



west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION/FACT SHEET

B BACKGROUND INFORMATION

Application No.:	R13-2005D
Plant ID No.:	011-00062
Applicant:	Earthgrains Baking Companies, Inc.
Facility Name:	Huntington
Location:	Huntington
NAICS Code:	311812
Application Type:	Modification
Received Date:	August 15, 2013
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1,000.00
Date Received:	August 28, 2013
Complete Date:	September 15, 2013
Due Date:	December 14, 2013
Applicant Ad Date:	August 1, 2013
Newspaper:	<i>The Herald-Dispatch</i>
UTM's:	Easting: 377.5 km Northing: 4,254.5 km Zone: 17
Description:	The application is for the increase in the annual production limit for the BP Bun Oven.

DESCRIPTION OF PROCESS

The general process involves receipt of ingredients (including flour), mixing of ingredients to produce dough, shaping and dividing the dough, proofing the dough pieces under humidified conditions using steam from the boilers, baking the product in the ovens, cooling the product and packaging the product for distribution to the customer

DESCRIPTION OF MODIFICATION

Production of bread and buns at the facility has been steadily increasing during the past couple of years. Consequently, the number of hours each oven is required to run product has increased also. Earthgrains has evaluated the limits imposed by Permit R13-2005C and has

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determined that the limit for the 18 Tray Baker Perkins 970 Oven (3S) of 7,800 tons is not sufficient to allow for the increased operating time. Earthgrains is proposing to increase the limit to 11,000 tons of buns per year, which will allow sufficient capacity for production, while maintaining the facility's status as a minor source under West Virginia's Major Source Permitting Rule (45 CSR14).

SITE INSPECTION

The facility is a major source under the Title V of Clean Air Act and is routinely inspected to verify compliance. This facility was last inspected by Mr. Andy Grimm, a Compliance and Enforcement inspector, on August 23, 2012. On this inspection, Mr. Grimm determined that the facility has been operating in compliance with the facility's operating permit. No further inspection for the purposes of this permitting action is warranted.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

VOC Emissions from Yeast Fermentation:

Ethanol, which is classified as a volatile organic compound (VOC), is produced in the bread baking process.

1 Sugar + Water + Yeast → 4 Ethanol + Carbon Dioxide

Stack testing performed on the bakery ovens during 1994 and 1995 yielded an emission factor for the bread oven of 3.053 lb VOC/1,000 lb bread baked (6.106 lb/ton). Similarly, the emission factor for bun baking in the Earthgrains ovens was 3.437 lb VOC/1,000 lb bun baked (6.874 lb/ton).

As an example, the potential to emit for Bread Oven [3S] is calculated below:

$(11,000 \text{ tons buns/yr}) \times (6.874 \text{ lbs VOC/ton bread}) \times (1 \text{ ton VOC}/2000 \text{ lb VOC}) = 37.8 \text{ ton VOC/year.}$

The actual increase in the permitted VOC limit is 11 tons per year. The hourly VOC rate for the BP Bun Oven as permitted in R13-2006C will remain the same at 14.6 pounds per hour.

Carbon dioxide equivalent (CO₂e) emissions were estimated based on a molar ratio of 1 lb-mole of ethanol released to 0.96 lb of CO₂e released. This approach yields an estimated 36.3 tons per year of CO₂e from the BP bun oven. This proposed change will result in an increase of 10.6 tons of CO₂e per year.

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Emission Calculations for Combustion of Natural Gas:

The maximum amount of fuel used in the BP Bun Oven was calculated by using the maximum design heat input rating for the oven. The calculated fuel usage numbers are listed in table N.2. The maximum hourly design rate (MDHR) is calculated based on the maximum design heat input rating for each oven and AP-42 default heating values of natural gas (1,020 BTU/scf). Potential emissions from combustion of the emission units are based on the MDHR multiplied by the emission factors for the fuel, from AP-42, Section 1.4.

Pollutant	Emission Factor	Annual Rate (TPY)	Increase in Emissions (TPY)
PM/PM ₁₀ /PM _{2.5} Filterable	1.9 lb/MMcf	0.02	0.01
PM Condensable Fraction	5.7 lb/MMcf	0.05	0.02
Total PM	7.6 lb/MMcf	0.07	0.03
Sulfur Dioxide (SO ₂)	0.6 lb/MMcf	<0.01	0.001
Oxides of Nitrogen (NO _x)	100 lb/MMcf	0.87	0.40
Carbon Monoxide (CO)	84 lb/MMcf	0.73	0.33
Volatile Organic Compounds (VOCs)	5.5 lb/MMcf	0.05	0.02
Carbon Dioxide Equivalent (CO _{2e})	120,000 lb/MMcf	1,038	474

REGULATORY APPLICABILITY

This facility is a major source subject to Title V with the potential to emit 100 tons or more of a criteria pollutant (VOCs). The facility is located in Cabell County, which means the facility is subject to 45 CSR 21. Because the facility has maximum theoretical VOC emissions of greater than 100 tons per year, the facility is subject to Section 40 of 45 CSR 21, which means that the source must prepare and submit a Reasonable Available Control Technology (RACT) control plan for the modified source.

The applicant followed the “Top Down” approach in identifying potentially effective control technologies for the BP Bun Oven. Earthgrains eliminated carbon adsorption, condenser and bio filtration technologies as technically infeasible. At this point of the analysis, the remaining control technologies were catalytic oxidizer and regenerative thermal oxidizer (RTO) technologies. Both of these oxidizing technologies can offer nearly the same level of control for emissions with VOC concentrations greater than 100 ppm, which is 95%.

Earthgrains is aware that catalytic oxidation has been found to be feasible in some determinations in the United States. However, Earthgrains is not aware of any bakery using an

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RTO to control VOCs. Thus, Earthgrains focused the cost effectiveness portion of the analysis using catalytic oxidizer technology, which is summarized in the following table

Table #2 Summary of Economic Analysis Using Catalytic Oxidizer		
Annualized Cost	Actual Project VOC Emission Reduction (tpy)	Cost Effectiveness for Actual Projected VOC Emissions (\$/tons of VOC removed)
\$293,220	35.91	\$8,165.41

The writer reviewed the RACT/BACT/LAER Clearinghouse and found several entries which catalytic oxidizers were BACT (Best Available Control Technology). Looking at these determinations, the Cost Effectiveness ranged from \$921 to \$3,827 per ton of VOCs reduced. One determination was for a bun oven line that found that use of catalytic oxidizer to VOCs from proof box and oven to not be feasible at \$3,402 per ton, but only controlling the oven emissions at \$921 per ton was BACT with a catalytic oxidizer. The writer found that most of these determinations were BACT determinations. Second, most determinations that found that controls was feasible were of larger ovens than the BP Bun Oven.

Earthgrains concluded that the catalytic oxidizer is not economically feasible as RACT for the BP Bun Oven. Based on the analysis in the application and entries in the RACT/BACT/LAER Clearinghouse, the writer concurs with the applicant's conclusion. Therefore, Earthgrains has satisfied Section 40 by making an acceptable case that controls on the BP Bun Oven are not feasible and an alternative emission limit of 37.8 tons per year be proposed to the Director for consideration.

This modification does not affect the facility in general or the BP Bun Oven specific ability to comply with any other rule or regulation. The facility will remain as a minor source under Prevention of Significant Deterioration (45CSR14) and a major source under Title V (45 CSR30).

Earthgrains prepared and submitted a complete application, paid the filing fee, and published a Class I Legal ad in *The Herald-Dispatch* on August 1, 2013. This proposed modification does not trigger any additional rule or regulations.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The change proposed in the application will not emit any pollutants that aren't already being emitted by the BP Bun Oven at the facility. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The writer recommends that the current monitoring requirements remain in place, which is tracking fuel usage and production of the BP Bun Oven.

CHANGES TO PERMIT R13-2005C

For the most part, the biggest difference between Permit R13-2005C and the proposed draft is that changes to the production, natural gas, and emissions limits for the BP Bun Oven as proposed in the application.

The writer reviewed the existing conditions and found the sulfur dioxide limits in Condition 4.1.4. not necessary this particular source. The writer recommends omitting the sulfur dioxide emission limits in Condition 4.1.2. for the baking ovens at the facility. All three of these ovens only use natural gas and have a design heat input of less than 10 MMBtu/hr. According to 45 CSR §10-10.1 and 10.3, these ovens are not subject to the sulfur dioxide emission standard of Rule 10. This recommendation falls within the Policy for Permitting Low Emitting Sources, which implies that natural gas burning sources with criteria pollutant emissions less than 2 tpy do not need emission limits established limits.

Condition 4.1.4. requires the permittee to comply with applicable provisions of 45 CSR7, 45 CSR 10, 45 CSR13, 45 CSR 21, and 45 CSR30 provided that the permittee shall comply with any more stringent requirement as may be set forth under this permit. The writer view this condition as redundant. A source must comply with an applicable requirement even if it is not stated in the permit. Second, the Title V permitting process should review all the applicable requirements at least once every five years and be included in the facility's operating permit. Thus, Condition 4.1.4. will not be included in the draft permit.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the facility will meet all the requirements of the applicable rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting Earthgrains Baking Companies Inc. a Rule 13 modification permit for their commercial bakery located in Huntington, WV.

Edward S. Andrews, P.E.
Engineer

December 20, 2013
Date

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