutrients into a solid form. The reduced nutrient liquid will then be piped directly to the liquid nutrient storage tanks until it can be used or transferred to other storage lagoons by the farmer. The proposed tanks will be designed and specified by Weston and Associates, LLC (https://westonandassociates.com/), a consulting group that has designed and constructed over 100 agricultural storage tanks throughout the country. The tanks are engineered systems, and are designed per AWWA D103 and or NRCS 313 Code specifications.[1] Given site space constraints and the engineered design of the tanks in accordance with industry-accepted standards, passive secondary containment is not practicable. The tanks will be hydro-tested for leaks prior to filling with digestate, and inspected and maintained in accordance with the manufacturer's operation and maintenance manual.

Off-Farm Feedstocks – Delivery Procedures

Off-farm feedstocks will be delivered to the digester site and transferred to the Hydrolyzer Tank until being fed into the AD Tank. Liquid feedstocks will be transferred from the delivery trucks into the Hydrolyzer Tank through a tube and cam-lock with bar-screen and a containment system to prevent any material from contacting soil or surface water. Solid feedstocks will be transferred to the Hydrolyzer Tank through entry of a retractable lid; this input is also equipped with containment measures.

Haulers delivering feedstock will transfer the material to the receiving tank during regular business hours and then leave the site. The delivery trucks will follow set delivery paths to maintain site biosecurity. The receiving stations are equipped with wash-down equipment so the trucks and unloading area can be cleaned after delivery. The water generated is washed down into the receiving hydrolyzer tank to prevent odors.

The Hydrolyzer Tank operates at 104˚F to promote the breakdown of material. The air within the headspace of this Tank will be treated through an activated carbon filter before it is released into the atmosphere, to prevent the emission of odorous air. To prevent leakage of the feedstock into the environment, a post-construction inspection of all material-handling equipment will be performed and in the event of a leak between the Hydrolyzer Tank and the AD Tank, the feedstock will remain in the Hydrolyzer Tank until the leak is repaired. If that tank is full because it is not feeding into the AD, then new loads of feedstock will not be accepted on-site.

[1] AWWA = American Water Works Association; NRCS = Natural Resources Conservation Service

The Facility will only accept materials for digestion that meet the quality standards established by the Operator and the hauler. This contract allows the Operators to refuse any load that does not meet these quality standards and testing requirements. To minimize the likelihood of refusing subpar deliveries, feedstock testing and inspection will be performed prior to accepting the first load in the digester. The high quality of the feedstock material is critical for the successful performance of the digester and production of stable and safe fertilizer.

Material Spill

Salisbury AD 1 will be responsible for site cleanliness and cleanup of surface spills. All spills will be addressed as quickly as possible. Sawdust or other dried material can be used to contain and soak up small amounts of spilled material. Larger spills may necessitate the mobilization of equipment to create berms or pits to contain material and avoid a release to surface waters or wetlands.

As discussed above, the tanks are designed and constructed so as to decrease or eliminate the potential for discharge of untreated material. These measures include ensuring all tanks and pipes are leak-proof. For any spills that occur atop the concrete receiving pad near the hydrolyzer, the material shall be washed down into the Tanks through a drain set in the base of the concrete pad. For any spills that occur outside of or breach this concrete pad area, the following cleanup measures are proposed:

Spill Response

The Facility will have an on-site Operator. Most spill conditions will be caught through observation of data being fed to a remote control system, the farmer's observations, and regular facility inspections. Employees of the Host Farm will be in close proximity to the facility for most of the day; these employees will be instructed to call an emergency number posted on a large, weather-proof sign near the Facility if they note any unusual conditions. These employees will also be instructed to follow the Farm's Spill Prevention protocols, which will be updated to include this Facility. This emergency number will forward to the Operator.

On notification of a spill event, whether through on-site inspection, remote monitoring, or a phone call, those reporting the spill will determine:

1. The magnitude of the spill in both size and risks posed
2. The potential for the spill to increase in magnitude
3. How the spill was addressed and cleaned up

If the spill is small and easily controlled, equipment stored in the Site Office (shovels, rags, plastic sheeting, spill kit) will be used to clean up the spill after the source of the spill is eliminated. Spill

containment equipment will be located on site in an easily accessible area where truck drivers can use it in case of a small spill. If the spill is large, but does not represent a dangerous condition or the threat of a dangerous condition, the Operator will contact either the Host Farm or a local contractor to source heavy equipment to clean up the spill. Any residual will be diluted with potable water and washed towards the drain in the receiving pad, if possible. Any cleanup materials used during the spill response will be replaced as quickly as possible.

All employees should practice appropriate personal industrial hygiene during the management and cleanup of any spill. Appropriate personal protective equipment, including relevant protective clothing and gloves, should be used when handling any spilled material.

If the spill represents a dangerous condition or has the potential to develop into a dangerous condition the Facility will:

1. Notify local Emergency Response (911) of:
    a. Type of Emergency (Spill)
    b. Location of Emergency (Farm Address)
    c. Injuries, if any, at the Location
    d. Magnitude of Spill
    e. Material Spilled
    f. Actions taken, including impact of Actions on Spill growth rate
    g. Contact Information
        i. If Operator is on-site: Name, Phone Number, Location
        ii. If Operator is off-site:
            1. Name, Phone Number, estimated time of arrival
            2. Host Farm Name, Phone Number
2. Notify the Host Farm of:
    a. Type of Emergency (Spill)
    b. Magnitude of Spill
    c. Material Spilled
    d. Actions Taken, including impact of Actions on Spill growth rate
    e. That a dangerous condition exists at the Facility
    f. If Operator is not currently on site:
        i. Advise them to clear the Facility Access Road and direct Emergency Responders to the Facility
        ii. Provide an estimated time of arrival

Once the dangerous condition has abated at the Facility, the spilled material will be removed and disposed of properly. Any spill that requires Emergency Responders to be notified, or cannot be resolved with only the tools stored on-site, will trigger a review of operations protocols leading to the spill and may lead to those protocols being amended, if a modification is warranted.

Spill Reporting

The Host Farm will be notified of any spills, excluding those that only require hand tools for cleanup. Any spilled feedstock material during delivery will be reported to the responsible hauler if discovered by or reported to the Operator.

The following list of contacts will be made available to the Host Farmer and the Operator and shall be posted inside the Site Office. This list will be distributed and posted before operation of the facility begins and will be checked for accuracy once per calendar year.

General Contact List	
Contact	**Phone Number**
Primary Farm Contact Chase Goodrich	(802) 989-8848
Vanguard Renewables Contact Kevin Chase	(781) 232-7597
Vermont DEC Waste Management and Prevention Division Solid Waste and Recycling Program (Cathy Jamieson, Solid Waste Program Manager) 24-Hour HAZMAT Hotline (for hazardous material spills)	(802) 828-1138 (802) 522-5938 (800) 641-5005
Facility-Specific Contact List	
Contact	**Phone Number**
Local Emergency Services	911
Facility Operator	(781) 232-7597