Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

February 23, 2017

Mr. David Muskopf
Ken's Foods, Inc.
One D'Angelo Drive
Marlborough, MA 01752

RE: Marlborough
Transmittal No.: X272928
Application No.: CE-16-030
Class: *SM-50*
FMF No.: 133684
AIR QUALITY PLAN APPROVAL

Dear Mr. Muskopf:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Limited Plan Application ("Application") listed above. This Application proposes to modify Plan Approval Transmittal No. X262867, which authorized the installation and operation of an electric generating engine at your food processing facility located at One D'Angelo Drive in Marlborough, Massachusetts ("Facility").

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-O, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Facility owner/operator ("Permittee") must comply in order for the Facility to be operated in compliance with this Plan Approval.

1. DESCRIPTION OF FACILITY AND APPLICATION

A. History

The Permittee operates an anaerobic wastewater treatment system to treat biodegradable waste materials from its food manufacturing processes. This system generates biogas containing about 60% methane. On September 14, 2001, MassDEP issued Plan Approval Transmittal No.101412 to the Permittee for the installation of a flare and a boiler to burn the biogas. The flare and boiler were designated Emission Unit ("EU") #1 and #2, respectively.

On March 23, 2015, MassDEP issued Plan Approval Transmittal No. X262867 for a new engine generator set to burn biogas previously burned in the flare and boiler. This unit is a Caterpillar Model No. CG170-12 engine generator set rated at 1,200 kilowatts and is designated as EU #3. At full load, the engine burns approximately 287 standard cubic feet per minute of biogas at about 600 British Thermal Units ("BTU") lower heating value ("LHV") per cubic foot. The engine also burns a lesser amount of pipeline natural gas to supplement the biogas when necessary. EU #1 and #2 remain in operation to burn biogas in excess of what the engine can burn.

B. Purpose of Plan Approval Modification

On September 21, 2016, the Permittee conducted emission testing on the new engine to show compliance with the approved emission limits.

The test results indicated that the engine did not meet the limits for particulate matter (PM) (using EPA Test Methods 5 and 202) and carbon dioxide (CO_2). The limits for PM were 0.03 pounds per megawatt-hour and 0.04 pounds per hour; the test results were 0.179 pounds per megawatt-hour and 0.205 pounds per hour. The limit for CO_2 was 1,060 pounds per megawatt-hour; the test results were 1,108 pounds per megawatt-hour.

On December 14, 2016, the Permittee submitted the present Application Transmittal No. X272928 to request modification of the Plan Approval limits for PM and CO_2. This Application proposed new limits which the Permittee considered to be achievable numbers: 0.24 pounds PM per megawatt-hour, and 1,272 pounds CO_2 per megawatt-hour.

MassDEP has reviewed the proposed new PM and CO_2 limits and has found the following:

1. The original PM limit of 0.03 pounds per megawatt-hour was the MassDEP Top-Case BACT number. MassDEP derived this number using a calculation which sought to estimate engine PM emissions based on boiler PM emissions. The calculation used conservative assumptions which produced a very low estimate for the engine PM emissions. MassDEP has since then received more realistic data on typical emissions from engines firing biogas from anaerobic

digestion facilities, which show that the expected PM emissions are higher than the original 0.03 pounds per megawatt-hour. MassDEP considers the requested limit of 0.24 pounds PM per megawatt-hour (equivalent to 0.08 grams per brake horsepower-hour) to be consistent with current BACT for biogas-fired engines at anaerobic digestion facilities. MassDEP also notes that the increased numbers for PM emissions will not cause exceedance of the National Ambient Air Quality Standards ("NAAQS") for PM, which were modeled for as discussed below.

2. The original CO_2 limit of 1060 pounds per megawatt-hour was close to the MassDEP Top-Case BACT limit for biogas fired engines, which was 1000 pounds per megawatt-hour. MassDEP has found that because the CO_2 measured during emission testing is a combination of biogenic CO_2 and CO_2 from combustion of the biogenic methane, there is uncertainty in the resulting estimate of CO_2 from combustion of methane. Because of the uncertainty, MassDEP has discontinued setting CO_2 limits in recent biogas fired engine approvals. Consistent with these other approvals, MassDEP is removing the CO_2 limit from this Plan Approval.

3. MassDEP has also reviewed the restriction it imposed on exporting power offsite, which was stated in Table 6, Special Condition 6, as "Energy produced by the engine/generator (EU3) shall be used for on-site electric power and heating use only." MassDEP notes the following:

    a. MassDEP has approved other biogas-fired engines which have not had this restriction (they have been allowed to export power offsite).

    b. The restriction is not necessary to achieve compliance with the NAAQS for the various air contaminants from the facility, since this restriction does not affect the inputs to the air dispersion modeling (discussed below) which showed compliance with the NAAQS.

Based on these considerations, MassDEP is accordingly issuing this revised Plan Approval. The revisions are as follows:

1. In Table 2, the PM limit in pounds per megawatt-hour is changed from 0.03 to 0.24, and the pounds per hour and tons per year limits are also changed accordingly.

2. In Table 2, the CO_2 limits are removed, consistent with other recently issued MassDEP Plan Approvals for biogas-fired engines.

3. Table 6, Special Condition 6, which stated "Energy produced by the engine/generator (EU3) shall be used for on-site electric power and heating use only." has been removed.

This Plan Approval Transmittal No. X272928 supersedes Plan Approval Transmittal No. X262867. The underlying plan application materials for Transmittal No. X262867 remain applicable where not superseded by Plan Approval No. X272928.

C. Applicable Regulatory Requirements

1. State Regulations:

This project is required to have Best Available Control Technology ("BACT") under 310 CMR 7.02. MassDEP has determined that the following represents BACT for this project:

a. Nitrogen Oxides ("NO_x"): BACT for NO_x will be NO_x emissions not to exceed 0.5 grams per brake horsepower-hour (1.53 pounds per megawatt-hour), which will be achieved by the installation and operation of a lean-burn technology engine.

b. Carbon Monoxide ("CO") and Volatile Organic Compounds ("VOC"): BACT for CO and VOC will be CO emissions not to exceed 0.2 grams per brake horsepower-hour (0.6 pounds per megawatt-hour) and VOC emissions not to exceed 0.1 grams per brake horsepower-hour (0.3 pounds per megawatt-hour), which will be achieved by the use of a catalytic oxidation catalyst.

c. Particulate Matter ("PM"). BACT for PM will be PM emissions not to exceed 0.08 grams per brake horsepower-hour (0.24 pounds per megawatt-hour).

This project is complying with the requirements of 310 CMR 7.02(5)(c) (Comprehensive Plan Application Requirements) in lieu of complying with the requirements of 310 CMR 7.43 (ERP for Engines and Turbines) because the engine will be burning digester gas.

2. Federal Regulations:

The Permittee has indicated that the Project is subject to 40 CFR 60 Subpart JJJJ and 40 CFR 63 Subpart ZZZZ. Since MassDEP has not accepted delegation for these Subparts for sources which are not subject to 310 CMR Appendix C, the Permittee is advised to consult with EPA Region 1 at 5 Post Office Square, Suite 100, Boston, MA 02109-3912, telephone: (617)918-1111. Other applicable requirements may include notification, record keeping, and reporting requirements.

The project is subject to the National Ambient Air Quality Standards ("NAAQS"). To estimate the impacts to the ambient air from the proposed facility, the Permittee used standard air dispersion models to project maximum ground level impacts from the estimated emissions. This modeling indicated the NAAQS would not be exceeded. MassDEP has determined that

the increase in PM emissions from the revised PM emission limits will also not cause any exceedance of the PM NAAQS.

Proposed permitted emissions from the proposed construction are less than the applicable thresholds for major New Source Review including Prevention of Significant Deterioration (PSD) review under 40 CFR Part 51, Section 52.21, and Emission Offsets and Nonattainment Review under 310 CMR 7.00 Appendix A.

2. EMISSION UNIT IDENTIFICATION

Each Emission Unit ("EU") identified in Table 1 is subject to and regulated by this Plan Approval:

Table 1

EU	Description	Design Capacity	Pollution Control Device (PCD)
3	Caterpillar Model No. CG170-12 engine	10.3 MMBtu per hour (Note 1) 1,200 kilowatts	Oxidation Catalyst

Table 1 Key:

EU = Emission Unit Number
PCD = Pollution Control Device
MMBtu =Million British Thermal Units

Table 1 Notes:

Note 1: Based on biogas fuel only with heat content of approximately 600 Btu/scf (LHV) at 100% load

3. APPLICABLE REQUIREMENTS

A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2:

Table 2						
EU	**Operational / Production Limit**	**Air Contaminant**	**Emission Limit (Note 1)**			
3	1. Natural Gas limit—24,282,743 cubic feet per year (Note 2)		lb/MWh (Note 3)	g/bhp-hr	lb/hr	TPY (Note 4)
		PM	0.24	0.08	0.30	1.3
		NO_x	1.53	0.5	1.88	8.25
		CO	0.6	0.2	0.74	3.24
		VOC	0.3	0.1	0.37	1.62
		SO_2	0.5	0.2	0.60	2.61
		H_2S	Not to exceed 200 ppmvd in biogas			
		Opacity	Stack emissions shall not exceed 5%, except 5 to 10% for no more than 2 minutes during any one hour			

Table 2 Key:

EU = Emission Unit Number
CO = Carbon Monoxide
PM = Total Particulate Matter, both filterable and condensable as measured by EPA Methods 5 & 202
lb/hr = pounds per hour
TPY = tons per consecutive12-month period
lb/MWhr = pounds per megawatt hour
NO_x = Nitrogen Oxides
SO_2 = Sulfur Dioxide
g/bhp-hr = grams per brake horsepower-hour
VOC = Volatile Organic Compounds
HRSG = Heat Recovery Steam Generator (unfired)
ppmvd = parts per million by volume, dry

Table 2 Notes

Note 1: Compliance with the lb/MWhr and lb/hr emission limits shall be based on the results of an applicable USEPA Reference Test Method.

Note 2: Biogas (primary fuel) shall be burned when available. Natural gas shall be burned only during initial commissioning, start up and/or limited time basis when biogas is not available or of sufficient quantity to keep the engine running at the required load.

Note 3: lb/MWh emission limits shall only apply to engine/generator loads of 50% or greater.

Note 4: The TPY limits are based on a hypothetical 94, 070, 828 cubic feet per year of biogas and maximum of 36,468,515 cubic feet per year of natural gas for all contaminants except SO_2. The TPY limit for SO_2 is based on 100 percent biogas usage.

B. COMPLIANCE DEMONSTRATION

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5:

Table 3

EU	Monitoring and Testing Requirements
3	1. The Permittee shall continuously monitor the exhaust gas temperature at the inlet to the oxidation catalyst, the engine backpressure, and the differential pressure across the oxidation catalyst.
	2. The Permittee shall conduct compliance testing on the engine, while it is operating at or near design capacity, to demonstrate compliance with the emission limitations specified in Table 2 above. The Permittee shall complete all compliance testing within 180 days of initial start-up.
	3. The Permittee shall construct the stack serving the engine to accommodate the emissions testing requirements as stipulated in 40 CFR Part 60, Appendix A or the latest test methods recommended by USEPA.
	4. Not later than 150 days after initial startup of the engine, the Permittee shall conduct sound level monitoring of the actual sound levels produced by the equipment, to verify compliance with the MassDEP noise guidelines.
	5. The Permittee shall equip the engine with a separate fuel meter for each type of fuel, and all fuel usage shall be monitored.
Facility-Wide	6. The Permittee shall monitor weekly the hydrogen sulfide concentration (in ppm by volume) exiting the Digester Tank before the biogas is combusted to document compliance with the emission limitations contained in Table 2. H_2S monitoring may be conducted using colorimetric detection tubes.

Table 3 Key:

EU = Emission Unit Number

H_2S = Hydrogen Sulfide

Table 4

EU	Record Keeping Requirements
Facility-wide	1. The Permittee shall maintain weekly records on-site of the H_2S concentration (in ppm by volume) exiting the Digester Tank before the biogas is combusted to document compliance with the emission limitations contained in Table 2.

Table 4	
EU	**Record Keeping Requirements**
	2. The Permittee shall continuously record the exhaust gas temperature at the inlet to the oxidation catalyst, the engine backpressure, and the differential pressure across the oxidation catalyst.
	3. The Permittee shall record with fuel meters the amount of biogas and natural gas burned in the engine.
	4. The Permittee shall maintain adequate records on-site to demonstrate compliance status with all operational, production, and emission limits contained in Table 2 above. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve-month period (current month plus prior eleven months). These records shall be compiled no later than the 15th day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping.
	5. The Permittee shall maintain records of monitoring and testing as required by Table 3.
	6. The Permittee shall maintain a copy of this Plan Approval, underlying Application and the most up-to-date SOMP for the EU and PCD approved herein on-site.
	7. The Permittee shall maintain a record of routine maintenance activities performed on the approved EU, PCD and monitoring equipment. The records shall include, at a minimum, the type or a description of the maintenance performed and the date and time the work was completed.
	8. The Permittee shall maintain a record of all malfunctions affecting air contaminant emission rates on the approved EU and PCD and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; corrective actions taken; the date and time corrective actions were initiated and completed; and the date and time emission rates and monitoring equipment returned to compliant operation.
	9. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	10. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	11. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.

Table 4 Key:

EU = Emission Unit Number
SOMP = Standard Operating and Maintenance Procedure
PCD = Pollution Control Device
USEPA = United States Environmental Protection Agency

Table 5	
EU	**Reporting Requirements**
3	1. The Permittee shall submit to MassDEP for approval a stack emission pretest protocol, and the sound level monitoring protocol, at least 30 days prior to emission testing, for emission testing as defined in Table 3 Monitoring and Testing Requirements.
	2. The Permittee shall submit to MassDEP a final stack emission test results report, and the sound level monitoring report, within 60 days after emission testing, for emission testing as defined in Table 3 Monitoring and Testing Requirements.
Facility-wide	3. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a "Responsible Official" as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).
	4. The Permittee shall notify the Central Regional Office of MassDEP, BAW Permit Chief by telephone: 508-767-2845, email: CERO.Air@massmail.state.ma.us and Roseanna.Stanley@state.ma.us, or fax : 508-792-7621, as soon as possible, but no later than three (3) business day after discovery of an exceedance(s) of Table 2 requirements. A written report shall be submitted to the Permit Chief at MassDEP within ten (10) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
	5. The Permittee shall report every three years to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form.

Table 5 Key:

EU = Emission Unit Number

4. SPECIAL TERMS AND CONDITIONS

A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

Table 6	
EU	**Special Terms and Conditions**
3	1. The Permittee shall operate the oxidation catalyst at all times the engine is running.
	2. The Permittee shall test the oxidation catalyst in accordance with the manufacturer's recommendations to ensure the catalyst continues to perform to achieve the required emissions reduction.

Table 6	
EU	**Special Terms and Conditions**
	3. The Permittee shall maintain the engine backpressure at less than 20 inches water column or as determined during startup, and the oxidation catalyst differential pressure within the range recommended by the manufacturer.
	4. The Permittee shall ensure the inlet temperature to the oxidation catalyst be within 482 °F to 1250 °F or as determined during startup.
	5. The Permittee shall burn biogas (primary fuel) when available. Natural gas shall be burned as a supplemental fuel only during initial commissioning, start up and/or on a limited supplemental basis when biogas is not available or of sufficient quantity to keep the engine running at the required load.
	6. Any prior Plan Approvals issued under 310 CMR 7.02 shall remain in effect unless specifically changed or superseded by this Plan Approval. The Facility shall not exceed the emission limits and shall comply with approved conditions specified in the prior Plan Approval(s) unless specifically altered by this Plan Approval.

Table 6 Key:

EU = Emission Unit Number °F = degrees Fahrenheit

B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including, but not limited to, rain protection devices known as "shanty caps" and "egg beaters."

C. The Permittee shall install and utilize exhaust stacks with the following parameters, as contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

Table 7				
EU	**Stack Height Above Ground (feet)**	**Stack Inside Exit Dimensions**	**Stack Gas Exit Velocity Range (feet per second)**	**Stack Gas Exit Temperature Range (°F)**
3	59	1.67 feet	21-61	363-700

Table 7 Key:

EU = Emission Unit Number °F = Degree Fahrenheit

5. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).

B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.

C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.

D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.

F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.

G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.

H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.

I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.

J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions," which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

7. APPEAL PROCESS

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Enclosed is a stamped approved copy of the application submittal.

Should you have any questions concerning this Plan Approval, please contact Paul Dwiggins by telephone at 508-767-2760, or in writing at the letterhead address.

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Roseanna E. Stanley
Permit Chief
Bureau of Air and Waste

Enclosures:

- Adjudicatory Hearing Fee Transmittal Form
- Stamped Plan Application

ecc: Marlborough Board of Health
Marlborough Fire Department
MassDEP/Boston - Yi Tian
Lisa Wilkinson, SCS Engineers