ATTACHMENT A

SARATOGA
biochar solutions
a project of northeastern biochar solutions

MENU

waste not.

Saratoga Biochar Solutions (SBS) is a Main Street business that was established to **build, own, and operate a carbon fertilizer manufacturing facility** in Moreau, NY. The facility is designed to process up to 15% of the biosolids generated in NY and produces a revolutionary new bio-fertilizer; Carbon Fertilizer™.

Fact vs. Fiction

- ✔ **Fact:** Saratoga Biochar proposes to build a Carbon Fertilizer™ manufacturing facility that employs pyrolysis with state of the art air quality controls to recover solids instead of burning them like an incinerator.

Carbon Fertilizer™, when applied to soil, sequesters carbon in soil while substituting for and reducing chemical fertilizer use and their associated greenhouse gas emissions. The use of traditional chemical fertilizers results in soil degradation that contributes to nutrient runoff into waterbodies with local, regional, and global impacts (e.g., aquatic dead zones). Traditional chemical fertilizers are, in essence, nutrients bound by salt, and the salts are corrosive to soils. Carbon Fertilizer™ represents a new class of fertilizer that binds nutrients with carbon, instead of salt. Carbon absorbs water quickly to reduce nutrient runoff and retain nutrients in the soil, which reduces ongoing fertilizer application that is necessary with traditional fertilizers. Replenishing soil carbon after more than 75 years of employing carbon-extractive agrarian techniques helps restore soil's capacity to act as an environmental filter to the benefit of streams, rivers, lakes, and other waterbodies. Carbon Fertilizer™ is needed now, more than ever, and farmers are aware of the need as they continuously try to improve soil carbon levels. This is evidenced through agricultural adoption of no-till, cover crops, and numerous attempts to preserve soil carbon. Carbon Fertilizer™ is the first commercially viable means of carbon sequestration in soils.

In summary, the Carbon Fertilizer™ manufacturing process beneficially uses waste materials and potentially achieves a negative carbon footprint based on 1) replacing chemical fertilizers, 2) decreasing biosolids hauling, 3) avoiding biosolids decomposition and incineration, 4) generating and using renewable energy in the manufacturing process, and 5) the carbon sequestration benefits associated with using Carbon Fertilizer™ in soil. An End-Use Marketing Plan is included in Appendix D.

2.2 Description of Annual Waste Quantity [6 NYCRR 360.12(d)(2)(ii)]

The Facility is designed to manufacture Carbon Fertilizer™ from biosolids and wood waste feedstock with an annual throughput up to 235,200 wet tons of biosolids and up to 35,280 tons of wood waste. The Facility is designed to be constructed in three phases with each phase consisting of a process line capable of processing up to 10 wet tons per hour of biosolids and up to 1.5 tons per hour of wood waste. Each process line is capable of manufacturing approximately 1 ton per hour of EQ Class A biosolids product.

Each process line will produce up to approximately 7,840 dry tons of Carbon Fertilizer™ annually as agglomerated pellets with a solids content of 95 to 98%. At full buildout, the Facility will produce up to approximately 23,520 tons of Carbon Fertilizer™ per year.

2.3 Description of Waste Source [6 NYCRR 360.12(d)(2)(iii)]

The Facility has contracted with an established regional hauling partner for an initial ten-year term with two five-year extensions to source and transport biosolids to the Facility. The Facility will be subject to an NYSDEC Solid Waste Management Facility Permit with strict criteria for acceptable waste.

The primary service area includes regional wastewater treatment plants, which may increase or decrease as negotiated arrangements change over time. The service area contemplated includes the Hudson Valley, western Massachusetts, western Connecticut, New York City, and Long Island. A redacted copy of the Facility contract with the biosolids supplier is included in Appendix B.

2.4 Chemical and Physical Properties [6 NYCRR 360.12(d)(2)(iv)]

Sourced biosolids will have been treated and tested by the source prior to receipt at the Facility, in accordance with 6 NYCRR 361-3.6. Based on the regional publicly owned treatment works (POTWs), sourced biosolids are anticipated to be approximately 25% anaerobically digested and 75% aerobically digested and otherwise destined for landfill disposal or incineration. Biosolids destined for landfill disposal in New York must meet criteria contained in 6 NYCRR 363-7.1(j); therefore, the composition of received

ATTACHMENT B

8.2.11 Perfluorooctonoic Acid (PFOA)

Per- and Polyfluoroalkyl Substances (PFAS) are known to be present in municipal biosolids. PFAS compounds that may be in the source biosolids will pass through the dryer and will be separated from the solids in the pyrolysis process and are not expected to be present in the final manufactured Carbon Fertilizer™. The current understanding of the fate of PFAS compounds during thermal treatment is evolving and is described in the proceedings from the 2021 WEF Residuals and Biosolids Conference[1], which confirmed the removal of between 98.9% and 100% of all PFAS compounds analyzed from the solid phase (i.e., biosolids to biochar) when thermally treated through pyrolysis at 500°C to 700°C. The study analyzed concentrations of 28 PFAS compounds in the source biosolids and in the resulting biochar, oils, and syngas following pyrolysis. 31 PFAS compounds were analyzed in the syngas based on the ability of the analytical method for this media. The results indicated that remaining PFAS compounds after pyrolysis were detected primarily in the syngas. The study supports the conclusion that PFAS compounds are first desorbed from the solids phase (i.e., the biosolids) and then transformed and/or destroyed when in the gas or oil phase, with greater desorption and transformation/destruction occurring at higher pyrolysis temperature.

The findings of the WEF conference proceedings are supported by independent testing performed by SBS during design of the Facility. SBS performed a small-scale thermal treatment test using biosolids from the North Shore Water Reclamation District's Zion Wastewater Treatment Plant located on the north shore of Chicago. The dried biosolids were tested for 21 PFAS compounds prior to thermally treating in a pyrolysis kiln at approximately 450°C for 20 minutes and then testing the resulting biochar. The raw dried biosolids had detections of 15 PFAS compounds, while the small-scale thermal treatment test resulted in the removal of all PFAS compounds to below quantification limits except for PFOS, which was reduced by 72%.

The Facility design intends to operate the pyrolysis kiln to achieve a material temperature of 900°F to 1,150°F (482°C to 621°C), which is higher than SBS's small-scale test and within the range evaluated in the WEF conference proceedings. The higher temperature is expected to result in greater removal of PFAS compounds from the solid phase. As indicated in the WEF conference proceedings, desorbed PFAS compounds are expected to be present in the syngas; however, the SBS Facility will thermally oxidize the syngas for heat recovery at a temperature of 1,600°F to 1,800°F (871°C to 982°C), which is expected to result in additional destruction of PFAS compounds.

In accordance with DAR-1, the only PFAS compound with an established emission limit is PFOA, which is designated as "H" for high toxicity and is assigned an Environmental Rating of "A". Emissions are restricted by the following:

- Depending on the Emission Rate Potential, the Degree of Air Cleaning Required must either achieve the Guideline Concentration as demonstrated through air dispersion modeling, or provided a minimum percent reduction through pollution control equipment (6 NYCRR 212-2.3 Table 4).
- The AGC is 5.3×10^{-3} µg/m^3. There is no SGC.

The Facility will perform a stack test upon startup to determine the actual emission factor for PFOA to demonstrate compliance with the AGC. If the stack test indicates concentrations of PFOA that do not meet the AGC, the Facility has included space in the floor plan to install carbon treatment.

[1] WEF Residuals and Biosolids Conference Proceedings, 2021, Water Environment Federation, "Removal and Transformation of PFAS from Biosolids in a High Temperature Pyrolysis System – A Bench Scale Evaluation."

ATTACHMENT C

2.3 Unauthorized Wastes

The Facility only receives biosolids and wood waste that is sourced and delivered by haulers. No unsolicited loads will be accepted. Agreements with source wastewater treatment plants include Terms and Conditions that specifically list acceptable condition of biosolids that are accepted. Only loads of biosolids coordinated by the hauling partner will be received at the Facility. Independent haulers attempting to enter the Facility will be rejected.

Non-accepted items are considered unauthorized waste, including municipal solid waste (MSW), construction and demolition debris, friable asbestos-containing material (ACM), mercury-added consumer products, radioactive waste, infectious and regulated medical waste, and hazardous wastes. Any material not permitted for handling at this Facility will be rejected. Facility personnel are trained to recognize, remove, segregate, and report all unauthorized solid waste in accordance with this Plan. Unauthorized waste specifically includes the following:

- MSW
- Source separated recyclables
- Construction and demolition waste
- Bulky goods (appliances, large furniture, white goods)
- Hazardous wastes
- Tires
- Liquid wastes
- Friable asbestos containing material
- Medical wastes
- Dead animals
- Radioactive or special wastes
- Batteries
- Oil
- Paint
- Compressed gas containers
- E-wastes
- Mercury containing products

Conspicuous signs at the Facility entrance remind delivery drivers of acceptable waste and that delivery is by contract only.

2.4 Unauthorized Waste Detection

The evaluation of waste begins with the hauling partner sourcing biosolids from regional wastewater treatment plants. Only sources with biosolids meeting specific criteria will be contracted for management at the Facility. Due to acceptance of strictly biosolids and wood waste from only contracted sources, the occurrence of unauthorized waste is expected to be minimal.

Biosolids are unloaded in the biosolids receiving area, and each load passes through a scalping grate to separate and remove any oversized material. Wood waste is unloaded on the concrete surface of the wood waste receiving and storage area for visual inspection before being moved into storage bunkers with a wheeled bucket loader or similar piece of mobile equipment. The unloading process of all material is visually inspected by personnel with necessary training and experience to identify unauthorized waste. Facility personnel are trained in the recognition, management, and reporting procedures for prohibited wastes. At least one employee is onsite at all times that has the knowledge and ability to recognize different forms of unauthorized waste that may be received and is able to execute proper procedures for managing each hazard if encountered.

If unauthorized waste is observed within the received load, the Facility Manager will be notified, and the waste will be removed to a designated area for temporary storage and management. Segregated unauthorized waste will be stored in a dumpster or roll-off container for weekly disposal to a properly permitted facility. In no event will hazardous waste be retained onsite for more than 90 days.

2.4.1 Scale House Inspection

To discourage unacceptable loads from entering the Facility, signs posted at the entrance clearly inform drivers of acceptable waste, that only contracted haulers are accepted, and that all vehicles are subject to random search. All inspections of biosolids loads will occur inside the biosolids receiving area to minimize odor potential. Results of random load inspections is documented on the Random Load Inspection Form provided in Appendix B, kept in a logbook, and the records stored onsite. At least one random inspection will be performed each day material is received.

All vehicles entering the Facility are weighed at the scale to determine the weight of delivered feedstock. Upon entering the scale, a visual inspection is performed to identify suspicious loads and confirm the load is being delivered by a contracted hauler. The scale house computer system will record the following information for each received load:

- Truck number
- Date and time of arrival
- Origin of material
- Weight

Loads that are identified containing unacceptable material or being delivered by a non-contracted hauler will be rejected at the scale and not permitted to proceed to unload.

2.4.2 Radioactive Waste Detection Plan

As required pursuant to 6 NYCRR 362-1.4, a fixed radiation detection unit must be installed at the scale to monitor each incoming load. Only loads with a concentration of radium-226 less than 25 pCi/g can be accepted. Loads with concentrations exceeding the acceptance limit will be rejected and not allowed to proceed to the thermal treatment building. The NYSDEC Regional Materials Management Engineer must be notified within 24 hours of all documented radiation exceedances, including the date, time, customer name, and truck number. Records must be kept of each instance in which the radiation detector is triggered. Recorded information will include the date of the incident, transporter name, origin of the waste, truck number, detection reading, disposition of the waste, and date of disposition.

The radiation detection unit setpoint will be between two and five times the background radiation level, and the background site radiation will be determined by daily readings. The detection unit will be calibrated at least annually, or more frequently according to manufacturer recommendations. During normal use, the radiation unit will be field checked weekly with a known radiation source. All Facility personnel involved in scale house operations will be properly trained in the operation of the detection unit as recommended by the manufacturer and as required by applicable State and Federal laws.

2.5 Unauthorized Waste Handling

Due to acceptance of strictly biosolids from contracted sources, the occurrence of unauthorized waste is expected to be minimal. In the event that unauthorized waste is detected after being unloaded, the following procedures will be followed:

2.5.1 MSW, Tires, Industrial Waste, C&D, etc.

1. Safely remove unauthorized item from current operations according to approved training.
2. Direct the hauler, if still onsite, to reload the unauthorized item.

ATTACHMENT D

building, including the areas where biosolids will be unloaded from trucks. In addition, dried biosolids and biochar will be transferred directly from storage silos to trucks that will leave the site as soon as they are full. As noted by MassDEP, the DEIR did not identify the biosolids loadout area as a waste handling area; the FEIR should identify all waste handling areas and associated 100-ft setbacks, and provide additional details regarding the route of trucks through the site, analyses of queuing at the site and local roadways and access and egress of truck to and from the site.

PFAS

A significant issue raised by MassDEP, the City and other commenters is the fate of PFAS in biosolids processed at the facility. According to the DEIR, MassDEP has estimated that treated biosolids in Massachusetts have an average PFAS concentration of 25 parts per billion (ppb). As described above, processing of biosolids at the facility includes separation of liquid wastewater from solids during the biosolids drying process, conversion of biosolids to biochar through gasification and production of syngas. PFAS present in biosolids entering the facility may remain in the wastewater, dried biosolids, biochar and air emissions released from the facility. According to the DEIR, much of the PFAS in biosolids will be destroyed due to the high temperatures involved in the gasification process, and 90 to 99 percent of the remaining PFAS will be destroyed in the thermal oxidizer. Due to the minimal data available for this new technology, the Scope included in the ENF Certificate identified the need for more data regarding levels of PFAS that could be discharged from the facility into the water, soil and air. The Proponent has constructed a similar facility in Linden, NJ that has started operations; however, no data from that facility is available yet. Without data from a comparable facility, it is not possible to determine the extent to which the project includes measure to avoid, minimize and mitigate impacts associated with PFAS. Therefore, the Proponent should file the FEIR after this data are made available from the Linden facility, and the FEIR should disclose and analyze the data collected.

Air Quality

The project requires a Non-Major Comprehensive Air Plan Approval (CPA) from MassDEP. The DEIR included an analysis of the project's air and odor emissions, provided air dispersion modelling based on emission rates and compared the results to state and federal standards. It included an analysis of Best Available Control Technology (BACT) that will be incorporated into the emissions control systems to minimize emissions.

The DEIR reviewed the results of an air dispersion model that predicted the spread of air pollutants emitted by the project from the project's stationary sources, which include the thermal oxidizer (emissions released through the main stack), biosolids cooling towers, bin vent filters, biosolids receiving building, and paved roads (a source of dust); and mobile sources, including truck and other vehicular traffic generated by the project. The analysis used the EPA's AEROMOD model, which incorporates emissions from the site, local meteorological data, orientation of buildings and stacks and surrounding terrain to estimate concentrations of air contaminants outside the site boundary. Pollutant concentrations were modelled in a grid of receptors extending 5 kilometers from the project site in each direction and four discrete

links to individual sections. Any references in the FEIR to materials provided in an appendix should include specific page numbers to facilitate review.

According to MassDEP, the FEIR should more completely characterize PFAS concentrations in process and waste streams, emission rates and destruction efficiencies across the proposed facility in order to more fully evaluate the potential environmental impacts from PFAS in processed biosolids. This information, as detailed below, should be provided in the FEIR. More specifically, MassDEP has identified the need for representative PFAS analytical data generated using appropriate composite sampling and analytical methods (e.g. from USEPA Method 1633) provided from a suitably analogous facility, such as the Proponent's Linden, New Jersey facility, including:

- Input biosolids and other residuals, as processed during three one-week periods, with duplicate composite samples collected for each period;
- Biochar/ash corresponding to the processed input biosolids and other residuals;
- Wastewater corresponding to the processed input biosolids and other residuals and biochar/ash;
- Stack tests corresponding to the processed input biosolids and other residuals to assess air emission rates and destruction efficiencies.

These results of the analyses requested above should be assessed with respect to potential environmental releases and impacts. In particular, the stack testing results should be used to inform and update emission rate estimates used in the DEIR which were based on the similar facility operating in Australia. The estimates should be further supported by a more in-depth consideration of the similarities and differences between the facilities, including the Proponent's facility in Linden, New Jersey. The FEIR should include a supplemental discussion of uncertainties regarding developing information on PFAS toxicity (e.g. the draft EPA RfDs for PFOA and PFOS) and emissions/releases of additional PFAS (e.g. decomposition products of other longer chain PFAS and polymers).

Project Description and Permitting

The FEIR should include detailed site plans for existing and post-development conditions at a legible scale. Plans should be provided at a legible scale and clearly identify buildings, impervious areas, stormwater and utility infrastructure and vehicular routes through the site.

The FEIR should describe the project and identify any changes since the filing of the DEIR. It should identify and describe State, federal and local permitting and review requirements associated with the project and provide an update on the status of each of these pending actions. The FEIR should include a description and analysis of applicable statutory and regulatory standards and requirements, and a discussion of the project's consistency with those standards.

Comments submitted from the Conservation Law Foundation indicate that the EPA has commenced further analysis of potential regulations to address gasification facilities. The FEIR should provide an update on the EPA's review and discuss how the proposed project could be affected by regulations adopted pursuant to this study.