Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS/SUMMARY

Conditional Major, Operating
Permit: F-25-009
Bluegrass Ingredients
Springfield, KY 40069
January 27, 2025
Kayla Thurman, Reviewer

SOURCE ID:	21-229-00009
AGENCY INTEREST:	11649
ACTIVITY:	APE20240001

Table of Contents

SECTION 1 – SOURCE DESCRIPTION

SIC Code: 2023, Dry, Condensed, and Evaporated Dairy Product Manufacturing

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☐ Yes ☒ No If Yes, Category:

County: Washington
Nonattainment Area ☒ N/A ☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ Ozone ☐ Lead

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☒ PM_{10} ☒ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☒ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No

If yes, list which pollutant(s):

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:
The facility primarily produces dried milk and dairy products for the food industry. Completed products include dried cheese, cream, non-dairy powders, and butter.

SECTION 2 – CURRENT APPLICATION

Permit Number: F-25-009 Activities: APE20240001

Received: August 5, 2024 Application Complete Date(s): January 21, 2025

Permit Action: ☐ Initial ☒ Renewal ☐ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☐Yes ☒No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐Yes ☒No

Description of Action:

On August 5, 2024, the Division for Air Quality received an application to renew the Conditional Major permit for Bluegrass Ingredients. No changes were requested in the application.

F-25-009 Emissions Summary		
Pollutant	2023 Actual (tpy)	PTE F-25-009 (tpy)*
CO	3.79	18.79
NO_X	4.51	28.92
PT	14.59	34.80
PM_{10}	15.59	34.80
$PM_{2.5}$	4.45	11.27
SO_2	0.03	1.17
VOC	0.25	1.23
Greenhouse Gases (GHGs)		
Carbon Dioxide	5,411	29,719
Methane	0.10	0.51
Nitrous Oxide	0.10	1.62
CO_2 Equivalent (CO_2e)	5,443	30,215
Hazardous Air Pollutants (HAPs)		
Combined HAPs	--	0.42

*No change from F-19-029 R1 PTE

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Unit 01 & 02 Spray Dryers				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM*	40% Opacity	401 KAR 61:020, Section 3(1)(a)	N/A	Visual Observation & Method 9, as needed
	$P \leq 0.50$, $E = 2.58$; $0.50 < P \leq 30$, $E = 4.10P^{0.67}$	401 KAR 61:020, Section 3(2)(a)	70 lb/ton for PM_{10} / PT (Material Balance); 21 lb/ton for $PM_{2.5}$ (EPA $PM_{2.5}$ uncontrolled multiplier of 0.3)	Performance testing and proper operation of control devices

*where P is the Product Weight Rate in tons/hr and E is Maximum Allowable Emission Rate in lb/hr

Initial Construction Date: 1/1959 (Emission Unit 01) & 1/1972 (Emission Unit 02)

Process Description:
Food products are liquefied and the slurry is conveyed into the drying chamber. The product is sprayed by air flow that's heated by natural gas-fired burners. Approximately 50% of the dried product falls to the bottom of the dryer and is conveyed to a packaging operation. Airflow containing the remaining 50% of product is conveyed through a series of cyclones that capture approximately 93% of the product and discharges it to an auger to convey it to packaging. The cyclones are considered an inherent design of the emission units. In order to capture the remaining 7% of product, the units are equipped with wet scrubbers with a minimum 95% control efficiency.

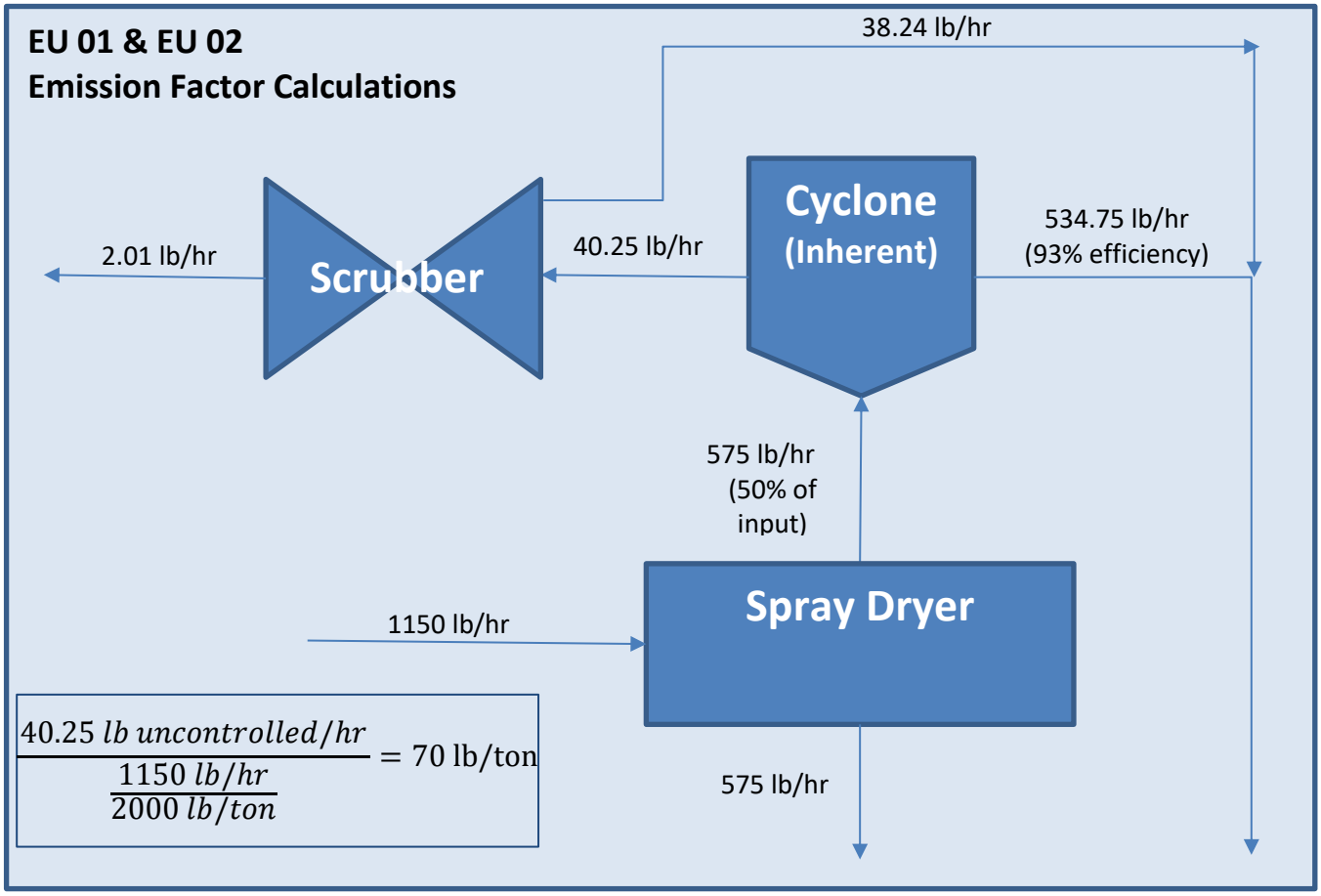
Spray Dryers	Unit 01	Unit 02
Maximum production rate:	1150 lb/hr product	1150 lb/hr product
Heat Input capacity:	5.0 MMBtu/hr	5.0 MMBtu/hr
Fuel Type:	Natural Gas	Natural Gas
Control Equipment:	Wet Scrubber	Wet Scrubber
Manufacturer:	Blaw Knox	Blaw Knox
Construction Date:	1959	1972

Applicable Regulation:
401 KAR 61:020, Existing Process Operations, applicable to each affected facility (the last operation preceding the emission of air contaminants which results in the separation of the air contaminant from the process materials) associated with a process operation, which is not subject to another emission standard with respect to particulates in this chapter, commenced before July 2, 1975.

Comments:
The scrubbers shall be in operation at all times that the spray dryers are in operation. Performance testing was conducted in September of 2020 to demonstrate compliance with particulate emission limits.

Maximum capacity of the units is based off dryer outputs.

Emission Unit 01 & 02 Spray Dryers



Emission Unit 03 Spray Dryer				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM*	$P \leq 0.50$, $E = 2.34$; $0.50 < P \leq 30$, $E = 3.59P^{0.62}$	401 KAR 59:010, Section 3(2)	70 lb/ton for PM_{10} PT (Material Balance); 21 lb/ton for $PM_{2.5}$ (EPA $PM_{2.5}$ uncontrolled multiplier of 0.3)	Performance testing and proper operation of control devices
	20% Opacity	401 KAR 59:010, Section 3(1)(a)	N/A	Visual Observation & US EPA Reference Method 9 as needed

*where P is the Product Weight Rate in tons/hr and E is Maximum Allowable Emission Rate in lb/hr

Initial Construction and Modification Dates: 1/2004; Modified 11/2015

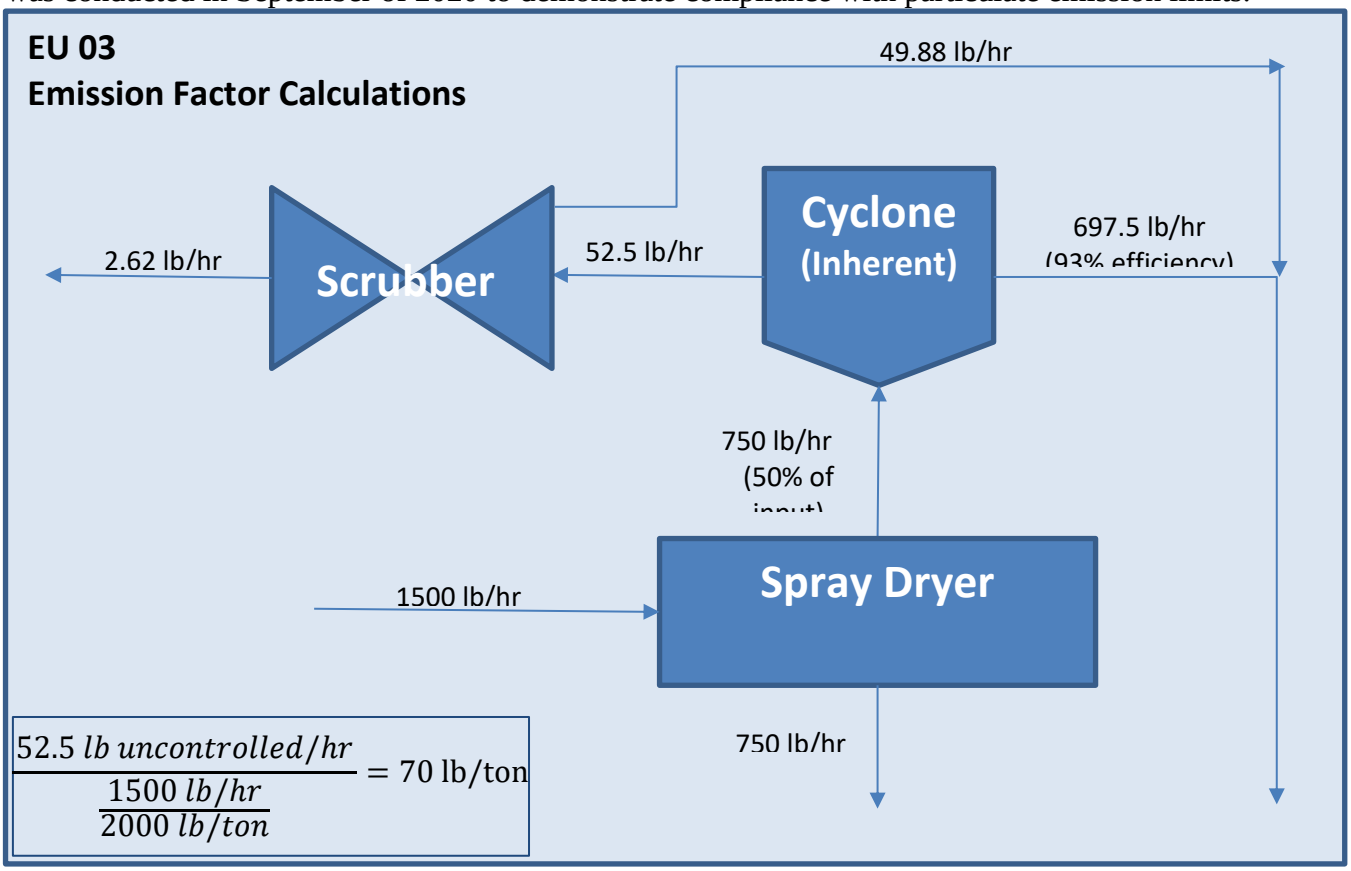
Emission Unit 03 Spray Dryer

Process Description:
Food products are liquefied and the slurry is conveyed into the drying chamber. The product is sprayed by air flow that's heated by natural gas-fired burners. Approximately 50% of the dried product falls to the bottom of the dryer and is conveyed to a packaging operation. Airflow containing the remaining 50% of product is conveyed through a series of cyclones that capture approximately 93% of the product and discharges it to an auger to convey it to packaging. The cyclones are considered an inherent design of the emission units. In order to capture the remaining 7% of product, the units are equipped with wet scrubbers with a minimum 95% control efficiency.

Maximum production rate:	1500 lb/hr product
Heat Input capacity:	7.0 MMBtu/hr
Fuel Type:	Natural Gas
Control Equipment:	Wet Scrubber
Manufacturer:	Blaw Knox

Applicable Regulation:
401 KAR 59:010, New Process Operations, applicable to each affected facility associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR Chapter 59, commenced on or after July 2, 1975.

Comments:
The scrubbers shall be in operation at all times that the spray dryers are in operation. Performance testing was conducted in September of 2020 to demonstrate compliance with particulate emission limits.



Emission Unit 04 & 05 Indirect Heat Exchangers				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	0.62 lb/MMBtu	401 KAR 61:015, Section 4(1)(a)	7.6 lb/MMscf (AP-42 Table 1.4-2)	Assumed compliant while burning NG
	40% Opacity	401 KAR 61:015, Section 4(1)(c)		
SO_2	5.41 lb/MMBtu	401 KAR 61:015, Section 5(1)	0.6 lb/ MMscf (AP-42 Table 1.4-2)	

Initial Construction Date: 1/1962

Process Description:
Process heat is supplied by two (2) boilers.

	EU 04	**EU 05**
Rated Capacity:	10.35 MMBtu/hr	12.5 MMBtu/hr
Fuel Type:	Natural Gas	Natural Gas
Backup Fuel Type:	Propane	Propane
Manufacturer	Continental	Kewanee
Construction Date:	1962	1962

Applicable Regulation:
401 KAR 61:015, Existing Indirect Heat Exchangers, applicable to each indirect heat exchanger having a heat input capacity of more than one (1) MMBtu/hr commenced before April 9, 1972.

Comments:
PM emission limits are established in Appendix A of 401 KAR 61:015 and are determined based on the county's Priority. According to 401 KAR 50:020, Washington County is part of the North Central Kentucky Intrastate Air Quality Control Region and is classified as Priority II for PM. Therefore, allowable PM emissions are to be calculated using the following equation:

$$Y = 1.2825X^{-0.2330}$$

Where Y is the allowable particulate emissions in lb/MMBtu actual heat input and X is (10.35+12.5) MMBtu/hr = 22.85 MMBtu/hr, the total rated heat input capacity of all indirect heat exchangers at the time of installation (determined by 401 KAR 61:015, Section 3(1)).

SO_2 emission limits are established in Appendix B of 401 KAR 61:015 and are determined based on the county's classification, found in 401 KAR 50:025; Washington County is not specifically listed and is therefore a Class V. Class V allowable SO_2 is determined by using the following equation:

$$Y = 8.0189X^{-.1260}$$

Where Y is the allowable sulfur dioxide in lbs/MMBtu actual heat input and X is (10.35+12.5)MMBtu/hr = 22.85 MMBtu/hr, the total rated heat input capacity of all indirect heat exchangers at the time of installation (determined by 401 KAR 61:015, Section 3(1)).

Emission Unit 12 Indirect Heat Exchanger				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	0.42 lb/MMBtu	401 KAR 59:015, Section 4(1)(c)	7.6 lb/MMscf (AP-42 Table 1.4-2)	Assumed compliant while burning NG
	20% Opacity	401 KAR 59:015, Section 4(2)(b)		
SO_2	1.83 lb/MMBtu	401 KAR 59:015, Section 5(1)(c)2.b.	0.6 lb/ MMscf (AP-42 Table 1.4-2)	

Initial Construction Date: 1/2020

Process Description:
The 10.42 MMBtu/hr boiler will replace the 10.35 MMBtu/hr Continental boiler.

Rated Capacity:	10.42 MMBtu/hr
Fuel Type:	Natural Gas
Backup Fuel Type:	Propane
Manufacturer	Apache

Applicable Regulation:
401 KAR 59:015, New Indirect Heat Exchangers, applicable to an indirect heat exchanger having a heat input capacity greater than one (1) MMBtu/hr commenced on or after April 9, 1972.

401 KAR 60:005, Section 2(2)(d), 40 CFR 60.40c to 60.48c (Subpart Dc), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applicable to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 100 MMBtu/h or less, but greater than or equal to 10 MMBtu/h.

Comments:
PM emission limits, Y in lbs/MMBtu, were calculated using the following equation:

$$Y = 0.9634X^{-0.2356}$$

With a total heat input capacity, X, of 33.27 MMBtu/hr (EU04+EU05+EU12).

SO_2 emission limits, Y, were calculated using the following equation:

$$Y = 7.7223X^{-0.4106}$$

With a total heat input capacity, X, of 33.27 MMBtu/hr.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements\Results

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Frequency	Test Method	Permit Limit	Test Result	Thruput and Operating Parameter(s) Established During Test (tons/hr)	Activity Graybar	Date of Compliance Testing
EU 01	Wet Scrubber	PM	To preclude Title V permit	Initial	US EPA Reference Method 5	$4.10P^{0.67}$ = 3.23 lbs/hr	0.69 lbs/hr	P = 0.7015	CMN20110001	11/16/2011 & 11/17/2011
EU 02						$4.10P^{0.67}$ = 3.20 lbs/hr	0.53 lbs/hr	P = 0.691		11/16/2011
EU 03						$3.59P^{0.62}$ = 3.15 lbs/hr	0.24 lbs/hr	P = 0.811		11/17/2011
EU 01	Wet Scrubber	PM	To preclude Title V permit	Initial	US EPA Reference Method 5	$4.10P^{0.67}$ = 3.38	0.19 lb/hr	P = 0.3455	CMN2020001	9/9/2020 & 9/10/2020
EU 02						$4.10P^{0.67}$ = 3.38	0.13 lb/hr	P = 0.368		
EU 03						$3.59P^{0.62}$ = 3.00	0.14 lb/hr	P = 0.6495		

Footnotes: Discrepancy between 2011 test production rates and dryer maximum throughput is presumed to be due to recording dryer input during testing while maximum capacity is based on dryer output.

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
90 tpy of PM/PM_{10} /$PM_{2.5}$ emissions on a 12-month rolling total basis	To preclude the applicability of 401 KAR 52:020, *Title V Permits*	Source-wide

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 59:010, *New process operations*	EU 03
401 KAR 59:015, *New indirect heat exchangers*	EU 12
401 KAR 61:015, *Existing indirect heat exchangers*	EU 04 & 05
401 KAR 61:020, *Existing process operation,*	EU 01 & 02
401 KAR 63:020, *Potentially hazardous matter or toxic substances*	EU01, 02, 03, 04, 05 &12
401 KAR 60:005, Section 2(2)(d), 40 CFR 60.40c to 60.48c (Subpart Dc), *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*	EU 12

Table C - Summary of Precluded Regulations:

N/A

Table D - Summary of Non Applicable Regulations:

N/A

Air Toxic Analysis
N/A

Single Source Determination
N/A

SECTION 5 – PERMITTING HISTORY

Permit	Permit Type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
F-04-038	Initial	APE20040001	10/6/2004	11/22/2004	Initial Construction Permit	N/A
F-09-035	Renewal	APE20090001	9/28/2009	12/15/2009	Renewal	Synthetic Minor
F-14-042	Renewal	APE20140001	8/10/2014	12/15/2014	Renewal and EU 06-09 moved to Insignificant Activities	N/A
F-14-042 R1	Revision	APE20150001	6/9/2015	6/15/2015	Change of Address	N/A
F-19-029	Renewal	APE20190001	7/17/2019	2/8/2020	Renewal and addition of 10.42 MMBtu/hr indirect fired heat exchanger (EU 12)	N/A
F-19-029 R1	Admin Amend	APE20200003	9/23/2020	10/4/2020	Name Change	N/A

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS – Ambient Air Quality Standards
Btu – British thermal unit
CAM – Compliance Assurance Monitoring
CO – Carbon Monoxide
Division – Kentucky Division for Air Quality
ESP – Electrostatic Precipitator
GHG – Greenhouse Gas
HAP – Hazardous Air Pollutant
MSDS – Material Safety Data Sheets
mmHg – Millimeter of mercury column height
NAAQS – National Ambient Air Quality Standards
NESHAP – National Emissions Standards for Hazardous Air Pollutants
NO_x – Nitrogen Oxides
PM – Particulate Matter
PM_{10} – Particulate Matter equal to or smaller than 10 micrometers
$PM_{2.5}$ – Particulate Matter equal to or smaller than 2.5 micrometers
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
SO_2 – Sulfur Dioxide
VOC – Volatile Organic Compounds
MMBtu/hr – million BTU per hour

APPENDIX B – INDIRECT HEAT EXCHANGER EMISSION LIMITATIONS

EU	Fuel	Capacity (MMBtu/hr)	Construction Date	Removal Date	Total Heat Input Capacity (MMBtu/hr)	PM Limit (lb/MMBtu)	SO_2 Limit (lb/MMbtu)
04	Natural Gas; Propane Backup	10.35	1962	N/A	22.85	0.62	5.41
05	Natural Gas; Propane Backup	12.5	1962	N/A	22.85	0.62	5.41
12	Natural Gas; Propane Backup	10.42	2020	N/A	33.27	0.42	1.83