

Statement of Basis

**Permit to Construct No. P-2015.0003
Project ID 61937**

**Lignetics of Idaho, Inc.
Kootenai, Idaho**

Facility ID 017-00029

Final

March 8, 2018 *gjc*
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The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01. et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
BDT	bone dry ton
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CMS	continuous monitoring systems
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	CO ₂ equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GACT	Generally Available Control Technology
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
lb/qtr	pound per quarter
Lignetics	Lignetics of Idaho
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOV	notice of violation
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM _{2.5}	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM ₁₀	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
<i>Rules</i>	<i>Rules for the Control of Air Pollution in Idaho</i>
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SO _x	sulfur oxides
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
U.S.C.	United States Code
VOC	volatile organic compounds
µg/m ³	micrograms per cubic meter

FACILITY INFORMATION

Description

Lignetics of Idaho (Lignetics) is a sawdust and shavings pelletizing plant. The facility processes sawdust and shavings from lumber mills into wood pellets and Presto logs. The sawdust and shavings are dried in a drum dryer heated by wood, natural gas, No. 2 fuel oil, used-oil-derived fuel, or a mixture of No. 2 fuel oil and used-oil-derived fuel. The dried sawdust and shavings are pneumatically conveyed to a hammer mill and pellet mill. A portion of the dried sawdust is conveyed to a material grinder which grinds the sawdust prior to burning in the wood-fired burner.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

August 5, 1991	DEQ issued the initial PTC for the wood pelletizing plant, Permit status (S)
October 9, 1992	DEQ amended the PTC for the wood pelletizing plant, Permit status (S)
November 22, 1995	DEQ amended the PTC for the wood pelletizing plant, Permit status (S)
October 28, 1996	DEQ amended the PTC for the wood pelletizing plant, Permit status (S)
April 18, 2003	P-000126, PTC modification to allow the combustion of a mixture of No. 2 fuel oil and used-oil derived fuel in addition to natural gas in the drum dryer, Permit status (S)
November 17, 2006	P-060119, PTC modification to install a new dryer line replacing the existing dryer line and to install a supplemental wood fuel grinder, Permit status (S)
November 2, 2015	P-2015.0003 PROJ 61468, PTC revision to include the consent order requirements into the permit, such as drum dryer short-term throughput limit, fuel usage limit, dryer inlet temperature limit, fugitive control. (A, but will become S upon issuance of this permit)

Application Scope

This permit is a revision of the facility's existing permit to construct (PTC). This permit revision does not include any changes to equipment at the facility. The purpose of this permitting action is to improve fugitive emissions control of the truck dump area and to revise the drum dryer throughput limit and its corresponding monitoring and recordkeeping requirements as required in the consent order case No. E-2016.0019.

Application Chronology

November 15, 2016	DEQ issued an NOV to the facility.
August 28, 2017	DEQ received an application and an application fee.
September 5, 2017	DEQ determined that the application was complete.
October 30, 2017	DEQ made available the draft permit and statement of basis for peer and regional office review.
November 3, 2017	DEQ made available the draft permit and statement of basis for applicant review.
December 27, 2018	DEQ received the permit processing fee.
January 9 & February 20, 2018	DEQ received the dryer throughput tracking procedures.
March 8, 2018	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
NA	Wood-furnish Drum Dryer or Rotary Dryer	High Efficiency Primary Cyclone and Quad Multiclone	NA
	Fines Cyclone Stack	Cyclone	
	Pellet Cooler Stack	Cyclone	

Emissions Inventories

This project is a PTC revision to address the issues listed in the consenter order case No. E-2016.0019. Allowable emissions will not change as a result of this permitting action. For a complete emission inventory, refer to the statement of basis for PTC No. P-060119 issued on November 17, 2006. All emission limits in the existing PTC are carried over with no change as a result of this permitting action.

Ambient Air Quality Impact Analyses

Emissions will not increase as a result of this permitting action, thus the ambient air quality impact analysis is not required.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Bonner County, which is designated as attainment or unclassifiable for PM_{2.5}, PM₁₀, SO₂, NO₂, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

- A = Use when any one HAP has actual or potential emissions ≥ 10 T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions ≥ 25 T/yr.
- SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of THAP.
- SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to < 8 T/yr of a single HAP and/or < 20 T/yr of THAP.
- B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold
- UNK = Class is unknown

For All Other Pollutants:

- A = Actual or potential emissions of a pollutant are > 100 T/yr.

- SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are ≥ 80 T/yr.
- SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are < 80 T/yr.
- B = Actual and potential emissions are < 100 T/yr without permit restrictions.
- UNK = Class is unknown.

TABLE 2 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION ¹

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	>100	<100	100	SM
PM ₁₀	>100	<100	100	SM
PM _{2.5}	>100	<100	100	SM
SO ₂	<100	<100	100	B
NO _x	<100	<100	100	B
CO	>100	<100	100	SM
VOC	>100	<100	100	SM
HAP (single)	<10	<10	10	B
HAP (total)	<25	<25	25	B
Pb	<100	<100	100	B

¹ Taken from the statement of basis for PTC No. P-060119 issued on November 17, 2006.

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the proposed revision. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400-410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 Visible Emissions

The sources of PM emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.9 and 2.29.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM₁₀, SO₂, NO_x, CO, or VOC, or 10 tons per year for any one HAP or 25 tons per year for all HAPs combined as demonstrated previously in the Emissions Inventories section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006, and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52.21(b)(1). Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a) and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is not subject to any NSPS requirements in 40 CFR Part 60.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

GACT/MACT Applicability (40 CFR 63)

The facility is not subject to any GACT/MACT standards in 40 CFR Part 63.

Permit Conditions Review

This section describes those permit conditions that have been added, revised, modified or deleted as a result of this permitting action. New text is in bold.

Permit Conditions 1.1 to 1.3

Permit Condition 1.1 states the purposes of this permitting action. Permit Condition 1.2 states that those permit conditions that have been modified or revised by this permitting action are identified by the permit issue date citation located directly under the permit condition and on the right-hand margin. Permit Condition 1.3 states that this PTC replaces PTC No. P-2015.00030 project 61468, issued on November 2, 2015.

Permit Condition 2.3

“b. Based on 24-hr averaging time period” is added to the footnote for Table 2.2. It clarifies that the lb/hr limits are based on 24-hr averaging time period. The limits are for compliance with the 24-hr PM₁₀ NAAQS.

Revised Permit Condition 2.13

The lb/hr limit was imposed in 2015 permit because the facility could not meet the permitted emission limits during the 9/23/2014 performance test when the wood furnish feed rate was at 20.7 tons per hour or greater.

On April 5, 2017, the facility performed another PM₁₀ performance test. The test result showed that the emissions rate was 51% of the permitted limit at the 83% of the permitted throughput rate. The facility has demonstrated compliance with the permit limits. Because the PM₁₀ lb/hr limit is for compliance with the 24-hr PM₁₀ NAAQS and because the averaging time period for the limit is 24-hour not hourly, the applicant has requested to only keep the daily throughput limit in the permit and removed the hourly throughput limit.

The 4/5/2017 source test correlates the dryer’s emissions with the dryer’s production rate in bone dry ton (BDT). Based on the source test data, the applicant has proposed to monitor the dryer production rate in BDT instead of green ton to demonstrate compliance with the dryer’s PM₁₀ emissions limits. The limit of 480 T/day in the existing permit is converted to BDT/day using the following method:

$$\begin{aligned} & (480 \text{ T/day, in the existing permit}) \times (1 - \text{moisture content in wood furnish in the existing permit, 45\%}) \\ & = 480 \text{ T/day} \times (1 - 45\%) \\ & = 264 \text{ BDT/day} \end{aligned}$$

The PC 2.13 is revised and read as follows:

“Drum Dryer Production Rate ~~Wood Furnish Processing~~ Limit and Moisture Content Specification

~~The production rate of the drum dryer Wood furnish feed to the drum dryer shall not exceed 20 tons per hour and 480 tons~~ **264 bone dry tons per day (BDT/day)** based on ~~feed material~~ **the moisture content of 0% 45%.**

Permit Condition 2.22

According to the 10/11/2017 email from the facility, the permittee would enclose the truck dump area and would have it completed by November 1, 2017.

“The permittee shall enclose the truck dump area.” is added to PC 2.22. This permit condition is to address the violation in the consent order for fugitive dust control.

Revised Permit Condition 2.23

“Within 60 days after startup” is removed. The permittee should have already developed the O&M manual.

Revised Permit Condition 2.25

To be consistent with General Provision 3.10, “two-year” has been changed to “five-year” in PC 2.25.

Revised Permit Condition 2.27.1

Due to the change of PC 2.13 on dryer’s throughput limit, the monitoring needs to be changed accordingly. The DEQ’s approved Dryer Throughput Tracking procedures are included in Appendix A of the SOB. PC 2.27.1 is revised and reads as follows:

“2.27.1 The permittee shall demonstrate compliance with Drum Dryer Production Rate Limit and Moisture Content Specification Permit Condition using the DEQ approved Dryer Throughput Tracking procedures that are included in the statement of basis for this permit. Changes to the procedures are required to be approved by DEQ.

The procedures shall include, but not limited to, the following:

- **Monitor and record the following tracking information daily:**
 - **Daily mass of packaged pellet production in tons,**
 - **Daily log production in tons,**
 - **The change in mass of pellets in the pellet bin daily in tons,**
 - **Record the daily average moisture content of green furnish and of finished product, respectively, and**
 - **Calculate the mass of fuel required to dry furnish from the daily average green furnish moisture content to the daily average finished product moisture content in tons.**
- **Provide the method, including the calculation, on how the daily drum dryer throughput is determined.**
- **Calculate daily drum dryer throughput in BDT/day.”**

Permit Condition 2.30

Typographical errors in PC 2.30 are corrected.

Revised Permit Condition 2.38

On April 5, 2017, the facility performed a PM₁₀ performance test. The test result showed that the emissions rate was 51% of the permitted limit at the 83% of the permitted throughput rate. Therefor the next required performance test will be by April 5, 2022. “June 16, 2019” in PC 2.38 is replaced with “April 5, 2022”.

Because of the changes to the dryer throughput monitoring in PCs 2.13 and 2.27.1, PC 2.38 is revised and reads as follows:

- **“The production rate of ~~wet furnish feed~~ to the drum dryer shall be monitored and recorded according to the DEQ approved test protocol during each performance test run.**
- **The ~~furnish feed~~ moisture content of the material dried by the drum dryer shall be monitored and recorded at least once during each performance test run.”**

In addition, based on the comments from DEQ's source test staff, the following is added to the PC 2.38:

“All performance testing shall be conducted in accordance with the requirements of IDAPA 58.01.01.157.02(a) which states:

The test must be conducted under operational conditions specified in the applicable state or federal regulation, rule, permit, order, consent decree or by Department approval. If the operational requirements are not specified, the source should test at worst-case normal operating conditions. Worst-case normal conditions are those conditions of fuel type, and moisture, process material makeup and moisture and process procedures which are changeable or which could reasonably be expected to be encountered during the operation of the facility and which would result in the highest pollutant emissions from the facility.”

Revised Permit Conditions 2.39 and 2.40

Because the complexity of how the production rate of the dryer in BDT will be determined, the permittee is required to obtain a DEQ approved source test protocol prior to conducting a compliance test required by this permit. The protocol shall include how the production rate in BDT of the drum dryer will be determined during source test and what will be included in the source test report.

General Provisions

General Provisions are updated using the current PTC template.

PUBLIC REVIEW

Public Comment Opportunity

Because this permitting action does not authorize an increase in emissions, an opportunity for public comment period was not required or provided in accordance with IDAPA 58.01.01.209.04.

APPENDIX A – DEQ APPROVED DRYER THROUGHPUT TRACKING PROCEDURES

- A.1 The Dryer Throughput Tracking Spreadsheet (2018AAG457)
- A.2 The January 9, 2018 letter (2018AAG456)
- A.3 The February 20, 2018 letter (2018AAG455)

Dryer Throughput Calculations

Date	Production - Finished Product										Moisture Content		Dryer Throughput - Finished Product				Fuel Usage Calculations					Total Dryer Throughput ⁽⁴⁾ (BDT/day)
	Pellets				Log Pellet Production (0.975 tons per pallet)						Green Furnish ⁽⁴⁾ (% wet basis)	Finished Product ⁽⁵⁾ (% wet basis)	Total Finished Product ⁽⁴⁾ (tons/day)	Dry Total Finished Product ⁽⁴⁾ (BDT/day)	Green Total Finished Product ⁽⁶⁾ (tons/day)	Total Water Removed ⁽⁴⁾ (tons/day)	Total Energy Required to Remove Water ^(f) (MMBtu/day)	Total Wood Fuel Required to Remove Water ^(g) (tons/day)	Total Wood Fuel Required to Remove Water ^(h) (BDT/BDT)	Ratio of Wood Fuel to Dry Finished Product ⁽ⁱ⁾ (BDT/BDT)	Wood Fuel to Dry Wood Fuel ^(j) (BDT/day)	
	Fuel Pellets Produced ⁽¹⁾ (tons/day)	Bedding Pellets Produced ⁽¹⁾ (tons/day)	Bulk Pellet Inventory ⁽²⁾ (tons)	Increase In Bulk Pellets ⁽⁴⁾ (tons/day)	Bulk Log Full ⁽³⁾ (Pallets/day)	Six Pack Log Full ⁽³⁾ (Pallets/day)	Home Depot 5-Pack Log Half ⁽³⁾ (Pallets/day)	Three Pack Log With Stick Full ⁽³⁾ (Pallets/day)	Three Pack Log Without Stick Full ⁽³⁾ (Pallets/day)													
12/1/2017	193		35	27	11			5	7	38.9	6.5	242	227	371	129	467	28.5	26.6	0.12	3.12	256	
12/2/2017	204		16	-19				8		42.3	6.5	193	180	312	120	434	26.5	24.8	0.14	3.40	208	
12/3/2017	156		24	8				10		44.3	6.5	174	162	292	118	428	26.1	24.4	0.15	3.67	191	
12/4/2017	107	34	30	6			1	18		43.9	6.5	167	156	278	111	403	24.6	23.0	0.15	3.39	182	
12/5/2017		167	21	-9					16	45.8	6.5	174	162	299	126	457	27.9	26.1	0.16	4.18	193	
12/6/2017		57	68	47				16		52.6	6.5	120	112	236	116	422	25.7	24.1	0.22	5.18	141	
12/7/2017		116	44	-24				13		55	6.5	105	98	217	113	410	25.0	23.3	0.24	5.57	127	
12/8/2017		77	44	0				1	5	57.5	6.5	83	77	182	99	361	22.0	20.6	0.27	5.47	104	
12/9/2017	164	27	26	-18				4	4	41.7	6.5	177	165	284	107	388	23.6	22.1	0.13	2.95	190	
12/10/2017	213		24	-2						37.2	6.5	211	197	314	103	374	22.8	21.3	0.11	2.31	221	
12/11/2017	181		24	0					17	36.4	6.5	198	185	290	93	337	20.6	19.2	0.10	2.00	206	
12/12/2017	230		15	-8	10	13			9	36.2	6.5	252	236	370	117	426	26.0	24.3	0.10	2.50	263	
12/13/2017	184		15	0	26	30				36.6	6.5	239	223	352	113	411	25.1	23.4	0.11	2.46	249	
12/14/2017	183		12	-3	25	15				37.2	6.5	219	205	326	107	389	23.7	22.2	0.11	2.40	229	
12/15/2017	181		19	7	24	18				35.35	6.5	229	214	331	102	371	22.6	21.1	0.10	2.09	237	
12/16/2017	211		27	8		11				37	6.5	230	215	341	111	404	24.6	23.0	0.11	2.47	240	
12/17/2017	192		28	1		14				38.6	6.5	207	193	315	108	392	23.9	22.4	0.12	2.59	218	
12/18/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/19/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/20/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/21/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/22/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/23/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/24/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/25/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/26/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/27/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/28/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/29/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/30/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	
12/31/2017			0	0								0	0	0	0	0	0.0	0.0	0.00	0.00	0	

Finished Product Heat Content (Btu/lb) = 8,200 (6)
 Enthalpy of Steam (Btu/lb H₂O) = 1,100
 Adjusted Enthalpy of Steam (Btu/lb H₂O) = 1,815 (7)

Notes:

- (a) Increase in bulk pellets (tons/day) = (bulk pellet inventory [tons]) - (previous day bulk pellet inventory [tons])
- (b) Total finished product (tons/day) = (pellet fuel produced [tons/day]) + (bedding pellets produced [tons/day]) + (increase in bulk pellets [tons/day]) + (sum of [bulk log full], six pack log full, three pack log with stick full, three pack log without stick full [pallets/day]) + [Home Depot 5-pack log half [pallets/day] / 2] x 0.975 tons/pallet)
- (c) Dry total finished product (BDT/day) = (total finished product [tons/day]) x (1 - [finished product moisture content (% wet basis) / 100])
- (d) Green total finished product (tons/day) = (dry total finished product [BDT/day]) / (1 - [green furnish moisture content (% wet basis) / 100])
- (e) Total water removed (tons/day) = (green total finished product [tons/day]) - (total finished product [tons/day])
- (f) Total energy required to remove water (MMBtu/day) = (total water removed [tons/day]) x (2,000 lbs/ton) x (adjusted enthalpy of steam [Btu/lb H₂O]) x (MMBtu/10⁶ Btu)
- (g) Total wood fuel required to remove water (tons/day) = (total energy required to remove water [MMBtu/day]) / (finished product heat content [Btu/lb]) x (10⁶ Btu/MMBtu) x (ton/2,000 lbs)
- (h) Total wood fuel required to remove water (BDT/day) = (total wood fuel to remove water [tons/day]) x (1 - [finished product moisture content (% wet basis) / 100])
- (i) Ratio of wood fuel to dry finished product (BDT/BDT) = (wood fuel required to remove water [BDT/day]) / (dry total finished product [BDT/day])
- (j) Wood fuel to dry the fuel (BDT/day) = (ratio of wood fuel required to remove water to dry total finished product [BDT/BDT]) x (total wood fuel required to remove water [BDT/day])
- (k) Total dryer throughput (BDT/day) = (dry total finished product [BDT/day]) + (total wood fuel required to remove water [BDT/day]) + (wood fuel to dry the fuel [BDT/day])

References:

- (1) Pellet production based on accounting of bagged pellets, with each bag weighing 40 pounds. Bag weights are verified hourly.
- (2) Based on the bulk pellet bin inventory level.
- (3) Log production is tracked by the pallet, with each pallet weighing approximately 0.975 tons. Similarly, a half pallet weighs approximately 0.49 tons. Log weights are verified periodically.
- (4) The daily average moisture content is based on moisture content analyses run on grab samples taken from the dryer infeed at least once every two hours.
- (5) The daily average finished product moisture content is based on moisture content analyses run on grab samples taken from the finished pellet production once every two hours.
- (6) The finished product heat content is representative of the finished product at the finished product moisture content. The value is periodically audited.
- (7) The adjusted enthalpy of steam accounts for inefficiencies such as removal of hygroscopic moisture, and heat lost through the dryer system.

Max Daily Throughput (BDT/day)
 262.8



31756 Hwy 200 E
Kootenai, ID 83840
(208) 627-5687

January 9, 2018

Steve Bacom
Idaho Department of Environmental Quality
Compliance and Enforcement, Air Quality Division
1410 North Hilton
Boise, Idaho 83706

Re: Proposed Dryer Throughput Tracking, Lignetics of Idaho, Inc., Facility ID No. 017-00029

Dear Mr. Bacom:

On October 2, 2017, Lignetics, Inc. received a draft of the proposed Consent Order for their facility located in Sandpoint, Idaho. The proposed Consent Order was drafted by the Idaho Department of Environmental Quality (DEQ) to resolve the November 10, 2016 Notice of Violation (NOV). Lignetics requested that Maul Foster & Alongi (MFA) and Stoel Rives, LLP review the conditions in the proposed Consent Order and develop comments, which were submitted to DEQ electronically on October 31, 2017.

As part of the comments submitted on the draft Consent Order, Lignetics proposed an in-person meeting with DEQ to review the dryer throughput tracking methodology. This meeting was held on December 19, 2017. Eric Laurance of Lignetics and Brian Eagle of MFA traveled to Boise to meet with Steve Bacom, Mike Simon, and Darrin Pampaian of the DEQ in person. Almer Casile and Shawn Sweetapple also attended the meeting via phone from the DEQ regional office in Coeur d'Alene.

After walking through the proposed dryer throughput tracking methodology, DEQ requested that Lignetics submit a writeup outlining the methodology, and include the Excel spreadsheet-based calculations for review and approval. The following memo outlines the dryer throughput tracking methodology implemented in the Excel spreadsheet, and identifies specific variables that will be tracked by Lignetics. The dryer throughput tracking methodology will be used by Lignetics to demonstrate compliance with the daily throughput limit of 264 bone dry tons (BDT) per day.

Dryer Throughput Tracking

All of the wood furnish processed through the dryer is used for pellet production, for log production, or as fuel in the wood-fired burner used to supply heat to the dryer. Dried furnish is transferred to the Main Cyclone, where it is separated from the dryer combustion air. From the Main Cyclone, the furnish is transferred to a hammer mill for sizing. The sized furnish is then deposited into Bin #7, which distributes the furnish to three pellet mills, two log machines, and the burner fuel bin.

The proposed dryer throughput tracking methodology calculates total dryer throughput as the sum of:

- a) Total production of pellets and logs (BDT/day)
- b) Fuel used to dry the pellet and log green furnish (BDT/day)
- c) Fuel required to dry the fuel in b) above (BDT/day)

Production of finished pellets and logs are closely tracked for accounting purposes. This, in addition to the consistent finished moisture content, make production a reliable foundation for calculating total dryer throughput. The sum of total pellet production (both packaged and stored) and total log production represents the majority of the dryer throughput. This production (in tons at 6.5% moisture) is corrected to bone dry tons using the following formula:

$$\text{Production (BDT/day)} = (\text{production [tons/day]}) \times (1 - [\text{moisture content \%} / 100])$$

The balance of the dryer throughput (total throughput minus pellet and log production) is used as fuel for the burner (i.e. a slipstream of the dryer throughput is directed back to the burner). Because it is not feasible to directly measure the amount of fuel redirected to the burner, the amount of furnish used as wood fuel in the burner is calculated based on the mass of water removed from the green furnish used to produce the pellets and logs. The mass of the green furnish dried for use in the pellets and logs is calculated using the following formula:

$$\text{Green throughput (tons/day)} = \frac{(\text{dry throughput [BDT/day]})}{(1 - [\text{green moisture content \%} / 100])}$$

The mass of water removed from the furnish used to produce pellets and logs is calculated by subtracting the total pellet and log production (at the finished product moisture content) from the mass of green furnish dried for use in the pellets and logs. The energy required to remove this water is calculated using the enthalpy of steam (1,100 Btu/lb water), adjusted to account for the additional energy needed to remove hygroscopic moisture (it is increasingly energy intensive to remove moisture below approximately 20%) and waste heat loss through the drying process. The calculated energy is then converted to an equivalent mass of wood using the heat content of the finished products (Btu per pound of wood). The resulting mass of wood is on the same moisture basis as the finished products. This mass is then converted to bone dry tons from the finished moisture content.

The final calculation is for the furnish throughput referred to as "the fuel to dry the fuel" (in BDT/day), which is calculated by applying the fuel to production ratio to the total wood fuel required to remove water from the pellet and log furnish (in BDT/day).

Each calculation used to derive the total dryer throughput is presented in the attached Excel workbook. Variables used in the calculations are further explained in the following sections.

In discussing the proposed dryer throughput tracking methodology, it is important to recognize that the most recent source test demonstrated that Lignetics has emissions well below the hourly PM₁₀ limit when operating within 90% of the throughput limit. It is also important to recognize that the

dryer inlet temperature limit imposed on the facility as a result of the 2014 source test serves to limit both the rate at which furnish can be effectively dried, and the rate at which fuel can be consumed.

Dryer Throughput Tracking Variables

Lignetics proposes to use the following variable as part of the throughput tracking methodology defined above.

Variable 1. Average Green Furnish Moisture Content

Lignetics proposes to record the daily average moisture content of the green furnish being fed to the dryer. The moisture content of the incoming green furnish is measured from grab-samples taken at least once every two hours from the infeed conveyor. The moisture contents are averaged over a given day, and this average moisture content is recorded in the Excel spreadsheet for each day.

Variable 2. Pellet Production

Lignetics proposes to track the daily finished pellet production, in units of finished tons per day. Furnish is extruded into pellets by the pellet mills, and the extruded pellets are conveyed to the bulk pellet bins. Extruding also produces some sawdust which is sent to the fuel bin. Pellets are conveyed from the bulk pellet bin to the packaging system where they are packaged into 40 pound bags. The production of packaged pellets is tracked, and the mass per bag of pellets is verified every hour. The daily mass of pellets produced is equal to the sum of pellets packaged, and the change in the level of pellets in the bulk pellet bins. The level of the bulk pellet bins is recorded once daily to correlate with the amount of pellets packaged over a 24-hour period. If pellet production outpaces pellet packaging, the level of pellets in the bulk pellet bin will increase, and vice versa. The change in bulk pellet bin levels (either positive or negative) is added to the amount of pellets packaged. Lignetics will record the production of packaged pellets and the level of the bulk pellet bins each day of operation.

Variable 3. Log Production

Lignetics proposes to track the daily finished log production, in units of finished pallets per day. Logs are produced from furnish by two log machines. The daily throughput of finished log production is tracked, and the log weights are verified every two hours. Logs are packaged on pallets. Lignetics produces both full and half pallets for distribution. A full pallet weighs 0.975 tons. Lignetics proposes to record the number of each type of pallet produced each day of operation.

Variable 4. Finished Product Moisture Content

Lignetics proposes to use a moisture content of 6.5% to represent the final moisture content of the pellets and logs. Lignetics sets a target final moisture content of approximately 6.5% for the finished pellets and logs, which is integral to the quality of the finished product. The pellets are regularly sent for audit testing to verify the physical pellet parameters (moisture content, heat value, fines content, etc.) as part of the Lignetics product labeling requirements. However, because there is potential variability from sample to sample, and because each sample sent for testing represents a small fraction of the overall production, Lignetics is not proposing to use the tested final moisture contents as part of the throughput tracking calculations. Lignetics will instead maintain records of

the pellet testing results for review by DEQ, if requested, to demonstrate that the facility is effectively achieving their target final moisture content of 6.5%.

Variable 5: Enthalpy of Steam

Lignetics proposes to use 1,815 Btu per pound water as the enthalpy of steam for calculating the energy required to remove moisture from the green furnish. This is 1.65 times higher than the enthalpy of steam (1,100 Btu per pound, stated previously) to account for vaporization of hygroscopic water and waste heat loss. Based on experience with other pellet mills, 1,815 Btu per pound water is a reasonably conservative value that is representative of the energy used per pound of water removed in the dryer system used at the Lignetics facility in Sandpoint.

Variable 6: Wood Heat Content

Lignetics proposes to use 8,200 Btu/pound as the heat content of the wood fuel to calculate the mass of wood fuel required to dry the pellets and logs. This is representative of the heat content of the fuel pellets produced by the facility. As stated previously, the pellet heat content is tested as part of the regular pellet testing done as part of quality assurance procedures. Because the burner uses the same furnish that is used to produce pellets, the pellet heat content is equivalent to the dryer fuel heat content. Lignetics will maintain records of the pellet testing data for review by DEQ if requested.

Conclusion

Lignetics appreciates the opportunity to propose the dryer throughput tracking methodology outlined in this letter. As has been stated before, a similar methodology is successfully implemented in Lignetics' two Oregon facility with the approval of the Oregon DEQ. If you have any remaining questions or concerns about the proposed dryer throughput tracking methodology, please contact me at (541) 466-7002, or elaurance@bmf.com.

Sincerely,

Lignetics, Inc.



Eric Laurance
General Manager

Attachments: Dryer Throughput Tracking Calculation Spreadsheet



31756 Hwy 200 E
Kootenai, ID 83840
(208) 627-5687

February 20, 2018

Steve Bacom
Idaho Department of Environmental Quality
Compliance and Enforcement, Air Quality Division
1410 North Hilton
Boise, Idaho 83706

Re: Proposed Dryer Throughput Tracking - Additional Information
Lignetics of Idaho, Inc., Facility ID No. 017-00029

Dear Mr. Bacom:

On January 9, 2018, Lignetics, Inc. submitted a proposed dryer throughput tracking methodology to the Idaho Department of Environmental Quality (DEQ) for review and approval. On February 5th, 2018, Eric Laurance of Lignetics and Brian Eagle of Maul Foster & Alongi participated in a conference call with DEQ to review specific questions related to the proposed dryer throughput tracking methodology. This letter seeks to address the following two items for which DEQ requested additional explanation:

1. Additional context for the proposed enthalpy of steam of 1,815 Btu per pound (Btu/lb) of water removed
2. Development of a plan for regular finished product moisture content measurements

Enthalpy of Steam

As stated in the January 9, 2018 submittal, Lignetics proposes to use 1,815 Btu/lb of water removed as the enthalpy of steam for calculating the energy required to remove moisture from the green furnish. This is 1.65 times higher than the enthalpy of steam (1,100 Btu/lb of water removed) to account for vaporization of hygroscopic water and waste heat loss.

Lignetics was provided with an estimate of the enthalpy of steam for the wood-fired dryer in operation at the Lignetics facility in Cascade Locks, Oregon of 1,726 Btu/lb of water removed. This is 1.57 times higher than the 1,100 Btu/lb referenced previously. As discussed in the conference call on February 5th, 2018, Eric Laurance used his professional experience working with wood-fired rotary dryers to conservatively estimate that the Sandpoint dryer has an enthalpy of steam 1.65 times higher than 1,100 Btu/lb. Eric took into consideration the differences between the Sandpoint and Cascade Locks dryer systems and operating conditions as part of applying his professional judgement to estimate the enthalpy of steam for the Sandpoint dryer.

Finished Product Moisture Content

Lignetics sets a target final moisture content of approximately 6.5% for the finished pellets and logs, which is integral to the quality of the finished products. Because the wood-fired burner is fueled by the furnish dried in the dryer, the increased fuel demand required to achieve moisture contents below 6.5% takes dried material away from potential production. Lignetics works to optimize the production of pellets and logs by minimizing the amount of wood required to fuel the burner.

Lignetics currently relies on a third party analytical laboratory to verify the moisture content of the finished products. However, to provide additional granularity on the finished product moisture content, Lignetics proposes to perform more regular in-house finished product moisture content testing. Lignetics will measure the moisture content of the finished pellets once every two hours, and calculate a daily average finished product moisture content for entry into the recordkeeping system. Data will be entered in a manner similar to the green furnish moisture content.

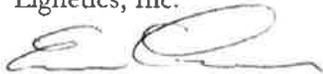
DEQ requested that Lignetics revise the dryer throughput tracking spreadsheet to incorporate the revised finished product moisture content sampling. A column for the daily finished product moisture content has been added to the revised dryer throughput tracking methodology in the attached Excel workbook.

Conclusion

Thank you for the opportunity to provide additional clarity on the proposed dryer throughput tracking methodology. Please contact me at (541) 466-7002, or elaurance@bmf.com if you have any issues receiving the attached Excel spreadsheet.

Sincerely,

Lignetics, Inc.



Eric Laurance
General Manager

Attachments: Dryer Throughput Tracking Calculation Spreadsheet

APPENDIX B – FACILITY DRAFT COMMENTS

The following comments were received from the facility on November 17, 2017:

Facility Comment: The proposed changes primarily related to the new truck dump enclosure. The language in the draft permit and statement of basis refer to the “totally enclosed” truck dump. The enclosure has an opening to allow the front end loader access to the enclosure. Netting similar to that surrounding the storage pile has been added to the opening of the enclosure to help improve the efficacy of the enclosure. To prevent confusion on the nature of the enclosure, the word “totally” should be removed from the permitting documents.

DEQ Response: The request change is made in Permit Condition 2.22 and in the SOB.

Facility Comment: Regarding the requirement to record the dryer throughput every 15 minutes during source testing, this is no longer a feasible option. Lignetics will utilize the new recordkeeping and tracking methodology to determine the amount of material dried during each test run. The 15 minute interval requirement was based on reading the output of the weigh scale conveyor, and is no longer pertinent. Lignetics will submit the proposed recordkeeping methodology with the future source testing protocol.

DEQ Response: “at least once every 15 minutes” is changed to “according to the DEQ approved test protocol” in Permit Condition 2.38 and in the SOB.

APPENDIX C – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:

Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:
 Address:
 City:
 State:
 Zip Code:
 Facility Contact:
 Title:
 AIRS No.:

N Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N

Y Did this permit require engineering analysis? Y/N

N Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO _x	0.0	0	0.0
SO ₂	0.0	0	0.0
CO	0.0	0	0.0
PM10	0.0	0	0.0
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	0.0
Fee Due	\$ 1,000.00		

Comments: