GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

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NARRATIVE

TO: Jeng-Hon Su

FROM: Dawn Wu

DATE: December 10, 2024

Facility Name:	**Derst Bakery Company, LLC**
AIRS No.:	051-00225
Location:	Savannah, GA (Chatham County)
Application #:	29495
Date of Application:	November 1, 2024

Background Information

Derst Bakery Company, LLC (hereinafter "facility") owns and operates a commercial bakery in Savannah, Georgia (Chatham County). The region is an attainment area for all the regulated air pollutants. The facility is a synthetic minor source and operates under Air Quality Permit No. 2051-051-0225-S-01-0 issued on October 18, 2006.

Bread and bun baking at this facility is a highly mechanized process. Bulk quantities of flour are shipped to the facility in tank trucks and conveyed into one of the storage silos. These silos are located outside the building and utilize process fabric filters to minimize loss of material during loading. The flour is then piped into a flour shifter and bin before entering the mixing area where it is weighed and mixed yeast, water, sugar, and other miscellaneous ingredients.

The bakery produces bread and buns on a high-speed production line utilizing three dough techniques. In any technique, the various dough ingredients can be mixed in different proportions to create the desired product. In one technique (called straight dough), all ingredients are combined in the mixer and blended to create the final dough. In the second technique (called sponge dough), there is an initial mixing and resting period followed by a second mixing with additional yeast and other dough ingredients (called spiking) to create the final dough. In the third technique, the liquid brew process, the mixing of various ingredients produces a "brew" which is pumped into a fermentation tank and allowed to ferment for a set period. This initiates a long series of complex biochemical changes that end in the oven where the bread is baked. From the fermentation tank, the brew is pumped to the mixer and blended with additional flour and the remaining ingredients to create the final dough.

The final dough is transferred to the make-up equipment where it is kneaded, cut to the proper size, and deposited into a pan and given a predetermined amount of time to rise before baking. Rising occurs in the "proof box". Steam for this high-temperature, high-humidity proof box environment is supplied by the boilers.

The baking of the product usually requires 15 to 20 minutes. Once the product exits the oven, it is allowed to cool while it is transferred via conveyor to the slicing and packaging area. Once sliced and packaged, code dates are printed (DATE) on the package, the product is shipped to customers by truck.

Purpose of Application

On November 1, 2024, the facility submitted an application (No. 29495) requesting the construction and operation of Bread Oven BD3 and Bun Oven BN3 to replace the bread oven on Bread Line BD2 and bun oven on Bun Line BN2, and to remove Bread Line BD1 and Bun Line BN1. The Public Advisory started on November 11, 2024 and expired on December 11, 2024.

On February 11, 2025, the facility submitted additional information to request the replacement of three existing silos (SL1, SL2, and SL3) with three new silos (SL4, SL5, and SL6) and the replacement of two natural gas-fired boilers BL1 and BL2 (6.659 MMBtu/hr each) with two new natural gas-fired boilers BL3 and BL4 (2.2 MMBtu/hr each).

Updated Equipment List

Emission Units			Associated Control Devices	
Source Code	**Description**	**Installation Date**	**Source Code**	**Description**
~~BD1~~	~~Bread Oven #1, 4.18 MMBtu/hr~~	existing	--	--
~~BD2~~	~~Bread Oven #2, 4.18 MMBtu/hr~~	existing	--	--
BD3*	**Bread Oven #3, 7.54 MMBtu/hr**	**2025**	--	--
~~BN1~~	~~Bun Oven #1, 4.27 MMBtu/hr~~	existing	--	--
~~BN2~~	~~Bun Oven #2, 4.27 MMBtu/hr~~	existing	--	--
BN3*	**Bun Oven #3, 4.84 MMBtu/hr**	**2025**	--	--
SL1	Flour Silo #1 (To be Replaced in 2025)	existing	--	--
SL2	Flour Silo #2 (To be Replaced in 2025)	existing	--	--
SL3	Flour Silo #3 (To be Replaced in 2025)	existing	--	--
SL4*	**Flour Silo #4**	**2025**	--	--
SL5*	**Flour Silo #5**	**2025**	--	--
SL6*	**Flour Silo #6**	**2025**	--	--
GEN1	Diesel Emergency Generator, 237 bhp	2009	--	--
DATE	Label Printing	existing	--	--
MICS	Parts Washers and Chain Lubricant	existing	--	--

*Proposed within current application. Upon and after the startup of Silos SL4, SL5, and/or SL6, the Permittee shall remove the Silos SL1, SL2, and/or SL3 from the operation permanently and notify Division in writing within 15 days of the event(s).

Storage Tanks

Source Code	Capacity (gallons)	Contents	Installation Date	True Vapor Pressure (psia)
T1	2600	Soy Oil Tank #1	existing	Negligible
T2	2600	Soy Oil Tank #2	existing	Negligible
T3	2600	Soy Oil Tank #3	existing	Negligible
T4	2600	Soy Oil Tank #4	existing	Negligible
T5	530	Garage Used Oil Tank	existing	Negligible
T6	567	Garage Motor Oil Tank	existing	Negligible
T7	265	Bakery Used Oil Tank	existing	Negligible
T8	330	Emergency Generator Diesel Tank	existing	Negligible
T9	11000	Wastewater Tank	existing	Negligible

Fuel Burning Equipment

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date
BL1	6.659	Natural Gas-fired Boiler (To be Replaced in 2025)	2003	2003
BL2	6.659	Natural Gas-fired Boiler (To be Replaced in 2025)	2003	2003
BL3*	**2.2**	**Natural Gas-fired Boiler**	**2025**	**2025**
BL4*	**2.2**	**Natural Gas-fired Boiler**	**2025**	**2025**

*Proposed within current application. Upon and after the startup of Boilers BL3 and/or BL4, the Permittee shall remove Boilers BL1 and/or BL2 from the operation permanently and notify Division in writing within 15 days of the event(s).

Note that the emergency generator (ID No. GEN1) is exempt from permitting and is therefore not included in the permit.

Emissions Summary

Baking occurs in the tunnel oven, which causes expansion of the baked good to final volume, crust formation, yeast and enzymatic activity in activation, coagulation of the dough proteins, partial gelatinization of the starch, and reduction of product moisture, all of which are necessary to produce high-quality, salable products. To accomplish all of these product and process effects in the proper sequence, the ovens typically have from three to eight temperature gradient zones which are maintained in critical balance. Emissions are generated in the oven by two processes: the combustion of natural gas and off-gassing from the products themselves. Off-gasses are generated as a result of the fermentation process.

The emissions of concern are VOC compounds from the baking ovens, printing activities, and combustion units. A portion of the VOC emissions is a HAP—acetaldehyde. Stack testing was performed at a similar Flowers Foods facility under a worst-case scenario that indicated acetaldehyde emissions of 0.42 lb/hr compared to VOC emissions of 12.09 lb/hr. Therefore, acetaldehyde emissions are estimated to be 3.5 percent of VOC emissions. When the baking process VOC emissions are limited at 90 tpy, the expected acetaldehyde emissions are 3.13 tpy, which is less than 10 tpy. There is no VOC emission control at the facility. The other emissions are from combustion units and silos, which are particulate matter (PM), Nitrogen Oxides (NOX), Sulfur Dioxide (SO_2), and Carbon Monoxide (CO).

Facility-Wide Emissions
(in tons per year)

Pollutant	Potential Emissions			Actual Emissions		
	Before Mod.	After Mod.	Emissions Change	Before Mod.	After Mod.	Emissions Change
PM/PM_{10}/$PM_{2.5}$	1.53/1.14/1.08	1.09/0.70/0.59	-0.44/-0.44/-0.49	<1.53/1.14/1.08	<1.09/0.70/0.59	<-0.44/-0.44/-0.49
NOx	13.27	7.50	-5.77	<13.27	<7.50	<-5.77
SO_2	0.08	0.044	-0.036	<0.08	<0.044	<-0.036
CO	11.24	6.39	-4.85	<11.24	<6.39	<-4.85
VOC (facility wide)	<100	<99	-1	<100	<99	-1
VOC (bread and bun baking)	<90	<90	0	<90	<90	0
Max. Individual HAP	<3.15	<3.15	0	<3.15	<3.15	0
Total HAP	<3.40	<3.29	-0.11	<3.40	<3.29	-0.11
Total GHG (if applicable)	15,564	8,762	-6,802	<15,564	<8,762	<-6,802

Regulatory Applicability

40 CFR 60 Subpart Dc – Small Steam Generating Units. NSPS Subpart Dc applies to steam generating units for which construction commenced after June 9, 1989, with a heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr. The proposed boilers BL3 and BL4 are both less than 10 MMBtu/hr, therefore, they are not subject to 40 CFR 60 Subpart Dc. The boilers, however, are subject to Georgia Rule 391-3-1-.02(2)(d). Since the new boilers will fire exclusively on natural gas, and natural gas is a clean fuel, compliance with the GA Rule (d) PM and visible emission limits are always expected.

The new silos SL4, SL5, and SL6 are subject to Georgia Rules (b) and (e).

The new Bread Oven BD3 and Bun Oven BN3 will still be subject to Georgia Rules (b), (e), and (g).

The facility wide VOC emissions limit has been modified to exclude the natural gas combustion VOC emissions from ovens and boilers (0.4 tpy).

Permit Conditions

Condition 2.1 has been modified to limit the entire facility (except natural gas combustion) volatile organic compound (VOC) emissions in an amount equal to or exceeding 99.0 tons during any consecutive twelve-month period. Potential VOC emissions from natural gas combustion is less than 1 tpy. The 99.0 tpy VOC limit will simplify VOC emissions tracking. It also allows for minor additions of natural gas sources provided the PTE remains less than 1 tpy total.

Condition 2.5 has been modified to specify natural gas as the only fuel allowed for the ovens and boilers. The fuel requirement will make all boilers as gas-fired boilers defined in 40 CFR 63 Subpart JJJJJJ and therefore be exempt from the rule.

Condition 2.6 has been added to include Georgia Rule 391-3-1-.02(2)(d) for the boilers.

Conditions 7.6 and 7.7 have been modified to change the VOC recordkeeping and reporting requirements from 8.33/100 tpy to 8.25/99 tpy based on Condition 2.1.

Condition 8.3 requires the facility to remove Boilers BL1 and BL2 from the operation permanently and notify Division in writing within 15 days of the event(s) after the initial startup of Boilers BL3 and BL4.

Condition 8.4 requires the facility to remove Silos SL1, SL2, and SL3 from the operation permanently and notify Division in writing within 15 days of the event(s) after the initial startup of Silos SL4, SL5, and SL6.

Toxic Impact Assessment

The facility had a toxic impact assessment in 2006. Since the facility has a facility wide VOC limit of 99 tpy and 90 tpy VOC limit for bread and bun baking processes. The maximum TAPs emissions are unchanged. A TIA is not required.

Summary & Recommendations

I recommend that Air Quality Permit Amendment No. 2051-051-0225-S-01-1 be issued to Derst Bakery Company for the removal of Bread Line BD1 and Bun Line BN1; the replacement of the bread oven on Bread Line BD2 and bun oven on Bun Line BN2 with Bread Oven BD3 and Bun Oven BN3; the replacement of three existing silos (SL1, SL2, and SL3) with three new silos (SL4, SL5 and SL6); and the replacement of two natural gas-fired boilers BL1 and BL2 (6.659 MMBtu/hr each) with two new natural gas-fired boilers BL3 and BL4 (2.2 MMBtu/hr each). The Coastal District Office continues to be responsible for the inspections and compliance oversight of this facility. The Public Advisory started on November 11, 2024 and expired on December 11, 2024. No comments were received.

Addendum to Narrative

The 30-day public review started on month day, year and ended on month day, year. Comments were/were not received by the Division.

//If comments were received, state the commenter, the date the comments were received in the above paragraph. All explanations of any changes should be addressed below.//