# Notice of Construction (NOC) Worksheet

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Puget Sound Clean Air Agency

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|---|---|
| **Applicant:** Lenz Enterprises Inc. | **NOC Number**: 11753 |
| **Project Location**: 5210 SR 532, Stanwood, WA 98292 | **Registration Number**: 28983 |
| **Applicant Name and Phone**: Edward Wheeler, (360) 654-6271 | **NAICS:** 325314 |
| **Engineer**: Courtney Shernan/Carole Cenci | **Inspector**: Tom Hudson |

## A. DESCRIPTION

For the Order of Approval:
Expansion of an existing aerated static pile (ASP) and windrow/mass bed composting facility from an incoming feedstock limit of 75,000 wet tons per year to an incoming feedstock limit of 150,000 wet tons per year of agricultural organics (cow manure, bedding, and paunch); pre and post-consumer food waste; and yard waste. Substantial alteration of control equipment on existing ASPs to be negatively aerated at all times. The facility includes one existing tipping and feedstock preparation building (5,000 cfm exhaust), eight existing ASP cells (17,000 $ft^2$ floor area total), five new ASP cells (22,000 $ft^2$ floor area total), windrow composting area, and final product storage and curing area. Emissions from the tipping building and the existing eight ASPs will be controlled by two existing biofilters (4,256 $ft^2$ area total) and the five new ASP cells will be controlled by two new biofilters (9,800 $ft^2$ area total). All ASPs are negatively aerated.

Additional Information:

**Existing Facility**

Lenz Enterprises Inc. (Lenz) operates an existing aerated static pile (ASP) and mass bed composting facility with an incoming feedstock capacity of 75,000 tons per year. The composting operation includes the following three-stage system:

- **Existing Stage 1 High-Rate Phase:** ASP composting with controlled positive/negative or no aeration with temperature monitoring;
- **Existing Stage 2 Stabilization Phase:** Windrow or turned mass bed composting with manual temperature and gas production monitoring; and
- **Existing Stage 3 Curing Phase:** Turned or unturned mass bed curing. This material may be screened or unscreened. Curing occurs for some materials based on the ultimate use of the final product, but curing is not required for all products.

**Proposed Equipment/Activities**

Lenz is proposing modifications to its existing facility to increase incoming feedstock capacity from 75,000 to 150,000 tons per year. These modifications are described in the NOC application as “Phase II” of the operational composting area at the facility. However in the application and other materials, the stages of composting (high-rate, stabilization, and curing) were sometimes also referred to as phases. To avoid confusion, the current project to add additional capacity will be referred to as the “new” ASPs, biofilters and windrows. The existing capacity which was temporarily permitted with NOCOA 10494 will

be referred to as the "existing" ASPs, biofilters, and windrows (previously massbeds). The modifications include the following, as listed in the original permit application for NOC 11753 (contained in Appendix A of this worksheet), the application for NOC 11053 (which was submitted to make permanent the 75,000 ton per year feedstock limit), and based on additional information from the applicant:

1. Modifications to feedstock handling operations in the tipping building to accommodate a 100% increase in feedstock handling capacity;
2. Installation of a larger greater capacity (5,000 CFM) air handling unit in the tipping building to capture tipping building air and routed to the existing north biofilter;
3. Construction and operation of an additional 22,000 square feet of high-rate aerated static pile (ASP) composting area with controlled forced negative airflow with temperature monitoring;
4. Construction and operation of two new biofilters creating an additional 5,488 square feet of biofilter to accommodate additional ASP operations;
5. Expanded second stage composting area to include four additional acres of impervious surface for windrow composting with manual temperature and gas monitoring.
6. Change in the method of operation of the existing ASPs to be fully negatively aerated (previously were permitted to use positive, negative, and no aeration) and changing from massbed to windrows for the second stage of composting.
7. Permanent approval of the temporary increase allowed by NOC 10494 and applied for in NOC 11053.

These modifications are discussed in more detail below:

1. **Feedstock Receiving and Pretreatment**
   To increase the amount of feedstock taken in, Lenz is proposing to add a second shift of compost personnel to allow longer processing onsite (7am to 5:30pm, Monday through Saturday). Lenz is also proposing to change its receiving evaluation process to allow certain materials, such as brush and stumps, to bypass initial screening and go straight to grinding.

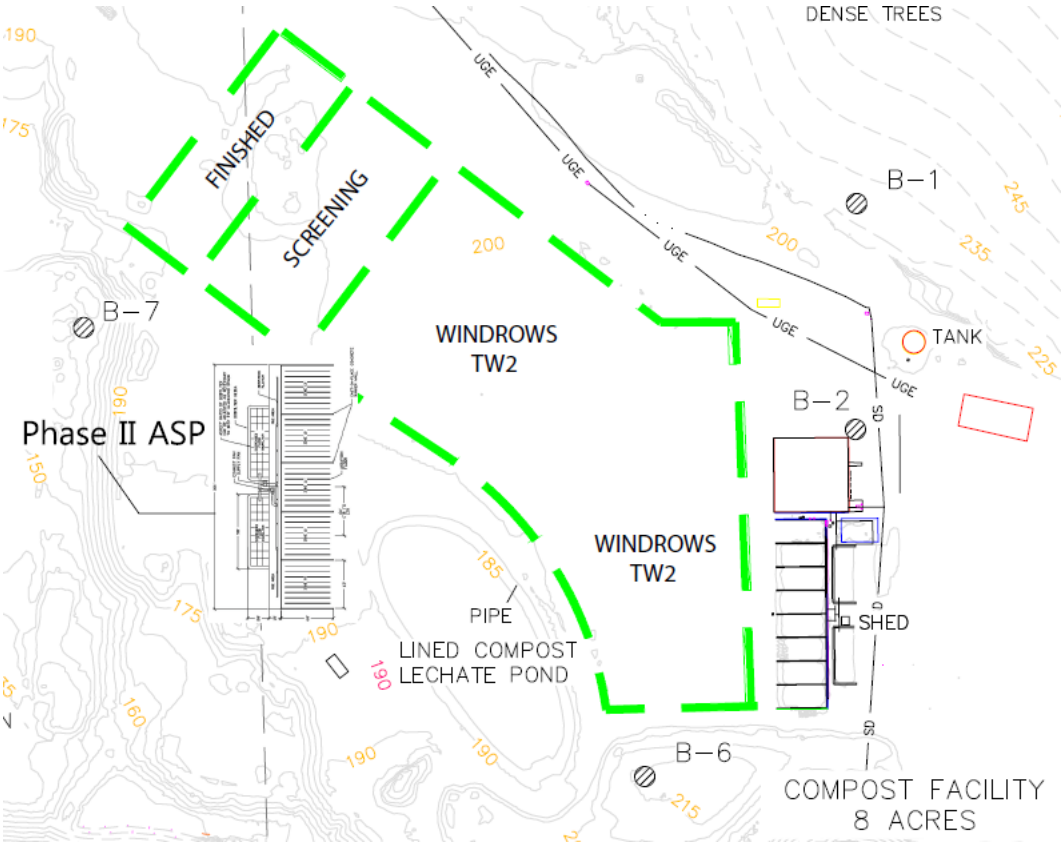
2. **Stage I Composting**
   The facility currently encompasses 17,000 square feet of ASP composting area. Lenz is proposing to construct an additional 22,000 square feet of ASP composting area. Two new biofilters (5,488 $ft^2$ area total) will control emissions from the new ASP composting area.

3. **Stage 2 Composting**
   Lenz currently uses a mass bed system for Stage 2 composting (72,000 square foot area with a pile size of 21,333 cubic yards). Lenz is proposing to change from using a mass bed system to a windrow system as the primary bed configuration for the existing and expanded capacity. In a windrow system, piles are formed into long rows, with valleys between the rows, rather than a single large pile (mass bed). The windrow system allows for faster turning of beds and additional exposure to natural aeration. Lenz is proposing to use an additional 177,000 square foot area for Stage 2 composting. The following table was provided in the NOC application:

| Phase II - Windrow Composting | | |
|---|---|---|
| **21,333** | cy | Mass-Bed Volume (current) |
| **72,000** | $ft^2$ | Mass-Bed Area (current) |
| **8** | ft | Pile height (current) |
| **1.65** | acres | Mass-Bed Area (current) |
| **177,000** | $ft^2$ | Proposed Phase II |
| **4.0** | acres | Proposed Phase II |
| **7,848** | cy | Proposed Phase II per acre of windrow |
| **5.72** | acres | Phase I & II |
| **44,861** | cy | Windrow Volume Phase I & II |
| **2.10** | x | Increase in Volume Capacity |

The majority (75%) of the raw materials composted will be curb-side recycled yard and food residuals (roughly 112,000 tons of material per year). Other materials will include land-clearing debris (20% or roughly 30,000 tons annually) and agricultural debris (5% or roughly 8,000 tons annually).

A plot plan of the composting area of the facility with the proposed modifications (identified as "Phase II ASP") is included below. See Appendix C of this worksheet for the full site plan of the facility, which was updated and submitted by Lenz on January 23, 2020.



**Permit History**

The Lenz facility was originally permitted under Order of Approval No. 9386 with a 30,000 ton per year capacity. In 2014, Order of Approval No. 10494 was issued for a temporary expansion of the facility from 30,000 to 75,000 tons per year. Order of Approval No. 10494 required Lenz to submit a Notice of Construction (NOC) application for final approval for the expansion by December 1, 2015, and it stated that if the application was deemed complete by January 15, 2016, temporary Order of Approval No. 10494 would remain in effect until final action was taken on the NOC application. Lenz's NOC application for permanent approval (NOC No. 11053) was deemed completed on January 7, 2016. The Agency has not taken final action on NOC No. 11053, so Lenz has been operating under Order of Approval No. 10494. Order of Approval No. 10494 will be cancelled and superseded by this Order, and the NOC application submitted for No. 11053 will be reviewed and included in this NOC as needed and appropriate.

## B. DATABASE INFORMATION

Source:
28983 - Lenz Enterprises Inc

Basic Equipment
Count: 23

| Reg | Name | I... | NC/N... | BE Code | Year... | U... | Rated Capacity | Rated Units | NOC... | NOC Exempted | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 28983 | Lenz Enterp... | 1 | 11753 | 14 - composting | 2009 | 1 | 150000.00 | Tons/Year | ☐ | ☐ | ECS Design - Aerated Static Pile (ASP) |
| 28983 | Lenz Enterp... | 2 | | 19 - crusher (cone, gyratory, impact, jaw) | | 1 | 450.00 | Ton/Hr | ☑ | ☐ | 30 x 42 Jaw Crusher (cedar rapids) |
| 28983 | Lenz Enterp... | 3 | | 19 - crusher (cone, gyratory, impact, jaw) | | 1 | 350.00 | Ton/Hr | ☑ | ☐ | 1316 El Jay Cone Crusher |
| 28983 | Lenz Enterp... | 4 | | 32 - IC engine (generator, pump, compressor) | 2017 | 1 | 97.00 | Hp | ☑ | ☐ | 2017 Komptech Nemus 2700 Trommel, Screen |
| 28983 | Lenz Enterp... | 5 | | 32 - IC engine (generator, pump, compressor) | 2017 | 1 | 68.00 | Hp | ☑ | ☐ | 2017 Screenpod Airvac 1600 Dual, |
| 28983 | Lenz Enterp... | 6 | | 32 - IC engine (generator, pump, compressor) | | 1 | 75.00 | Hp | ☑ | ☐ | 6" Pioneer Trailer mounted diesel pump NA Serial # 5936 |
| 28983 | Lenz Enterp... | 7 | | 32 - IC engine (generator, pump, compressor) | | 1 | 75.00 | Hp | ☑ | ☐ | 6" Pioneer trailer mounted pump #2 NA Serial # 7239 W |
| 28983 | Lenz Enterp... | 8 | | 32 - IC engine (generator, pump, compressor) | 1996 | 1 | 15.00 | Hp | ☑ | ☐ | Airbo Light Plant 1462-SF 940912 CI LSD 15 Light generat |
| 28983 | Lenz Enterp... | 9 | | 32 - IC engine (generator, pump, compressor) | 2016 | 1 | 45.00 | Hp | ☑ | ☐ | CEC 36X80 Stacker Conveyor 36X80 No serial # on machi |
| 28983 | Lenz Enterp... | 10 | | 32 - IC engine (generator, pump, compressor) | 2006 | 1 | 97.00 | Hp | ☑ | ☐ | CEC Screener 6' X 16' Serial # 06369-278 CI LSD 97 Scree |

Comment: ECS Design - Aerated Static Pile (ASP)

Control Equipment
Count: 2

| Reg | Name | Item # | NC/N... | CE Code | Year Installed | Units Inst... | Rated Capa... | Rated E... | NOC Not Required | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 28983 | Lenz Enterp... | 3 | 11753 | 99 - Miscellaneou... | 2020 | 2 | 5488.00 | | ☐ | Phase II biofilter (north and south cells) |
| 28983 | Lenz Enterp... | 2 | 11753 | 99 - Miscellaneou... | 2009 | 2 | 4256.00 | 21220.00 | ☐ | Biofilter for Phase I ASPs and Tipping Building |

Comment: Biofilter for Phase I ASPs and Tipping Building

| | | | |
|---|---|---|---|
| **New NSPS due to this NOCOA?** | **No** | **Applicable NSPS: None** | **Delegated? N/A** |
| **New NESHAP due to this NOCOA?** | **No** | **Applicable NESHAP: None** | **Delegated? N/A** |
| **New Synthetic Minor due to this NOCOA?** | **No** | | |

## C. NOC FEES AND ANNUAL REGISTRATION FEES

**NOC Fees:**

Fees have been assessed in accordance with the fee schedule in Regulation I, Section 6.04. All fees must be paid prior to issuance of the final Order of Approval.

| Fee Description | Cost | Amount Received (Date) |
|---|---|---|
| Filing Fee | $ 1,150 | |
| Composting Facility | $ 10,000 | |
| Refined Dispersion Modeling Review | $ 1,000 | |
| SEPA (DNS) | $ 800 | |
| Public Notice | $ 700 (plus publication costs to be invoiced later) | |
| Filing received | | $ 1,150 (3/6/2019) |
| Additional fee received | | $ 12,500 (2/23/2021) |
| **Total Remaining** | $ Publication Fees | |

**Registration Fees**:
Registration fees are assessed to the facility on an annual basis. Fees are assessed in accordance with Regulation I, Section 5.07.

| **Applicability** | | |
|---|---|---|
| **Regulation I** | **Description** | **Note** |
| 5.03(a)(1) | Facilities subject to federal emission standards (Title 40 CFR) | |
| 5.03(a)(5) | Facilities with gas or odor control equipment (>= 200 cfm) | |
| 5.03(a)(8)(D) | Facilities with commercial composting operations | |
| 5.03(a)(8)(K) | Facilities with rock crushers | |
| **Annual Registration Fee** | | |
| **Regulation I** | **Description** | **Fee** |
| 5.07(c) | Base Registration Fee | $ 1,150 |
| 5.07(c)(1) | 40 CFR 60 Subpart OOO | $ 2,100 |
| 5.07(c)(3) | Emission reporting | Varies |
| 5.07(c)(6) | Facilities with composting operations (≥ 100,000 tons/yr) | $ 23,000 |
| | **Total =** | $ 26,250+emission fees |

## D. STATE ENVIRONMENTAL POLICY ACT (SEPA) REVIEW

State Environmental Policy Act (SEPA) review was conducted in accordance with Regulation I, Article 2. The SEPA review is undertaken to identify and help government decision-makers, applicants, and the public to understand how a project will affect the environment. A review under SEPA is required for projects that are not categorically exempt in WAC 197-11-800 through WAC 197-11-890. A new source review action which requires a NOC application submittal to the Agency is not categorically exempt.

In addition to an Order of Approval from PSCAA, the proposed project requires a modification to Lenz's solid waste permit from the Snohomish Health District. This permit modification from Snohomish Health District cannot be issued until a SEPA determination is made.[1]

The applicant submitted a signed and completed environmental checklist that is included below and in Appendix B. Each of the sections of the checklist are discussed in detail below.

Lenz updated SEPA CL07032019.pdf

### Earth

The checklist indicates, "The site has been graded and prepared for industrial use as a part of the site mine reclamation plan. All construction will be slab on grade." The checklist lists Lenz's proposed measures to reduce or control erosion or other impacts to the earth, including preparing and implementing a construction quality control plan; using good construction techniques, procedures, and best management practices; and following the site's Stormwater Pollution Prevention Plan (SWPPP).

### Air

Compost operations are potential sources of odor emissions. The tipping building where feedstock is received, processed, and stored and the aerated static piles are expected to have the greatest potential for odor. Currently on the existing aerated static piles, Lenz alternates between positive aeration, with emissions controlled using a biofilter layer over the ASPs, and negative aeration, with emissions controlled using a 5' deep biofilter. With this modification, Lenz will be operating under negative aeration at all times with emissions controlled by a separate biofilter and is expected to have a greater removal efficiency than the current method of positive/negative/no aeration for VOC compounds, ammonia, and odor. For the proposed project, Lenz is proposing to control VOC, ammonia and odor emissions from the tipping building and ASPs using negative aeration to biofilters during 100% of the operation time of the ASPs, which does not include building or reclaiming the piles.[2]

[1] Email from Anne Alfred (Snohomish Health District) to Edward Wheeler, dated July 3, 2019.
[2] In the original application, Lenz proposed alternating between positive and negative aeration of the ASPs. In Lenz's January 2020 submittal, Lenz updated the project proposal to indicate that negative aeration would be used 100% of the time for both new and existing ASPs except when building and reclaiming the piles.

Lenz will be required to test the biofilters on a recurring basis to ensure that they are meeting the performance standards for VOC and ammonia removal required by this Order of Approval.

This Order of Approval will require that there shall be no detectable odor associated with the Lenz composting facility at or beyond the facility's boundary. The Order of Approval will also require a complaint response plan addressing any odor or other complaints.

Composting is also a source of greenhouse gas emissions, including methane, nitrous oxide, and carbon dioxide. However, diversion of waste from landfills is expected to reduce emissions of methane and greenhouse gases overall. Researchers from Washington State University analyzed and compared emissions from composting and landfilling, and their findings were published in 2019. Using EPA's LandGEM model for estimating landfilling emissions and assuming a throughput of 100,000 tons per year, emissions of $CO_2e$ from composting were estimated to be 25% less than emissions from landfilling.[3] Using EPA's WARM model, the results showed that diverting waste from landfilling to composting would reduce greenhouse gas emissions. **Error! Bookmark not defined.** In the report, this was attributed to two factors: "removing food waste emissions of methane from landfills" and "the carbon storage benefit of applying compost to soils".**Error! Bookmark not defined.** Based on this information, the Lenz facility is expected to have an increase in greenhouse gas emissions associated with this project; however, net greenhouse gas emissions are expected to decrease due to the diversion of material from landfills.

Other air contaminants, including but not limited to VOCs, hazardous air pollutants (HAPs), and toxic air pollutants (TAPs), are also discussed in Sections E, F, G, and H of this worksheet. Conditions related to air contaminants are identified Section K of this worksheet.

**Water**

The checklist states that groundwater is drawn from the site and used for sanitary needs; that sanitary wastewater is collected and hauled offsite; and that all stormwater on the site will be collected, treated, and reused onsite. Lenz confirmed that this is specifically referring to the composting activities at the facility in a letter dated June 25, 2020 (see Appendix E).

The checklist further states that there will not be discharges to ground water or surface water from proposed operations. Stormwater and leachate issues will also be reviewed by the Snohomish Health District as part of their solid waste permit review implementing WAC 173-350 (with input from the Washington Department of Ecology).

Lenz will be required to have no stormwater discharges from the composting area of the property and no discharges to groundwater or surface water. Specific requirements for the leachate collection system will be reviewed by the Snohomish Health District and will be incorporated into the facility's solid waste permit.

[3] Jobson, T., Khosravi, N., "Emissions from Washington State Compost Facilities: A Review of Volatile Organic Compound Data, and an Estimation of Greenhouse Gas Emissions" (November 2019, updated February 2020)

**Plants and Animals**

The checklist indicates that there is no existing vegetation at the compost facility and no noxious weeds or invasive species on or near the site.

The checklist also indicates that hawks, eagles, and songbirds have been observed on or near the site. The checklist indicates that the site is not part of a migration route. This is incorrect, since the site is part of the Pacific Flyway migratory route.[4] However, the project is not expected to have an impact on plants or wildlife.

**Energy and Natural Resources**

The checklist states that electricity will be used for motors, blowers, and system controls and that energy conservation is designed into the system by utilizing energy efficient motors, blowers, and control systems.

**Environmental Health**

The checklist indicates that there is no contamination present on the site from any uses, and there are no existing hazardous chemicals or conditions that might affect project development or design. Diesel fuel and lubricants such as grease for operating and maintaining equipment will be used during construction and normal operations.

The checklist describes in general terms the sources of noise from the proposal and further states that noise reduction is included in the design of the equipment used onsite that can create noise, and this applies to both mobile and stationary equipment that can generate noise. The checklist also states the property size and vegetation provide additional buffer to control noise impacts. The compost portion of the facility is located roughly 800 feet south of State Route 532, which borders the north side of the property. Lenz is required to comply with Snohomish County Code, Title 10, Chapter 10-01 Noise Control and not exceed allowable noise levels.

**Land and Shoreline Use**

Snohomish County's comprehensive plan designation for the site is Mineral Conservation (MC) and Rural 5 acre (R-5). The applicant provided additional documentation to demonstrate that the composting operation is authorized by Snohomish County. See Appendix E of this worksheet for the supplemental documentation provided.

**Housing, Aesthetics, Light/Glare, Recreation, and Historical and Cultural Preservation**

The project is not expected to have impacts on housing or recreation. In addition, the checklist indicates that no views will be altered or obstructed by the project and indicates that there are no landmarks, features, or other evidence of Indian or historic use or occupation. However, it is likely that the land was historically inhabited by indigenous people.

[4] https://www.fws.gov/birds/management/flyways.php (accessed 7/16/2020)

The checklist states that light will be generated from safety lighting and heavy equipment use, with normal operating hours between 7:00am and 5:30pm, but light and glare will not be a safety hazard or interfere with views. The checklist also states the property size and vegetation provide additional buffer to control light and glare impacts.

**Transportation**

The checklist states at B.14.f: "The proposed completed project will not generate any additional vehicular trips per day." Based on that statement, the checklist states at 14.h that "No measures to reduce or control transportation impacts are proposed." However, the proposal would increase the maximum amount of feedstock processed from 75,000 tons per year to 150,000 tons per year. Lenz has stated that its assumption that no additional vehicular trips per day is based upon the concept that materials arriving and leaving the site will be accomplished with larger vehicles (i.e. larger load per vehicle).[5]

Based on documentation provided by Lenz, there will be no more than 77 total truck trips per day and 7,118 total truck trips per year for the compost facility,[6] and vehicular traffic will not increase. Limits on the number of truck trips per day and per year will be established to verify that the vehicular traffic will not increase, with a requirement to maintain records of each truck trip to verify compliance with the limits.

**Public Services and Utilities**

The checklist states that the project will not result in an increased need for public services. In addition, the following utilities are currently available at the site: electricity, telephone, water, and refuse service.

Based on the proposed action and the information in the checklist, the project will not: adversely affect environmentally sensitive or special areas, or endangered or threatened species; conflict with local, state, or federal laws or requirements for the protection of the environment, or establish a precedent for future actions with significant effects. This proposal is not likely to have a probable significant adverse environmental impact, and I recommend the issuance of a Determination of Non-Significance with a 30-day public comment period.

[5] "Lenz Permit Modification Application_PSCAA_2018.pdf", received via email on February 19, 2019. See Appendix A of this worksheet.

[6] "Transportation Analysis for Lenz Compost Facility Expansion.pdf", received via email on May 5, 2020. See Appendix E of this worksheet. This document indicates that there will be 37 truck trips per day (highest day, peak season) and 5,357 truck trips per year **to** the facility, and there will be 40 truck trips per day (highest day, peak season) and 1,761 truck trips per year **from** the facility. These values have been combined to get the total truck trips listed above.

## E. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) AND REASONABLY AVAILABLE CONTROL TECHNOLOGY REVIEW

**Best Available Control Technology (BACT)**

New stationary sources of air pollution are required to use BACT to control all pollutants not previously emitted, or those for which emissions would increase as a result of the new source or modification. BACT is defined in WAC 173-400-030 as, "an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under Chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

An emissions standard or emissions limitation means "a requirement established under the Federal Clean Air Act or Chapter 70.94 RCW which limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction and any design, equipment, work practice, or operational standard adopted under the Federal Clean Air Act or Chapter 70.94 RCW."

**Best Available Control Technology for Toxics (tBACT)**

New or modified sources are required to use tBACT for emissions control for TAP. Best available control technology for toxics (tBACT) is defined in WAC 173-460-020 as, "the term defined in WAC 173-400-030, as applied to TAP."

**Reasonably Available Control Technology (RACT)**

"Reasonably available control technology (RACT)" means the lowest emission limit that a particular source or source category is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. RACT is determined on a case-by-case basis for an individual source or source category taking into account the impact of the source upon air quality, the availability of additional controls, the emission reduction to be achieved by additional controls, the impact of additional controls on air quality, and the capital and operating costs of the additional controls.

A project to replace or substantially alter emission control technology at an existing stationary source that does not result in an increase in emissions of any air contaminant is required to submit a NOC application and receive an Order of Approval. It is required that the owner or operator employ RACT for the affected emission unit(s). The agency may prescribe reasonable operation and maintenance conditions for the control equipment and prescribe other requirements as authorized by chapter 70.94 RCW. Lenz is substantially altering the control equipment on the existing ASPs to provide better capture and lower emissions by switching the aeration system from positive/negative/no aeration to fully

negatively aerated. This is a substantial alteration of control equipment that will not result in an increase in emissions therefore the controls must meet RACT.

Similar Permits

**Table 1. Similar Permits Issued by PSCAA**

| Origin | Description | Limitations |
|---|---|---|
| PSCAA Order No. 11935 (12/3/2020) | Commercial composting facility (maximum of 14,000 wet tons of feedstock per year) for recycling green yard waste, fish waste, pre-consumer food waste, and agricultural manure and bedding using Extended Aerated Static Pile composting technology. The compost operation consists of a tipping area, two Extended Aerated Static Pile composting bays with four zones each, concrete composting pad (100'x300'), curing piles, final product storage piles, and a leachate pond. | **PM/Visual Emissions**<br>• Visible emissions from grinding and screening shall not exceed 5% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour as measured by WDOE Method 9A.<br><br>**VOC/Odor/Organic HAP&TAP**<br>• VOC removal efficiency of at least 75.0% across biofilter cover layer.<br>• No detectable odor allowed at or beyond the facility's boundary<br><br>**Ammonia**<br>• NH3 removal efficiency of at least 53.0% across biofilter cover layer.<br>• No detectable odor allowed at or beyond the facility's boundary |

| Origin | Description | Limitations |
|---|---|---|
| PSCAA Order No. 12023 (11/6/2020) and 11582 (6/13/19) | One Anaerobic Digester System with food waste feed. System made up of two 18,853 gallon fermentation tanks, one 7,060 cubic feet biogas storage unit, waste gas flare, one biofilter rated at 23 cubic yards volume capacity with H2S removal system, one 750 gallon receiving tank, one 300 gallon food waste grinding tank, one 2,333 gallon feeding tank, one 4,250 gallon feeding tank, one 4,250 gallon liquid plant food tank, System design capacity is 1500 tons per year of food waste feedstock. | **VOC/Odors**<br>• With respect to the emissions produced from material handling activities and emissions from the digester operation itself BACT for VOC and odor is total enclosure with 100% of emissions vented directly into the biofilter inlet duct.<br>• The anaerobic digestion process is completely sealed from the atmosphere with no direct discharge.<br>• Food waste receiving and handling all occurs within a building and is directly vented to the biofilter<br>• There will be no storage of unprocessed food waste on-site.<br>• Digestate slurry (liquid plant food) will go to a tank that is directly vented to the biofilter<br>• The biofilter will be monitored and maintained to ensure proper operation and in compliance with the permit conditions (see additional discussion below).<br>• No detectable odor from the facility operation is allowed outside the property line.<br><br>**Ammonia**<br>• Ammonia concentration in biogas sent to the flare below 500 ppm.<br>• Ammonia concentration after the biofilter below 55 ppm<br>• pH of digestate limited to 8.5 |
| PSCAA Order No. 10494 (4/1/2014) | Temporary Expansion of an existing Aerated Static Pile (ASP) and Mass Bed Composting Facility from 30,000 to 75,000 tons per year; of Agricultural Organics (Cow Manure, bedding, and Paunch), pre and post-consumer food waste, and yard waste. | **PM/Visible Emissions**<br>▪ Water mist system for wood grinder<br>▪ Shall not exceed 10% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour<br><br>**VOC/Odor**<br>▪ Biofilter for ASPs and tipping building.<br>▪ Daily odor inspections of the property.<br>▪ Material must be premixed for composting prior to leaving the tipping building.<br>▪ No storage of compost material at the end of each workday unless it is covered with a 6” biofilter media cap.<br>▪ Use of leachate collection and treatment system. |

| Origin | Description | Limitations |
|---|---|---|
| PSCAA Order No. 10455 (8/21/2012) | Composting System rated at 228,521 tons per year of pre and post-consumer food waste, yard, clean wood and land clearing wastes; consisting of (4) four - 41,000 ton per year Gore Composting Systems with the first phase of composting reduced from 28 to 21 days; a Tipping Building (with additional 100 ft x 50 ft apron canopy) for receipt, grinding, and mixing of feedstocks with a 24,000 cfm rated biofilter; and a Grinding Building (625 square foot) for grinding and mixing feedstocks to be equipped with a 900 square foot biofilter rated at 2,100 cfm exhaust flow. | **PM/Visible Emissions**<br>▪ Shall not exceed 10% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour<br>▪ Water mist system for wood grinder<br>**VOC/Odor**<br>▪ Biofilter for tipping building.<br>▪ Composting material must be covered for the gore cover composting system.<br>▪ Daily odor inspections of the property.<br>▪ Material must be premixed for composting prior to leaving the tipping building.<br>▪ Use of leachate collection and treatment system. |

In addition to the Orders of Approval listed above, multiple composting facilities in the Agency's jurisdiction have been operating for many years without receiving any Notices of Violation for odors, which would indicate they are likely able to operate without odors beyond the property line. Examples include:

- 21331, Pierce County Recycling Composting & Disposal
- 29611, Hyponex
- 29147, Olympic Organics
- 28983, Lenz
- 18656, Riverside Topsoil

Other Regulatory Agencies Requirements

**California Air Districts**

South Coast Air Quality Management District (SCAQMD) and San Joaquin Air Pollution Control District (SCAQMD) require air quality permits for some composting operations and have adopted composting facility-specific rules to complement the requirements of their NSR rules. These rules are summarized in the table below.

**Table 2. California Permitting Rules for New and Existing Composting Operations**

| Air District | Relevant Rules | Emissions Limitations |
|---|---|---|

| | | |
|---|---|---|
| SJVAPCD | Rule 4565 (animal manure, biosolids, poultry litter) & 4566 (organics); NSR Rule 2201 | Mitigation measures based on wet-tons of material processed to achieve reductions of 19%, 60%, 80% VOCs. |
| SCAQMD | Rule 1133.2 (co-composting with biosolids and/or animal waste), Rule 1133.3 greenwaste only; NSR Regulation XIII, Rules 1304, 317 | 70% reduction by weight for existing operations, and 80% reduction by weight for new operations for VOCs and NH3 (Rule 1133.2); 80% reduction by weight for VOC and NH3 (Rule 1133.3) |

**SJVAPCD Composting Rules Summary**

SJVAPCD Rule 4565 (Biosolids, Animal Manure, and Poultry Litter Operations) and SJVAPCD Rule 4566 (Organic Material Composting Operations) provide requirements for new and existing composting operations and related activities. Rule 4565 requires reductions of VOC emissions from biosolids (sewage sludge or wastewater), animal manure, and poultry litter composting and co-composting (biosolids/manure/litter mixed with other materials) operations. Rule 4566 requires VOC emission reductions from organic material (food, green, or a mixture thereof) composting operations. In addition to reducing VOC emissions, the measures and practices required by SJVAPCD Rules 4565 and 4566 also reduce ammonia ($NH_3$) emissions. Per Rule 4565, mitigation measures, for both the active and curing composting stages, are aiming at reducing VOC emissions from biosolids, animal manure, or poultry litter composting operations. The number of mitigation measures required depends on the facility's annual feedstock throughput. A list of all mitigation measures can be found in Table 2 of District Rule 4565.

- Composting of up to 20,000 wet-tons per year are required to implement at least three Class One mitigation measures.
- Composting between 20,000 and 100,000 wet-tons per year are required to implement at least four total mitigation measures (either four Class One measures or three Class One measures and one Class Two measure).
- Composting of 100,000 wet-tons per year or greater are required to implement four or five mitigation measures (depending on the measures chosen).
- Composting of less than 200,000 wet-tons per year are required to implement two mitigation measures or an alternative measure that demonstrates at least 19% VOC reduction.
- Composting between 200,000 and 750,000 wet-tons per year are required to implement either three mitigation measures or an alternative measure that demonstrates at least 60% VOC reduction.
- Composting 750,000 wet-tons per year or greater are required to implement a mitigation measure that demonstrates at least 80% VOC reduction.

Per Rule 4566, mitigation measures are aiming at reducing VOC emissions from organic material composting during the active stage. The number of mitigation measures required depends on the facility's annual feedstock throughput. A list of all mitigation measures can be found in Table 1 of District Rule 4566.

- Composting of less than 200,000 wet-tons per year: for windrow composting only, implement at least 3 turns during the active-phase and one mitigation measure; or an Agency-approved alternative measure that demonstrates at least 19% VOC reduction.
- Composting between 200,000 and 750,000 wet-tons per year: for windrow composting only, implement at least 3 turns during the active-phase, one mitigation measure for watering systems, and the finished compost cover mitigation measure; or an Agency-approved alternative measure that demonstrates at least 60% VOC reduction.

Pursuant to SJVAPCD Rule 2201, add-on emission control devices may be required if a new or modified composting/co-composting operation triggers BACT. The SJVAPCD has established BACT guidelines relevant to the composting industry, which are summarized in the table below:

**Table 3. SJVAPCD BACT Guideline Summary**

| Basis | Description | BACT/tBACT |
|---|---|---|
| SJVAPCD BACT Guideline 6.4.1 (4/3/1998) | Composted Materials – Screening, Transportable, Wood Waste Processing | **$PM_{10}$:** Use of a water sprinkler system or maintaining adequate moisture content of the process materials to prevent visible emissions in excess of 5% opacity. |
| SJVAPCD BACT Guideline 6.4.3 (7/16/2018) | Green Waste, Wood Waste, and Composted Material – Transfer & Screening | **$PM_{10}$:** Process materials with moisture content ≥25% and ≤30%; visible emissions not to exceed 5% opacity |
| SJVAPCD BACT Guideline 6.4.8 (12/19/2016) | Manure Composting Operations | **VOC:** Class One Mitigation Measures from District Rule 4565 (10% control)<br>**$NH_3$:** Class One Mitigation Measures from District Rule 4565 (10% control) |

## SCAQMD Composting Rules Summary

SCAQMD 1133 series rules provide requirements for composting and related activities. SCAQMD Rule 1133.3 requires reductions of VOC and $NH_3$ emissions from green waste composting. For green waste composting, it includes three types of feedstock materials: green waste-only, green waste mixed with food waste, or green waste with up to 20% manure, by volume.

Either best management practices (BMPs) or add-on emission control devices are required to reduce VOC and $NH_3$ emissions from green waste composting windrows per Rule 1133.3, depending on the facility's feedstock throughput.

- Composting of green waste only, up to 20 volume % manure, or up to 5,000 tons per year (tpy) of food waste throughput:
    - Cover each active phase pile with finished compost (at least 6" thick) within 24 hours of formation.
    - Apply water within 6 hours before turning, such that the top of the pile is wet at a depth of at least 3".

- Alternatively, implement a mitigation measure that demonstrates emission reductions of at least 40 wt% for VOC and at least 20 wt% for $NH_3$.

- Composting of greater than 5,000 tpy of food waste throughput:
  - Requires an add-on emission control device that has an overall system control efficiency of 80% or higher for VOC and $NH_3$ during the active phase (at least 22 days) of composting containing more than 10% food waste, determined by a source test.

Any relocation or any new or modified source which results in an emission increase of any non-attainment air contaminant, ozone depleting compound, or ammonia shall employ BACT. SCAQMD has interpreted the BACT provision as a 1.0 lb/day increase in emissions from all sources subject to NSR. Minor Source BACT requires compliance with SCAQMD Rule 1133.2 for composting. ASP composting systems with an appropriate emission control device may be considered as BACT.

**Washington Department of Ecology**

**Table 4. Similar Permits Issued by WDOE & PSCAA**

| Origin | Operational and Design Limitations | |
|---|---|---|
| PSCAA Order No. 11935 (12/3/2020) | Commercial composting facility (maximum of 14,000 wet tons of feedstock per year) for recycling green yard waste, fish waste, pre-consumer food waste, and agricultural manure and bedding using Extended Aerated Static Pile composting technology. The compost operation consists of a tipping area, two Extended Aerated Static Pile composting bays with four zones each, concrete composting pad (100'x300'), curing piles, final product storage piles, and a leachate pond. | VOC/Organic HAP<br>▪ VOC removal efficiency of at least 75.0% across biofilter cover layer<br>▪ No detectable odor allowed at or beyond the facility's boundary<br>Ammonia<br>▪ NH3 removal efficiency of at least 53.0% across biofilter cover layer<br>▪ No detectable odor allowed at or beyond the facility's boundary<br><br>Particulate Matter<br>• Visible emissions from grinding and screening shall not exceed 5% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour as measured by WDOE Method 9A. |

| Origin | Operational and Design Limitations |
|---|---|
| WDOE Order No. 14AQ-C191 (9/17/2019) | Compost facility accepting up to 62,700 wet tons per year feedstock from industrial, institutional, and residential, sources.<br><br>**PM/Visible Emissions**<br>▪ Grinding, mixing, and turning conducted with adequate moisture to prevent visible emissions<br>▪ Vehicle routes covered with crushed stone or paved and controlled w/ water or chemical dust suppressants<br><br>**VOC/Odor**<br>▪ Negative aeration system collecting at least 98% of Stage 1 emissions<br>▪ Biofilter with at least 75.0% destruction for all collected VOC emissions and 21.8% destruction for all collected $NH_3$ emissions<br>▪ Unscreened compost cover (at least 12") applied to stockpiles at the end of each day<br>▪ Unscreened compost cover (at least 12") applied to compost piles<br>▪ Carbon to nitrogen ratio of 25:1 to 30:1 for feedstock prior to placement in compost bed<br>▪ Compost bed moisture content 55-65% |

BACT for Other Source Categories with Potential Odor Emissions

**Table 5. BACT Determinations for Source Categories with Potential Odor Emissions**

| Origin | Description | Limitations |
|---|---|---|
| PSCAA Order No. 11946 (8/21/2020) | Septage and biosolids processing facility consisting of one Dusky Shark septage and biosolids receiving/ screening station, eight septage and biosolids storage tanks (37,500 gallons each), Varcor septage and biosolids waste stream separation system (90 gallons per minute; including a preheater, degas tower, sludge dryer, and condensing units), one pelletizer, one convective dryer drag chain conveyor, dry material storage bay (20 ton capacity), and ammonia truck loading. | **VOC/Odor**<br>▪ Odor removal of ≥ 90% & $H_2S$ removal of ≥ 99% using enclosed biofilter vessel.<br>▪ Building HVAC system equipped with carbon filtration system<br>▪ No detectable odor allowed at or beyond the facility's boundary |
| PSCAA Order No. 11955 (8/4/2020) | Establishment of a Tier 2 marijuana production and processing facility with a 10,000 square foot canopy. The facility is composed of five 2,000 square foot greenhouses containing the production and processing of marijuana. | **VOC/Odor**<br>▪ Use of carbon adsorption for odor control<br>▪ No detectable cannabis odors allowed at or beyond the property line. |

| Origin | Description | Limitations |
|---|---|---|
| PSCAA Order No. 11985 (6/19/2020) | Establishment of a Tier 2 marijuana production and processing facility with a 2,100 square foot canopy. | **VOC/Odor**<br>▪ Use of carbon adsorption for odor control<br>▪ No detectable cannabis odors allowed at or beyond the property line. |
| PSCAA Order No. 11939 (4/22/2020) | Four 400 Watt CO2 laser cutters (one MultiCam Laser Cutter 2000 Series and three Kern Model HSE lasers) for cutting and engraving of primarily acrylic products with some incidental cutting of wood and stainless steel products. | **VOC/Odor**<br>▪ Use of carbon adsorption system<br>▪ No detectable odor allowed at or beyond the facility's boundary |
| PSCAA Order No. 11846 (7/15/2019) | Food production facility including the following equipment: two existing 600 horsepower, 24.5 MMBtu/hr heat input capacity, Cleaver Brooks Scotch Marine firetube steam boilers; and four existing soup kettles and one new stock cooking vessel (900 gal) | **VOC/Odor**<br>▪ Use of packed-bed scrubber<br>▪ No detectable odor allowed at or beyond the facility's boundary |

Analysis

Different types of emissions, including odorous emissions are generated during the various stages of the composting process, including the following:

- Feedstock receiving and processing;
- Aerated Static Pile composting;
- Windrow (Stage 2) composting;
- Leachate collection, treatment, and storage; and
- General site conditions

For this emission source, BACT and RACT are the same given that the controls chosen by Lenz meet the definition of RACT as well as BACT. RACT/BACT for each of these stages is analyzed in detail below.

1. **Feedstock Receiving and Processing**
   Feedstocks are unloaded at the southeast corner of the receiving building, where an air handling system is used to exhaust air through a biofilter. According to the NOC application, the material is evaluated as it is delivered to assess the necessary bulking agents that will be required. Mixing and grinding also occur within the tipping building and bulking agents are added when the mixture is moved out of the tipping building.

   BACT/RACT for feedstock receiving and processing will be achieved using a designated tipping building for receiving material with a negative ventilation system to capture and route emissions to a biofilter. Additionally, mixing and grinding of material must occur within the tipping building except for bulking agents which are added outside the tipping building. The BACT requirements for biofilter performance are discussed in Item 2 below (ASP Composting) and are also applicable to feedstock receiving and processing. Based on the design of the tipping building and the ventilation system, the building is not expected to capture 100% of emissions from material being stored in the building. Therefore, as part of the BACT/RACT determination, Lenz will also be required to process all feedstock received by the end of the workday, except in the rare event of primary and back-up equipment failure. This work practice requirement is expected to reduce the potential for emissions from the tipping building.

2. **Aerated Static Pile (ASP) Composting**
   Lenz has established ranges for various parameters (e.g., food waste percentage, carbon to nitrogen ratio, bulk density, etc.) to achieve a desired initial mix for composting. Once the material is transferred to the ASP, a computerized system is used to continuously monitor the temperature of the piles. Material will be processed in new and existing ASPs for a retention time between 10 and 15 days. Lenz is proposing to use the following management practices to control VOC, organic HAP, ammonia, and other odors during ASP composting in the new and existing piles:

   - Mixing compost to specific design parameters.

- Monitoring of ASP to minimize temperature fluctuations and maintain appropriate moisture content, oxygen content, pH, and temperature.
- All ASPs covered with a minimum 12" layer of biofilter material.
- Negative aeration with emissions controlled by biofilters.

This Order of Approval will establish requirements for the initial construction of the new and existing ASPs, including required ranges for carbon-to-nitrogen ratio, bulk density, and percent food waste:

- Carbon-to-Nitrogen Ratio: Page 18 of *Industrial Composting* states, "the composting process is effective within carbon-to-nitrogen ratios of 22 to 40." Page 146 of *Industrial Composting* also states, "Feedstocks with low carbon-to-nitrogen ratios (lower than 20:1) will release ammonia during composting." Lenz indicated that the target carbon-to-nitrogen ratio for the feedstock mix is 20:1 to 40:1.[7] This range will be established as a requirement for the initial construction of each ASP.

- Bulk Density: Lenz's Plan of Operation (pg. 60) indicates that "the optimal initial density for composting is approximately 800 to 900 pounds per cubic yard".[8] However, Table 3 (pg. 13) of the Plan of Operation indicates that the mix goal is 850 to 950 lbs/yd$^3$. A bulk density upper limit of 950 lb/yd$^3$ will be established as a requirement for the initial construction of each ASP.

- Each ASP will be required to contain no more than 14.0% food waste by weight. See Section F for additional discussion of the basis of this requirement.

This Order of Approval will also establish required operating ranges for new and existing ASPs during Stage 1 composting, including moisture content, temperature, pH, and oxygen levels. In conversations with the applicant they stated that these ranges were developed for ASPs where the active composting process has established itself. The ASPs can be outside these ranges during the initial 48-72 hours after construction as the biodegradation process begins. The conditions allow for these initial periods to allow the process to stabilize. The ranges in the conditions are as follows:

- Moisture Content: Lenz indicated that the target moisture range during Stage 1 composting after the first 48 hours is 35% to 65%. This operating range will be established as a condition in this Order of Approval.

- Temperature: Lenz indicated that the target temperature range during Stage 1 composting after the first 48 hours is between 45 and 70°C. This operating range will be established as a condition in this Order of Approval, and the temperature of the ASPs will be required to be monitored hourly.

- pH: Lenz indicated that the target pH range during Stage 1 composting is between 6.5 and 8.0. However, Lenz's Plan of Operation indicates that the ideal pH range is 6.5 to 8.5

[7] See Appendix A, "Lenz Permit Modification Application_PSCAA_2018.pdf"

and that thermophilic bacteria are inhibited by low pH conditions (< 6).[8] Therefore, a required pH range of 6.0 to 8.5 after the first 72 hours will be established as a condition in this Order of Approval. During the first 72 hours after construction, the pH in the pile may vary outside this range and is not a parameter that can be controlled according to the applicant.

- Oxygen: Page 124 of *Industrial Composting* indicates that oxygen levels should range between 10 and 18% in aerated systems. Page 86 of *Industrial Composting* states, "The aeration system must be designed to provide uniform and oxygen levels exceeding 10% throughout the mass." Therefore, a required oxygen minimum of 10% will be established as a condition in this Order of Approval.
- Cover Layer Thickness: each pile is required to be covered with a 12-inch layer of ground wood residuals, finished compost, or compost screen overs.[8] WDOE Order No. 14AQ-C191 (9/17/2019) requires that a 12 inch cover be applied after compost bed placement. Therefore, during Stage 1 composting, each aerated static pile will be required to be covered with at least 12 inches of biofilter media.

Lenz will control emissions from the new and existing ASPs using negative aeration to biofilters. Biofilters have been used for odor removal for many years. It is critical for the biofilter to be operated within appropriate operational ranges and to have sufficient monitoring and regular testing to demonstrate the biofilter is in good working order and the media's surface area is actively contacting emissions. The media must be actively sustaining bacterial cultivation and growth and maintaining a healthy population of bacteria. Research is available that gives us a better understanding of what criteria must be met for the biofilter to operate efficiently:

- Moisture content: Williams and Miller[9] (1992) report that bed moisture is the single most important parameter for biofilter viability – optimal moisture contents varied from 20% to 60%. Devinny et al.[10] (1999) and Frederickson et al.[11] (2013) agreed with the importance of moisture (30 – 60% water). Kuter[12] (1990) recommended a moisture range between 40 to 60%. Lenz's Plan of Operation (pg. 65) indicates that a design setpoint of 50% moisture is used.[13] Lenz commented on moisture content and how they propose to build and maintain the most efficient biofilter as shown below. The order of approval does not require a specific moisture content for the biofilters. However, Lenz must follow their O&M plan and maintain and operate the biofilter in a way that ensures they will continue to meet 98% control of VOC and 80% control of ammonia. Conformance with these requirements will be shown through regular testing of the biofilters. Lenz' comment is pasted in below:

[8] See Appendix A, "LENZ_COMPOST_POO_150k_2019.pdf"
[9] Williams, T.O. and F.C. Miller. 1992. Odour control using biofilters. BioCycle 33(10): 72-77.
[10] Devinny JS, Deshusses MA & Webster TS. (1999) Bilfiltration for air pollution control: Lewis Publishers
[11] Frederickson, J, Boardman CP, Gladding TL, Simpson AE, Howell G & Sgouridis F (2013) Biofilter performance and operation as related to commercial composting.
[12] Kuter, G. A. 1990. Odor control, completing the composting process. Monograph. Glastonbury, CT: International Process Systems, Inc
[13] See Appendix A, "LENZ_COMPOST_POO_150k_2019.pdf"

"The moisture content of a biofilter becomes a gradient from inside to outside due to moisture retention and how the biofilter is moistened to facilitate water-film layer emissions control at the surface; and the level of moisture content of the air coming from the ASPs. This condition only becomes more enhanced as a deeper biofilter (which will control emissions more effectively) is used. This condition actually restricts Lenz's ability to build the most efficient biofilter system." (Quoted from an attachment to an email dated January 7, 2021 at 12:13 PM from Edward Wheeler to Carole Cenci and John Dawson)

- Temperature: According to Tunee[14] (2011), the most efficient temperature range is 15°C to 30°C – the higher the temperature, the higher the metabolic and hence biodegradation rate up to around 40 degree C. Leson and Winder[15] (2012) specified a temperature between 20 and 40 degrees C should be maintained at the inlet air to the biofilter. Frederickson et al (2013) indicated optimum microorganism performance when biofilter operated between 30 and 40 degrees C. Lenz has indicated that they maintain a biofilter media temperature between 10°C and 45°C. This range is slightly larger than what is cited in the references above. As mentioned above, higher temperatures can result in a higher biodegradation rate. Temperature is not an explicit parameter required in the Order of Approval. However, Lenz must follow their O&M plan and maintain and operate the biofilter in a way that ensures they will continue to meet 95% control of VOC and 80% control of ammonia. Conformance with these requirements will be shown through regular testing of the biofilters. Lenz' comment is pasted in below:
- Oxygen: The applicant identified oxygen levels in the biofilters as an important parameter for proper operation, specifically that there is a lower floor below which the biofilters will not be functioning properly. The OA conditions require the oxygen levels to be at or above 10%.
- Depth, residence time, static pressure and vegetation: The Order of Approval includes a minimum bed depth requirement (at least 4 feet), a minimum residence time (at least 40 seconds), and an allowable static pressure range that will be established by the manufacturer of the biofilter. These parameters will be some of the parameters that will help detect potential degradation. The Order of Approval also requires that Lenz does not allow vegetation growth on the biofilters.

Porosity is also a key operating parameter but a search of literature indicates a broad range so this has not been included in this permit.

Another key parameter found to be important for achieved odor removal is media replacement. It was suggested that media be replaced after 4 years continuous operation (Colon et al.[16]

[14] Tunee (2011) Evaluation of MBT biofilters design criteria and efficiency in VOC removal. MSC dissertation (NT4011), University of Central Lancashire, September 2011.
[15] Leson G & Winer AM (2012) Biofiltration: an innovative air pollution control technology for VOC emissions. Journal of A&WMA, 41, 8, pp 1045-1054.
[16] Colon J. et al (2009) Performance of an industrial biofilter from a composting plant in the removal of ammonia and VOCs after material replacement. Journal of Chemical Technology and Biotechnology.

(2009)), however the frequency at which it needs to be changed will vary for each biofilter. Traditional biofilters typically use a combination of wood chips, bark, and compost as media. To evaluate the biofilter media, this permit requires routine monitoring of new and existing biofilter static pressure in each duct between the fan and each biofilter. A higher than normal static pressure would indicate the biofilter is clogged or too compacted. This information will be required to be used in determining appropriate measures Lenz must take to ensure proper biofilter operation, including replacing the media.

Lenz has indicated that the new and existing biofilters will be able to achieve 95% control of VOC emissions,[17] and this assumption is used for the potential project and facility-wide emission calculations (see Section F of this worksheet). Therefore, a limit will be established by this Order of Approval requiring each new and existing biofilter to achieve at least 95.0% reduction of VOC emissions. The new and existing biofilters will also be required to achieve at least 80.0% removal of ammonia, consistent with SCAQMD Rule 1133.3.

In addition, the negative aeration systems for both the new and existing ASPs will be required to achieve at least 98% capture of emissions, which will all be routed to and controlled by a biofilter. All ASPs will be required to operate only in a negative aeration mode. This capture efficiency is consistent with the assumption used for WDOE's Order No. 14AQ-C191. To control uncaptured emissions, Lenz will be required to cover each new and existing ASP with at least 12" of biofilter material.

This permit will require monitoring of oxygen, bed depth, bed residence time, and static pressure to verify biofilter performance. In addition, Lenz will be required to conduct performance testing after startup and every calendar quarter to verify that all biofilters are meeting the required removal efficiencies.

3. **Windrow Composting**
During the windrow stage of composting, the bed will be turned at least every 7 days to ensure that proper oxygen, moisture, and porosity levels are maintained. Lenz is proposing to use the following management practices to control odors during windrow composting:

- Mixing compost to specific design parameters.
- Monitoring of bed to maintain appropriate temperatures, minimize temperature fluctuations, and maintain appropriate moisture content.
- Turning the bed at least every 7 days.

Lenz will be required to maintain a moisture content of 40% to 65% during the entirety of the Stage 2 composting process (the windrows).

4. **Mass Bed Curing**
Curing occurs for some materials based on the ultimate use of the final product, but curing is not required for all products. This material may be screened or unscreened, and these piles may or may not be turned. The curing piles are expected to be a smaller source of VOC and odor emissions than the Stage 1 and Stage 2 composting operations. Consistent with the Stage 2 windrows, Lenz will be required to maintain a moisture content of 40 to 65%.

[17] See Appendix C, "20200104_Lenz Response to PSCAA Compost App review 122019.pdf"

**5. Leachate Collection, Treatment, and Storage**

Lenz uses a leachate treatment system with the following equipment and processes to reduce the potential for odors from collected and stored leachate (as stated in the NOC application):

- Collected leachate drains through conveyance piping to deliver leachate to the treatment system in a timely manner.
- A leachate collection tank with coarse bubble diffusion is used to ensure that aerobic conditions persist in the collection tank.
- A chopper pump is used to transfer water from the leachate collection tank to minimize downtime and ensure proper solids sizing for treatment.
- A rotary drum screen (RDS), with a 0.02-inch wedgewire screen is used to separate the majority of solids collected with the leachate.
- A fully-programmable, automatically controlled Modified Sequential Batch Reactor (MSBR), with fine bubble diffusion is used to reduce Biological Oxygen Demand (BOD), and Total Suspended Solids (TSS). The treatment of this water significantly reduces the potential of odors from collection of leachate.
- Only leachate that has been treated is stored in the lagoon to reduce the potential for odors.

This Order of Approval will require Lenz to route standing water and water runoff from the tipping building and the compost pads to the leachate collection and treatment system. Leachate (treated or untreated) from the compost facility may not be used for dust suppression, but may be used for moisture addition during feedstock preparation or moisture addition during the composting process. Excess leachate that has been treated may be stored in the on-site lagoon.

**6. General Site Conditions**

Lenz is proposing to use the following management practices to control odors and fugitive dust emissions:

- Continual assessment and housekeeping to cleanup and dispose of waste in a timely manner.
- Regular compost technician walk-through inspections and cleanings of the facility.
- Regular site management inspections.
- Timely spill and debris clean up action.
- Regular use of a sweeper truck to clean surfaces.

To satisfy BACT, no detectable odor shall be allowed at or beyond the facility's boundary. Grinding, mixing, and turning must be conducted with adequate moisture to prevent visible emissions. Consistent with SJVAPCD BACT Guidelines 6.4.1 and 6.4.3, visible emissions from grinding and screening shall not exceed 5% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, as measured by WDOE Method 9A. Vehicle routes must be controlled with water or chemical dust suppressants adequate to

prevent visible emissions. Lenz will be required to perform facility-wide inspections for odor and visible emissions and conduct corrective action if either is detected.

BACT/RACT Recommendations

**Table 6. BACT/RACT Summary**

| Emission Unit | Pollutants | BACT/RACT Limits (applies to all pollutants listed) | OA Conditions Implementing BACT/RACT |
|---|---|---|---|
| Feedstock Receiving and Processing | VOC, ammonia, odor, HAPs/TAPs and | • VOC removal efficiency of at least 95.0% across biofilters.<br>• No detectable odor allowed at or beyond the facility's boundary<br>• Unload at SE corner of tipping building<br>• Must be done in tipping building with negative ventilation system and routed to biofilter<br>• Grinding and mixing (except for bulking agents) occurs in tipping building<br>• Process all feedstock by end of each workday (VOC, HAPs/TAPs & odor only) | Conditions: 1, 4, 5, 7-12, 14, 17, 25-31 33, 35-40 |
| | Particulate | • Visible emissions from grinding and screening shall not exceed 5% opacity for more than 3 minutes in any hour | Condition: 1, 6, 11, 13, 32, 35, 36, 38-40 |

| Emission Unit | Pollutants | BACT/RACT Limits (applies to all pollutants listed) | OA Conditions Implementing BACT/RACT |
|---|---|---|---|
| Aerated Static Pile Composting | VOC, Odor, Ammonia, HAPs/TAPs | • Capture efficiency of all emissions from the ASPs of at least 98%.<br>• VOC, including volatile HAPs and TAPs, removal efficiency of at least 95.0% across biofilters.<br>• Ammonia removal efficiency of at least 80% across biofilters<br>• No detectable odor allowed at or beyond the facility's boundary | 1, 5, 15-17, 19-36, 38-40 |
| | Particulate | • ASPs covered with minimum 12-inch layer of biofilter material | 1, 16e) |
| Windrow Composting | VOC, Odor, Ammonia, HAPs/TAPs | • No detectable odors beyond the property line | 1, 5, 15, 18, 20, 24, 32, 33, 35, 36, 38-40 |
| | Particulate | • Minimize fugitive dust | 18, 32, 35, 38-40 |
| Leachate Collection, treatment, and storage | Odor | • No detectable odors beyond the property line | 1, 5, 14, 33 |

## F. EMISSION ESTIMATES

### Proposed Project Emissions

VOC emissions from the compost expansion were estimated using VOC emission factor information collected and reviewed by the Agency in 2014. That information relied on numerous references, but used a significant portion of the information collected in California. That information and subsequent rulemaking by SCAQMD and SJVAPCD were included in the California SIP revision package approved by EPA (see FR November 29, 2012, pp. 71129-71131). The Agency VOC technical report on composting is embedded below

Final Report - Compost VOC EF.docx

For this case, Lenz is proposing to control VOC and odor emissions from the composting operation using covered ASPs with negative aeration to biofilters. In addition, the ASPs will be constructed with no more than 14% food waste. Therefore, an uncontrolled VOC emission factor of 5.7 lb/ton for greenwaste composting is used (see Table 1 of the Agency technical report above). Lenz has indicated that this ASP system with negative aeration to biofilter will capture 98% of emissions and achieve a 95% reduction of emissions in the biofilters, which Lenz will be required to verify on a recurring basis through testing. This 95% control is applied to the VOC emission calculations for ASP composting.

Ammonia emission factors used for the calculations are based on data presented in SJVAPCD's 2010 compost emission factor report. These uncontrolled emission factors are consistent with the factors used for Order No. 14AQ-C191 issued by WDOE. An 80% control efficiency is applied to the $NH_3$ emission calculations for ASP composting, which is consistent with the requirement in SCAQMD Rule 1133.3 for composting operations with greater than 5,000 tons per year food waste. This ammonia control efficiency will be established as a permit requirement by this Order of Approval. Lenz has indicated that this ASP system with negative aeration to biofilter will capture 98% of ammonia emissions.

The calculations provided by the applicant assume 90% of the uncontrolled VOC emissions from the compost process will be emitted during ASP composting and the remaining 10% of the emissions will be emitted from the windrow/mass bed composting. According to the applicant's "Air Quality Technical Report 2nd Addendum" (Appendix D), emissions were calculated "assuming that 90% of emissions happen in the active composing phase (i.e., from the engineered biofilters), and the remaining 10% from the windrows." The Agency was able to identify references that state that 90% of VOC emissions occur

during the active stage of composting and 10% occur during the curing stage, including SJVAPCD's compost emission factor report.[18,19]

Lenz will be required to meet at least a Solvita® Maturity Index of 3.5 or greater prior to moving material from Stage 1 to Stage 2 of the composting process.

Toxic air pollutant (TAP) emissions (except ammonia, methanol, and acetaldehyde) were calculated based on sampling conducted at the Lenz facility by the Washington Department of Ecology in June 2013. Concentration measurements were taken at the following locations:

- ASP biofilter (south biofilter)
- ASP & tipping building biofilter (north biofilter)
- Fresh ASP
- 7-Day ASP
- Mass bed
- Finished pile

For emission sources where multiple samples were taken, the maximum of all samples was used to estimate TAP emissions. Methanol was not measured during the June 2013 sampling, and the maximum acetaldehyde measurement during the sampling was an outlier. Therefore, methanol and acetaldehyde emissions were calculated by multiplying the total VOC emissions by the weight percentage from EPA's SPECIATE tool for composting (12.79% for methanol and 0.14% for acetaldehyde).

The applicant provided updated emission calculations via email on March 12, 2020 (see Appendix D). The Agency made the following updates to the March 2020 calculations provided by the applicant:

- The calculations provided by the applicant assumed 100% capture of emissions from the ASPs with the negative aeration system. The calculations were updated to assume a 98% capture efficiency, consistent with Order No. 14AQ-C191 issued by WDOE.
- The maximum stockpile time was updated from 0.25 days (6 hours) to 0.5 days (12 hours). This was updated to be consistent the feedstock receiving and processing window indicated in the application (7am – 5:30pm), with a small buffer. This is also being established as a condition in this Order of Approval.
- The applicant assumed a 19% VOC control efficiency for the Stage 2 windrows. Per the SJVUAPCD Final Draft Staff Report for Proposed New Rule 4566 (8/18/2011), "Data from the San Joaquin Valley Air Pollution Study Agency's (Study Agency) field study showed that the watering system would provide a 19% reduction in VOC emissions during the active phase." Since the magnitude of emissions is lower during the windrow stage (compared to the Stage 1 ASPs), a 19% reduction may not be achievable from watering alone. Therefore, the 19% control efficiency was removed from the calculations.
- The measured concentrations of speciated HAP and TAP were converted to a mass emission rate basis using the following formula,[20]

[18] San Joaquin Valley Air Pollution Control District, "Compost VOC Emission Factors" (9/15/2010).
[19] Authority to Construct for Permit Application No. 26437, Plant No. 2066 (issued 9/21/2017).
[20] Jobson, T., Khosravi, N., "Emissions from Washington State Compost Facilities: A Review of Volatile Organic Compound Data, and an Estimation of Greenhouse Gas Emissions" (November 2019, updated February 2020)

$$flux\ density\ \left(\frac{\mu g}{m^2 min}\right) = conc.\left(\frac{\mu g}{m^3}\right)\ x\ air\ flow\ rate\left(\frac{m^3}{min}\right) x\ \left(\frac{10\%\ He}{\%\ He_{sample}}\right) / area\ (m^2)$$

where the air flow rate measured during the testing was 5 L/min (0.005 $m^3$/min) and the surface area sampled by the chamber was 0.13 $m^2$.

- For the HAP/TAP calculations, since the surfaces of the ASPs were not measured while under negative aeration during the Ecology sampling, emissions from the surfaces of the ASPs (uncaptured by negative aeration) were back-calculated assuming a 98% capture efficiency of the negative aeration system, 95% control efficiency for the biofilter, and 75% control efficiency for the biofilter layer on the ASP. This 75% control efficiency for the biofilter layer is based on the Agency's VOC technical report on composting.

The updated calculations are provided below:

11753css Emissions.xlsx

The permitted potential emissions are calculated based on the increase from 75,000 tons of feedstock per year to 150,000 tons of feedstock per year. The facility expects to operate near this limit of 150,000 tons of feedstock per year, so actual project emissions are assumed to be equal to potential project emissions.

**Table 7. Project VOC and HAP Emission Summary**

| Emission Source | Project Increase in Potential VOC Emissions (tpy) | Project Increase in Potential Total HAP Emissions (tpy) | Project Increase in Potential Single HAP (Methanol) Emissions (tpy) |
|---|---|---|---|
| Covered ASPs/Biofilter | 10.39 | 1.62 | 1.59 |
| Windrows | 21.38 | 6.40 | 2.73 |
| Stockpiling | 2.06 | Included above | Included above |
| **Total** | 33.83 | 8.02 | 4.33 |

**Table 8. Project Speciated Emission Summary**

| Pollutant | CAS Number | Potential Project Emissions (tpy) | | | |
|---|---|---|---|---|---|
| | | Biofilter | ASP | Mass Bed | Finished |
| Propene | 115-07-1 | 3.41E-02 | 3.48E-03 | 4.70 | 2.47E-03 |
| Dichlorodifluoromethane | 75-71-8 | 0.00E+00 | 0.00E+00 | 0.00 | 1.94E-04 |
| Chloromethane | 74-87-3 | 0.00E+00 | 0.00E+00 | 0.08 | 0.00E+00 |
| 1,3-Butadiene | 106-99-0 | 0.00E+00 | 0.00E+00 | 0.01 | 0.00E+00 |
| Ethanol | 64-17-5 | 0.00E+00 | 0.00E+00 | 2.26 | 0.00E+00 |
| Acetonitrile | 75-05-8 | 3.12E-03 | 3.18E-04 | 0.11 | 1.18E-03 |
| Acetone | 67-64-1 | 0.00E+00 | 0.00E+00 | 4.29 | 2.83E-03 |
| Trichlorofluoromethane | 75-69-4 | 0.00E+00 | 0.00E+00 | 0.00 | 3.53E-04 |
| Methylene Chloride | 75-09-2 | 0.00E+00 | 0.00E+00 | 0.00 | 0.00E+00 |
| Vinyl Acetate | 108-05-4 | 0.00E+00 | 0.00E+00 | 1.87 | 0.00E+00 |
| 2-Butanone (MEK) | 78-93-3 | 0.00E+00 | 0.00E+00 | 2.53 | 0.00E+00 |
| Ethyl Acetate | 141-78-6 | 0.00E+00 | 0.00E+00 | 0.00 | 0.00E+00 |
| n-Hexane | 110-54-3 | 0.00E+00 | 0.00E+00 | 0.05 | 2.30E-04 |
| Benzene | 71-43-2 | 0.00E+00 | 0.00E+00 | 0.04 | 2.65E-04 |
| n-Heptane | 142-82-5 | 0.00E+00 | 0.00E+00 | 0.08 | 0.00E+00 |
| 4-Methyl-2-pentanone | 108-10-1 | 0.00E+00 | 0.00E+00 | 0.06 | 0.00E+00 |
| Toluene | 108-88-3 | 7.57E-03 | 7.73E-04 | 0.07 | 0.00E+00 |
| n-Octane | 111-63-9 | 0.00E+00 | 0.00E+00 | 0.07 | 0.00E+00 |
| Ethylbenzene | 100-41-4 | 0.00E+00 | 0.00E+00 | 0.00 | 0.00E+00 |
| m,p-Xylenes | 179601-23-1 | 0.00E+00 | 0.00E+00 | 0.00 | 0.00E+00 |
| Styrene | 100-42-5 | 0.00E+00 | 0.00E+00 | 0.08 | 0.00E+00 |
| n-Nonane | 111-84-2 | 0.00E+00 | 0.00E+00 | 0.24 | 0.00E+00 |
| alpha-Pinene | 80-56-8 | 6.94E-01 | 7.08E-02 | 25.73 | 3.00E-04 |
| d-Limonene | 5989-27-5 | 4.23E-01 | 4.32E-02 | 19.49 | 1.59E-04 |
| Carbonyle Sulfide | 463-58-1 | 0.00E+00 | 0.00E+00 | 0.08 | 0.00E+00 |
| Methyl Mercaptan | 74-93-1 | 0.00E+00 | 0.00E+00 | 0.20 | 0.00E+00 |
| Dimethyl Sulfide | 75-18-3 | 0.00E+00 | 0.00E+00 | 2.81 | 0.00E+00 |
| Carbon Disulfide | 75-15-0 | 0.00E+00 | 0.00E+00 | 0.04 | 0.00E+00 |
| Formaldehyde | 50-00-0 | 0.00E+00 | 0.00E+00 | 0.26 | 0.00E+00 |
| Propionaldehyde | 123-38-6 | 0.00E+00 | 0.00E+00 | 0.90 | 0.00E+00 |
| Butyraldehyde | 123-72-8 | 0.00E+00 | 0.00E+00 | 0.86 | 0.00E+00 |
| Benzaldehyde | 100-52-7 | 0.00E+00 | 0.00E+00 | 0.97 | 0.00E+00 |
| Isovaleraldehyde | 590-86-3 | 0.00E+00 | 0.00E+00 | 1.01 | 0.00E+00 |
| Valeraldehyde | 110-62-3 | 0.00E+00 | 0.00E+00 | 0.03 | 0.00E+00 |
| o-Tolualdehyde | 529-20-4 | 0.00E+00 | 0.00E+00 | 0.05 | 0.00E+00 |
| n-Hexaldehyde | 66-25-1 | 0.00E+00 | 0.00E+00 | 0.09 | 0.00E+00 |
| 2,5-Dimethylbenzaldehyde | 5779-94-2 | 0.00E+00 | 0.00E+00 | 0.00 | 0.00E+00 |
| Methanol | 67-56-1 | 1.47 | 0.12 | 2.73 | - |
| Acetaldehyde | 75-07-0 | 0.016 | 0.001 | 0.030 | - |
| Ammonia | 7664-41-7 | 5.57 | 0.25 | 11.36 | - |

**Facility-wide Emissions**

The facility expects to operate near this limit of 150,000 tons of feedstock per year, so actual facility-wide emissions are assumed to be equal to potential facility-wide emissions. The same emission controls (ASP with negative aeration to a biofilter) will be used for both the existing compost area and the new

compost area, so the same assumptions are used for calculating the facility-wide emissions (based on 150,000 tons of feedstock per year).

**Table 9. Facility-Wide Emission Summary**

| Emission Source | Facility-wide Potential VOC Emissions (tpy) | Facility-wide Potential Total HAP Emissions (tpy) | Facility-wide Potential Single HAP (Methanol) Emissions (tpy) |
|---|---|---|---|
| Covered ASPs/Biofilter | 20.78 | 3.24 | 3.18 |
| Windrows | 42.75 | 12.80 | 5.47 |
| Stockpiling | 4.13 | Included above | Included above |
| **Total** | 67.65 | 16.04 | 8.65 |

Reporting Source? Yes. VOC, total HAP, and individual HAP emissions from the facility are expected to exceed reporting thresholds.

## G. OPERATING PERMIT OR PSD

The Title V Air Operating Permit (AOP) program applicability for the entire source has been reviewed. Facility-wide potential VOC emissions will be 67.65 tons per year (see Table 9 above), which is less than the 100 ton per year threshold for Title V applicability. Facility-wide potential total HAP emissions will be 16.04 tons per year (see Table 9 above), which is less than the 25 ton per year threshold for Title V applicability. Facility-wide potential single HAP (methanol) emissions will be 8.65 tons per year (see Table 9 above), which is less than the 10 ton per year threshold for Title V applicability. Therefore, the facility is not a Title V air operating permit source because post project PTE remains below Title V applicability thresholds and criteria. The source is considered a "**natural minor**". However, the facility-wide potential emissions calculated for this facility are dependent on the assumptions described in Section F of the worksheet. If any of these assumptions is determined to be inaccurate, the facility-wide potential emission calculations will need to be updated, and the Title V applicability will need to be reassessed.

Emission increases associated with this project were reviewed for Prevention of Significant Deterioration (PSD) Program applicability. The facility is not an existing PSD major source and the increase in emissions from this permitting action is below PSD thresholds.

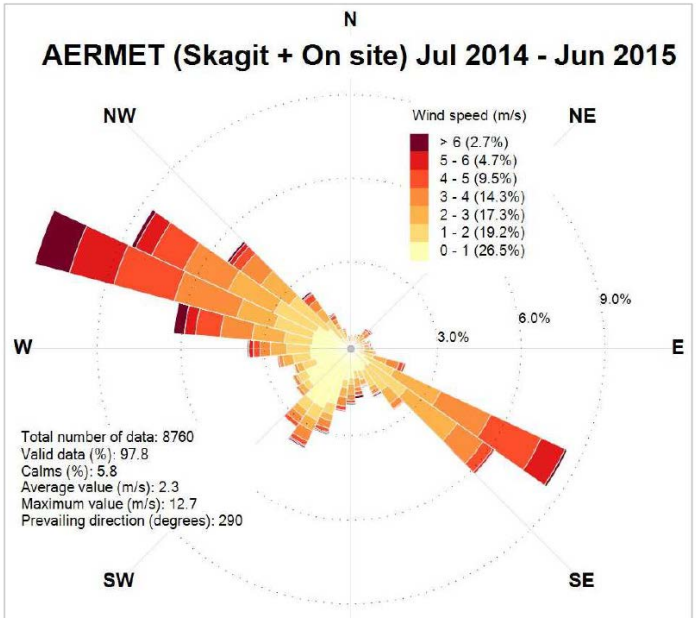
## H. AMBIENT TOXICS IMPACT ANALYSIS

The estimated potential toxic air pollutant (TAP) emission increases are calculated based on the increase from 75,000 tons of feedstock per year to 150,000 tons of feedstock per year. The table below includes estimated potential emissions of all TAP and compares those to the Small Quantity Emission Rates (SQER) in WAC 173-460-150.

**Table 10. TAP Analysis**

| Pollutant | SQER (lb/avg. period) | Averaging Period | Project Emissions (lb/avg. period) | % of SQER |
|---|---|---|---|---|
| Propene | 220 | 24-hr | 25.96 | 11.80% |
| Chloromethane | 6.7 | 24-hr | 0.45 | 6.69% |
| 1,3-Butadiene | 5.4 | year | 11.14 | 206.29% |
| Acetonitrile | 4.4 | 24-hr | 0.61 | 13.78% |
| Methylene Chloride | 9800 | year | 0.00 | 0.00% |
| Vinyl Acetate | 15 | 24-hr | 10.25 | 68.35% |
| 2-Butanone (MEK) | 370 | 24-hr | 13.88 | 3.75% |
| n-Hexane | 52 | 24-hr | 0.26 | 0.51% |
| Benzene | 21 | year | 77.57 | 369.40% |
| 4-Methyl-2-pentanone | 220 | 24-hr | 0.31 | 0.14% |
| Toluene | 370 | 24-hr | 0.43 | 0.12% |
| Ethylbenzene | 65 | year | 1.91 | 2.93% |
| Styrene | 65 | 24-hr | 0.43 | 0.66% |
| Carbonyl Sulfide | 0.74 | 24-hr | 0.45 | 60.62% |
| Carbon Disulfide | 59 | 24-hr | 0.21 | 0.36% |
| Formaldehyde | 27 | year | 514.56 | 1905.78% |
| Propionaldehyde | 0.59 | 24-hr | 4.91 | 832.67% |
| Methanol | 1500 | 24-hr | 23.71 | 1.58% |
| Acetaldehyde | 60 | year | 94.71 | 157.85% |
| Ammonia | 37 | 24-hr | 94.15 | 254.47% |

For some TAPs, the potential emission increase exceeds the SQER. An air dispersion modeling analysis was conducted using AERMOD and one year of meteorological data from Lenz's onsite meteorological station processed using the latest version of AERMET. In addition to these data, surface data from Skagit County Regional Airport and upper air data from Quillayute Airport were used to create the AERMOD-ready meteorological files. The applicant provided the following wind rose for the data:



The following ambient air boundary was used for the modeling analysis. Using the Snohomish County's Online Property Information (SCOPI) web viewer, the Agency confirmed that these parcels are owned by Lenz. Based on information received from Lenz on January 6, 2020, Lenz uses fencing, signage, video surveillance, and security personnel to preclude public access to the facility.


The applicant provided modeling files via email on March 12, 2020. The Agency made the following updates to the modeling files provided by the applicant:

- The model setup assumed that emissions were distributed across the newly constructed sources at the facility and the existing sources. Since the modeled emissions are based on the increase in emission due to the project, the modeled sources were updated to reflect only the new sources of emissions associated with the project, or existing sources that will experience an increase in emissions due to the project (e.g., additional stockpiling emissions going through the existing Biofilter 1). The updated modeled sources are shown in the figure below:


- In the model emission rate calculations provided by the applicant, it assumed that the stockpiling emissions are evenly distributed among the biofilters. Since the stockpiling emissions exit from Biofilter 1 only, the Biofilter 1 source was updated to be modeled with all of the emissions from stockpiling apportioned to it.

- The locations of Biofilter 3 (BF3) and Biofilter 4 (BF4) were adjusted slightly to align more closely with the updated plot plan received from the applicant on January 23, 2020.

- The onsite receptors included in the submitted modeling files were removed for clarity. Only offsite impacts were reviewed in this analysis.

The results of the modeling analysis are presented below. All of the modeled impacts are below the corresponding ASIL. The Agency's final modeling files are included in Appendix F of this worksheet.

**Table 11. Modeled Impacts**

| Pollutant | ASIL ($\mu g/m^3$) | Averaging Period | Model Conc. ($\mu g/m^3$) | % of ASIL |
|---|---|---|---|---|
| 1,3-Butadiene | 3.30E-02 | year | 0.003 | 10.30% |
| Benzene | 1.30E-01 | year | 0.02 | 18.24% |
| Formaldehyde | 1.70E-01 | year | 0.16 | 92.41% |
| Propionaldehyde | 8.00E+00 | 24-hr | 4.00 | 50.03% |
| Acetaldehyde | 3.70E-01 | year | 0.04 | 10.00% |
| Ammonia | 5.00E+02 | 24-hr | 51.65 | 10.33% |

## I. APPLICABLE RULES & REGULATIONS

### Puget Sound Clean Air Agency Regulations

***SECTION 5.05 (c):*** The owner or operator of a registered source shall develop and implement an operation and maintenance plan to ensure continuous compliance with Regulations I, II, and III. A copy of the plan shall be filed with the Control Officer upon request. The plan shall reflect good industrial practice and shall include, but not be limited to, the following:
(1) Periodic inspection of all equipment and control equipment;
(2) Monitoring and recording of equipment and control equipment performance;
(3) Prompt repair of any defective equipment or control equipment;
(4) Procedures for startup, shut down, and normal operation;
(5) The control measures to be employed to ensure compliance with Section 9.15 of this regulation; and
(6) A record of all actions required by the plan.
The plan shall be reviewed by the source owner or operator at least annually and updated to reflect any changes in good industrial practice.

***SECTION 6.09***: Within 30 days of completion of the installation or modification of a stationary source subject to the provisions of Article 6 of this regulation, the owner or operator or applicant shall file a Notice of Completion with the Agency. Each Notice of Completion shall be submitted on a form provided by the Agency, and shall specify the date upon which operation of the stationary source has commenced or will commence.

***SECTION 9.03***: (a) It shall be unlawful for any person to cause or allow the emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is:
(1) Darker in shade than that designated as No. 1 (20% density) on the Ringelmann Chart, as published by the United States Bureau of Mines; or
(2) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Section 9.03(a)(1).
(b) The density or opacity of an air contaminant shall be measured at the point of its emission, except when the point of emission cannot be readily observed, it may be measured at an observable point of the plume nearest the point of emission.

(c) This section shall not apply when the presence of uncombined water is the only reason for the failure of the emission to meet the requirements of this section.

***SECTION 9.09***: General Particulate Matter (PM) Standard. It shall be unlawful for any person to cause or allow the emission of particulate matter in excess of the following concentrations:
Equipment Used in a Manufacturing Process: 0.05 gr/dscf

***SECTION 9.11***: It shall be unlawful for any person to cause or allow the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property.

***SECTION 9.13***: It shall be unlawful for any person to cause or allow the installation or use of any device or use of any means designed to mask the emission of an air contaminant which causes detriment to health, safety or welfare of any person.

***SECTION 9.15***: It shall be unlawful for any person to cause or allow visible emissions of fugitive dust unless reasonable precautions are employed to minimize the emissions. Reasonable precautions include, but are not limited to, the following:
(1) The use of control equipment, enclosures, and wet (or chemical) suppression techniques, as practical, and curtailment during high winds;
(2) Surfacing roadways and parking areas with asphalt, concrete, or gravel;
(3) Treating temporary, low-traffic areas (e.g., construction sites) with water or chemical stabilizers, reducing vehicle speeds, constructing pavement or rip rap exit aprons, and cleaning vehicle undercarriages before they exit to prevent the track-out of mud or dirt onto paved public roadways; or
(4) Covering or wetting truck loads or allowing adequate freeboard to prevent the escape of dust-bearing materials.

***REGULATION I, SECTION 9.20(a)***: It shall be unlawful for any person to cause or allow the operation of any features, machines or devices constituting parts of or called for by plans, specifications, or other information submitted pursuant to Article 6 of Regulation I unless such features, machines or devices are maintained in good working order.

**Washington State Administrative Code**

WAC 173-400-040(3): Fallout. No person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

WAC 173-400-040(4): Fugitive emissions. The owner or operator of any emissions unit engaging in materials handling, construction, demolition or other operation which is a source of fugitive emission:

(a) If located in an attainment area and not impacting any nonattainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

WAC173-400-111(7): Construction limitations.

(a) Approval to construct or modify a stationary source becomes invalid if construction is not commenced within eighteen months after receipt of the approval, if construction is discontinued for a period of eighteen months or more, or if construction is not completed within a reasonable time. The permitting authority may extend the eighteen-month period upon a satisfactory showing by the permittee that an extension is justified.

**Federal**

None

## J. PUBLIC NOTICE

A notice of application was posted on the Agency's website for 15 days. No requests or responses were received. A copy of the website posting is below:

### New Construction Projects

| Company | Address | Project Description | Date Posted | Contact Engineer |
|---|---|---|---|---|
| Lenz Enterprises Inc | 5210 SR 532, Stanwood, WA 98292 | Application for the expansion of an existing composting facility to increase feedstock capacity from 75,000 to 150,000 tons per year. | 3/13/19 | Courtney O'Gorman |

The Agency has determined that there could be significant public interest in this project; therefore, the project meets the criteria for mandatory public notice under WAC 173-400-171(3)(n).

A 30-day public comment period was held from March 23, 2021 through April 21, 2021. Notices that the draft materials were open to comment were published in the Everett Herald and the Daily Journal of Commerce on March 23, 2021. The Agency posted the application, the draft worksheet, the draft Order of Approval and DNS on the Agency's website during the comment period. [Placeholder for response to comments received].

pscleanair.org
Puget Sound Clean Air Agency

## K. RECOMMENDED APPROVAL CONDITIONS

**Standard Conditions:**

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the installation address in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

**Specific Conditions:**

**EMISSION LIMITS**

3. The aeration systems for the both the new and existing aerated static piles shall always be operated in the negative aeration mode, excluding active pile construction and deconstruction during which the aeration system can be run in positive mode. The aeration system must:

    a. Capture at least 98% of the volatile organic compound emissions generated by the aerated static piles. The owner or operator shall demonstrate compliance with this specification by the method given in Condition 30.

    b. Capture at least 98% of the ammonia emissions generated by the aerated static piles. The owner or operator shall demonstrate compliance with this specification by the method given in Condition 30.

4. All emissions captured by the negative aeration systems must be routed to a biofilter. Each new and existing biofilter shall:

    a. Provide a minimum removal efficiency of 95.0% for volatile organic compounds

    b. Provide a minimum removal efficiency of 80% for ammonia

5. No detectable odor associated with the Lenz composting facility is allowed at or beyond the facility's boundary.

6. Visible emissions from grinding and screening shall not exceed 5% opacity for any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour as measured by WDOE Method 9A.

**FEEDSTOCK AND TIPPING BUILDING REQUIREMENTS**

7. Acceptable feedstock shall be limited to "organic material", meaning any solid waste that is a biological substance of plant or animal origin capable of microbial degradation. Acceptable organic materials include but are not limited to the following:
   a) Agricultural wastes, including herbivorous animal manure, paunch waste, shells, marijuana waste which complies with WAC 314-55-097;
   b) ASTM compostable films and containers;
   c) Yard debris;
   d) Food waste;
   e) Food processing wastes; and
   f) Wood waste as defined by WAC 173-350-100, which does not contain paint or stain, laminates, bonding agents, or chemically treated wood.

8. Incoming feedstock shall be visually inspected for contaminants prior to being accepted into the facility. The following types of feedstock are unacceptable and shall be turned away as soon as possible:
   a) Feedstock types that are not an acceptable feedstock as defined in Condition 7;
   b) Acceptable feedstock as defined in Condition 7 contaminated with material that is not acceptable for composting. Visible non-acceptable material as defined in Condition 7 observed during the inspection may render a load as contaminated unless it can be removed from the feedstock during pre-processing or can be screened from the finished compost at the end of the process;
   c) Approved feedstock decomposed or putrefied to a degree that could cause an immediate odor problem in the receiving area that cannot be mitigated by mixing and/or bulking with other materials; and
   d) Any load that is determined to have the potential to cause an immediate, unreasonable nuisance that cannot be mitigated by mixing and/or bulking with other materials.

9. For each load of feedstock received, the owner or operator shall record the following information:
   a) Feedstock type;
   b) Weight of load;
   c) Results from inspection of the load;
   d) Date and time of receipt of the load; and
   e) Name(s) of employee(s) who performed the inspection.

10. The owner or operator shall calculate and record the total weight of feedstock received on a monthly and 12-month rolling basis. The total weight of material placed into the aerated static piles, including feedstock for the composting process plus all other material (including bulking agent), shall not exceed 150,000 tons during any consecutive 12-month period. For the purposes of compliance with this condition, any finished compost that is added to the surface of the aerated static piles to act as a biofilter for emission control is not counted toward the limit.

11. With the exception of stumps, brush, and clean wood, all feedstock brought on site shall be deposited completely into the tipping building, where it shall be stored under negative ventilation until processed and removed from the building to be placed in an aerated static pile. The tipping building ventilation system must be routed to a biofilter. All feedstock, with the exception of bulking agents (which consists of stumps, brush, and clean wood), shall be premixed for composting prior to removal from the tipping building.

12. With the exception of stumps, brush, and clean wood, all feedstock shall be processed and placed in an aerated static pile within 12 hours of receipt, and no material may be stored in the tipping building overnight, except in the event of primary and back-up equipment failure. If feedstock cannot be processed within 12 hours of receipt or by the end of the workday due to primary and back-up equipment failure, the owner or operator shall perform the following actions:

    a) All remaining material shall be stored in the southeast corner of the tipping building and covered with at least 12 inches of biofilter media;
    b) The owner or operator shall notify the Agency in writing prior to the end of the workday, including the amount of material that is being stored in the tipping building and the reason(s) why the material could not be processed within the required timeframe; and
    c) The owner or operator shall maintain records of the days that feedstock could not be processed within the required timeframe, including the amount of material stored, the reason(s) why the material could not be processed within the required timeframe, and the date and time that the material was able to be processed and placed in an aerated static pile.

**OPERATIONAL LIMITS**

13. The owner or operator shall install and properly operate a fine water mist system on all wood grinders to control fugitive dust. With the exception of stumps, brush, and clean wood, all grinding of feedstock must occur within the tipping building.

14. The owner or operator shall route standing water and water runoff from the tipping building and the compost pads to the leachate collection and treatment system. Leachate (treated or untreated) from the compost facility shall not be used for dust suppression, but may be used for moisture addition during feedstock preparation or moisture addition during the composting process.

15. The new and existing aerated static piles shall be constructed within the following parameter ranges:

    a) Each pile shall contain no more than 14.0% food waste by weight.
    b) Carbon to nitrogen ratio shall be between 20:1 and 40:1.
    c) Bulk density shall be no greater than 950 lbs/yd$^3$.

16. Each new and existing aerated static pile shall be operated within the following operational limits at all times, except as described in a) through e):

    a) After the first 48 hours of initial construction of the pile, the moisture content throughout the entire pile shall be maintained between 35% and 65%.

b) After the first 48 hours of initial construction of the pile, the temperature throughout the entire pile shall be maintained between 45°C (113°F) and 70°C (160°F), based on an hourly average.
c) After the first 72 hours of operation, the average pH of the pile shall be maintained between 6 and 8.5.
d) At all times, the oxygen content throughout the entire pile shall be maintained at or above 10% .
e) At all times, each aerated static pile shall be covered with at least 12 inches of biofilter media and shall be negatively aerated, such that the ventilation system continuously vents emissions to a biofilter in accordance with Conditions 3 and 4.

17. Each new and existing biofilter shall be operated within the following operational limits at all times:

a) The oxygen content throughout each biofilter shall be maintained at or above 10%.
b) Each biofilter shall have a depth of at least 4 feet throughout the entire biofilter.
c) Residence time in each biofilter shall be no less than 40 seconds.
d) Static pressure in each duct between the fan and each biofilter shall within the manufacturer's specified range. Documentation of the range from the manufacturer shall be kept on site.
e) There shall be no vegetation growing on the surface of any biofilter.

18. The average moisture content of each windrow shall be maintained between 40% and 65% at all times.

**AERATED STATIC PILE and FEEDSTOCK MONITORING**

19. Within the same calendar day that each new and existing aerated static pile is constructed, the owner or operator shall record the bulk density of the pile and the estimated carbon to nitrogen ratio based on the feedstock used to construct the pile.

20. To demonstrate compliance with Condition 15.a, during each of the first 12 calendar months of operation of the new aerated static piles approved in this Order, the owner or operator shall determine the percentage of food waste by weight by verifying the food waste content is 14 percent or less of overall weight of each new and existing pile based on the Initial compost mix composition. The owner or operator shall submit to the Agency for approval a proposed method for making this determination within 14 days of the issuance date of this Order of Approval.

21. To demonstrate compliance with condition 16.b, the temperature of each new and existing aerated static pile shall be monitored and recorded hourly. At least two temperature averaging probes shall be used per ASP, and each probe shall be capable of measuring temperatures in both the core and outer layer of the compost pile. The first probe shall be placed at approximately one-third of the pile length, and the second probe shall be placed at approximately two-thirds of the pile length. The components of the temperature monitoring system shall be calibrated and maintained in accordance with manufacturer instructions and operating manuals. If any temperature reading is outside the range identified in Condition 16.b), the system must provide both an audible and visual alarm to alert the operators.

22. To show compliance with condition 16.d, percent oxygen of each new and existing aerated static pile shall be measured and recorded each calendar day. Multiple measurements shall be made each calendar day to obtain a value representative of the overall pile.

23. All material put into the composting process shall remain within an aerated static pile until the organic material has a Solvita Maturity Index of 3.5 or greater as measured using the TMECC Method 05-08-E – Solvita® Maturity Test.

24. Once an aerated static pile has met the criterion in Condition 23, the material may remain in the aerated static pile or be moved to a windrow. For each batch of material moved from an aerated static pile to a windrow, the owner or operator shall record the results of the Solvita® Maturity Test performed to meet condition 23., which pile was moved, and the date it was moved.

**BIOFILTER MONITORING**

25. Starting after the first full month of operation of the aerated static piles approved under this Order, each calendar month and for each new and existing biofilter, the owner or operator shall measure the static pressure in the duct between the fan the biofilter. Each measurement for each biofilter and each test must be conducted while operating each system at manufacturer's recommended set points, including constant fan speed and all dampers in fixed and predetermined positions. The fan speed and damper positions for each test must be the same as all previous tests. The pressure monitoring equipment shall be calibrated and maintained in accordance with manufacturer instructions and operating manuals. The biofilters shall always be operated within the manufacturer's specified pressure range. After 12 consecutive months of testing if the static pressure is within the manufacturer's recommended pressure range for all measurements, the owner or operator may reduce the test frequency to quarterly. If any quarterly reading is outside the manufacture's pressure range, the test frequency immediately reverts to monthly.

26. Oxygen content of each biofilter shall be measured and recorded each calendar month, no less than 21 days apart and no more than 31 days apart, using a properly calibrated oxygen probe.

27. The depth of each biofilter shall be measured and recorded each calendar month, with no less than 21 days apart and no more than 31 days apart.

28. The residence time for each biofilter shall be determined and recorded once each calendar quarter concurrently with the testing required in condition 30.

29. The owner or operator shall submit for Agency approval a biofilter monitoring plan providing the details of how the facility will perform the required static pressure, oxygen content, biofilter depth and residence time monitoring for each biofilter, including but not limited to, locations of the monitoring equipment, procedures for determining when the biofilter media needs to be replaced, and the number of samples, sampling locations, and procedures for measuring all required parameters. The plan must be submitted at least 60 calendar days prior to completion of construction of the new composting process area. The owner or operator must comply with the plan at all times. All changes to the plan required by the Agency shall be made to the plan within 7 calendars days of receipt by the owner or operator.

**PERFORMANCE TESTING**

30. The owner or operator shall have emissions tested for compliance with the capture efficiency requirements established in Condition 3 and removal efficiency requirements in Condition 4 of this Order within 180 days of the completion of construction of the new composting process areas. The emission tests described in this requirement shall be repeated at least once every calendar quarter

for both the new and existing aerated static piles and associated biofilters. The testing shall be performed in accordance with the following:

a) To demonstrate capture of ammonia and VOC by the negative aeration system serving the aerated static piles, the owner or operator shall demonstrate that all air flow through each aerated static pile is definitively flowing into the pile or by other methods required or approved by the Agency prior to the testing.

b) To demonstrate removal efficiency, the concentrations of total VOC and ammonia, shall be measured as close to the inlet of the aeration systems as possible of each biofilter while maintaining good sampling technique to obtain a representative sample.

c) Total VOC and ammonia concentrations shall be measured at the surface or at the subsurface of each biofilter. Sampling can be performed using colorimetric tubes, hand held organic vapor analyzer, other hand held methods, evacuated canisters, or other method approved by the Agency. The resulting measurements must be representative of the concentrations being emitted by the biofilter. Sample locations shall be distributed to provide measurements that are representative of the removal efficiency of the entirety of each biofilter. The location and method of the sampling must be in the test plan required by Condition 31.

d) Sampling at the inlet of each biofilter shall be conducted within four hours of the sampling at the surface/subsurface of each of the corresponding biofilters.

e) The average concentrations of VOC and ammonia in the inlet and surface/ subsurface shall be used to determine removal efficiency of each biofilter for VOC and ammonia.

f) The total weight of material in each of the aerated static piles and the initial construction date of each aerated static pile shall be recorded each sampling day.

31. For testing conducted pursuant to Condition 30, the owner or operator shall submit a compliance test plan with the test notification submitted under Regulation I, Section 3.07(b) at least 60 days prior to the compliance test. The test plan must include a detailed description of the methods proposed for determining capture and removal efficiency as required by condition 30. The test plan must be approved before conducting the source test, and the owner or operator must follow the approved test plan. Changes to the approved test plan are acceptable as long as the owner or operator has obtained approval from the Agency prior to the start of the test. The Agency may require different test methods if needed to accurately determine the capture and control efficiencies of the biofilters.

**FACILITY-WIDE REQUIREMENTS**

32. The owner or operator shall inspect the entire facility for visible emissions of fugitive dust at least once per calendar day, including an evaluation of whether dust control equipment (e.g. water spray bars, water truck) is being operated in good working order. If visible emissions are observed, the owner or operator shall investigate the cause and take immediate corrective action to minimize emissions. The owner or operator shall record the date, time, and results of each inspection. If visible fugitive dust emissions were observed during any inspection, the owner or operator shall record the cause and what precautions were taken to minimize emissions.

33. The owner or operator shall conduct an inspection of its entire facility at least once per calendar day to monitor along and outside the property line for detectable odors from the facility. If odors from

the facility are detected at or outside the property line during the monitoring or at any other time, the owner or operator shall take immediate corrective action to eliminate the odors. The daily inspection shall also include a visual inspection of the tipping building, each aerated static pile, and each biofilter to evaluate whether these activities are being maintained and operated in good working order. The owner or operator shall record the date, time, and results of each inspection, including any corrective actions taken to eliminate odors or maintenance performed on the biofilters.

34. Pursuant to the State Environmental Policy Act, RCW 43.21C.060, WAC 197-11-660, and Puget Sound Clean Air Agency Regulation I, Section 2.12:

    a) There shall be no stormwater discharges or discharges to ground water or surface water from the areas of the facility related to compost activities, including but not limited to the tipping building, aerated static piles, composting pads, leachate treatment system, and leachate pond.

    b) The total number of truck trips for incoming feedstock delivery and outgoing compost delivery for the compost facility shall not exceed 77 truck trips per day and 7,118 truck trips during any consecutive 12-month period. The owner or operator shall calculate and record the total number of truck trips on a daily, monthly, and 12-month rolling basis to demonstrate compliance with these limits.

**COMPLAINTS**

35. The owner or operator shall establish a complaint response program for complaints received regarding air quality, including but not limited to odors and/or fugitive dust, as part of an Operation and Maintenance (O&M) Plan. The program shall include a complaint phone line, criteria and methods for establishing whether the Lenz facility may be the source of the air emissions related to the complaint, and a format for communicating results of investigation and advising complainants of Lenz's corrective actions.

    a) The owner or operator shall record and investigate complaints received regarding air quality as soon as possible, but no later than one working day after receipt.

    b) The owner or operator shall correct any problems identified by these complaint investigations within 24 hours of identification or cease operation of the equipment until the problem is resolved;

    c) Records of all complaints received regarding air quality issues shall include information regarding date and time of complaint; name and address of complainant (if known); nature of the complaint; investigation efforts completed and basis for conclusion reached; and date, time, and nature of any corrective action taken.

    d) The owner or operator shall operate and maintain a meteorology station capable of measuring and recording temperature, wind speed, and wind direction.

**OPERATION & MAINTENANCE**

36. The owner or operator shall develop an O&M Plan consistent with the requirements of Regulation I, Section 5.05(c). The plan must address procedures for determining when the composting systems, tipping building, and biofilters are operating properly and the corrective actions that will be taken when they are not.

37. The owner or operator shall have the operations and performance of the tipping building overall, including the air handling system and the performance of the biofilter to which the tipping building is vented, reviewed and evaluated by an independent third party at least once every 12 months. The first review required by this condition shall be conducted within 90 days of the completion of construction of the new composting process areas. The independent third party in conjunction with Lenz shall develop a proposed evaluation plan and proposed report format and submit these to the Agency for approval at least 90 days prior to the first evaluation. A copy of each written evaluation report shall be submitted to the Agency no later than 45 days after the evaluation date. The evaluation shall include, but is not limited to:

    a) Operational condition and integrity of the tipping building exhaust/capture system extending from the entrance to the tipping building to the point at which the exhaust enters the biofilter, including an evaluation of whether additional fan capacity is needed to adequately capture emissions.

    b) Operational condition and integrity of the biofilter to which the tipping building is vented.

    c) Adequacy and effectiveness of the system maintenance program and practices, including repair history and troubleshooting efforts.

    d) An assessment showing that the existing biofilters are adequately draining to ensure that the beds are not becoming waterlogged.

    e) Actions taken to address any issues or concerns found

    f) Recommendations for continuous improvement of the integrated system operation.

**RECORDS AND OTHER REQUIREMENTS**

38. All records of observations and supporting documentation required by this Order of Approval shall be completed contemporaneously and no later than the end of each day. Each inspection and observation required on a daily basis by this Order shall be completed for each operational day for the site. An operational day is defined as any day that feedstock, actively composting material, or finished compost is located onsite.

39. The owner or operator shall maintain records required by this Order of Approval for five years and make them available to Puget Sound Clean Air Agency personnel upon request.

40. For the purposes of this Order of Approval, “new” refers to the operations and equipment covered by this Order of Approval and added to the facility after February 2021 and “existing” refers to the

operations and equipment temporarily approved by OA 10494 and permanently approved with this Order of Approval.

41. Upon issuance of this Order of Approval, this Order supersedes and cancels Order of Approval No. 10494, dated April 1, 2014, and cancels NOC application 11053 submitted November 12, 2015.

## L. REVIEWS

| Reviews | Name | Date |
|---|---|---|
| Engineer: | Courtney Shernan | 9/16/2020 |
| Inspector: | Tom Hudson | 9/3/2020 |
| Supervisor Review: | Carole Cenci | 9/17/2020 |
| Engineer: | Carole Cenci | 3/10/2021 |
| Supervisor Review | John Dawson | 3/15/2021 |

In addition to the reviews above, the applicant was given a courtesy copy of this worksheet prior to issuance.