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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-1965E After-The-Fact
Plant ID No.:	021-00011
Applicant:	Lignetics of West Virginia, Inc.
Facility Name:	Stouts Mill, WV
Location:	Stouts Mill, Gilmer County
SIC Code:	2499 - Wood Products, NEC
Application Type:	Modification
Received Date:	1/18/12
Engineer Assigned:	Daniel P. Roberts
Fee Amount:	$1,000
Date Received:	1/20/12
Complete Date:	//12
Applicant Ad Date:	1/05/12
Newspaper:	*The Glenville Democrat*
UTM's:	Easting: 523.00 km Northing: 4304.305 km Zone: 17
Description:	After-the-Fact modification to include a dry raw material feed system and grinder collection auger (#141) which were constructed in 2007.

BACKGROUND

Lignetics of West Virginia, Inc. ("Lignetics") is a facility which manufactures wood pellets from wood waste (sawdust) and is currently operating under permit R13-1965D approved on July 21, 2009. Application R13-1965D was received by the DAQ on August 18, 2008. The wood pellets are marketed as a fuel for wood pellet home heating stoves.

As a result of citizen complaints, Eric Ray of the DAQ's Compliance and Enforcement Section performed compliance inspections on June 29 and August 12, 2009. As a result of the inspections, it was discovered that the facility had begun receiving kiln-dried sawdust and the unloading operations were not included in the facility's permit. Also, the facility did not carry out the kiln-dried sawdust unloading operations in such a manner as to minimize the generation of fugitive particulate matter. On September 3, 2009, the DAQ issued a Notice of Violation to Lignetics of West Virginia, Inc.

On September 28, 2009, a meeting was held at the DEP headquarters which was attended by the following people: John Utter of Lignetics; Jesse Adkins, Eric Ray and Dan Roberts of the DAQ. Mr. Ray presented photos for each date that displayed fugitive dust escaping from the Dry Dust Receiving Facility/Bucket Elevator and rising from the Raw Material Storage Area/In Feed Bin Area. The Kiln Dried Dust Recovery System was already in place, but was erroneously omitted from application R13-1965D.

DESCRIPTION OF PROCESS

The wood pellet manufacturing process at Lignetics can best be summarized by the following categories of operations:

1) Green Raw Material Feed System

2) Dry Raw Material Feed System

3) Dryer System

4) Dried Material Fuel Feed System

5) Pellet Production

6) Product Bagging and Storage

7) Emission Points and Dust Control Equipment

GREEN RAW MATERIAL FEED SYSTEM

Wet sawdust (with a typical moisture content of 35% to 60%) is received from a box truck (#102) and deposited onto a concrete pad. A front-end loader moves the material from the concrete pad to a raw material storage pile (#104). From the storage pile, the front-end loader transfers material into the feed bin (#110). The material is screened by the disc screen (#112) and material greater than 3 inches passes over the screener and drops into the overs-bunker (#114). Belt conveyor (#116) transfers the less than 3 inch material to the in-feed belt conveyor (#118), which transfers it to a top-loaded shaker screen (#120). Material greater than 1.5 inches passes over the screener and is transferred to the oversize pile or overs-bunker (#114), while material less than 1.5 inches drops into the surge bin (#122). The surge bin (#122) then feeds the Dryer Feed Screw Airlock (#126), which then feeds the material to the Dryer (#230).

DRY RAW MATERIAL FEED SYSTEM

The purpose of the Dry Raw Material Feed System is to minimize the fugitive dust generated from self-unloading trucks delivering Dry Raw Material to the Green Raw Material storage area. The system incorporates an enclosed structure that will allow a self-unloading truck trailer to back

into the structure and unload into a reclaiming system that will transfer the material into a storage silo and then on into the plant processing system after the dryer. The structure is equipped with a sealing system that seals the sides and the top of the trailer to the walls of the structure and a negative airflow is pulled through the roof of the structure via a fan, therefore minimizing the fugitive dust. The airstream from the fan is then ducted to the existing plant baghouse. All components of the system are provided negative air and seals to minimize fugitive dust. In the event that this system is down or a truck delivers a load of dry material and the this system is full, the truck trailers will be backed under an overhead water deluge system for unloading in the Green Raw Material storage area. This system incorporates a sliding, hanging tarp that is positioned to form a wind break and a high pressure water spray over the top of the area, which create an envelope that encompasses the material as it is unloaded to the ground.

Dry wood waste (dry sawdust with a typical moisture content of 6% to 12%) is received from a self-unloading truck trailer (#500). The trailer is backed into a covered structure called the Dry System Reclaim (#503). The Dry System Negative Draft Fan (#501) pulls air out of the top of the structure, providing a strong negative airflow through the enclosure to minimize fugitive dust from escaping the unloading system. The air from the fan is ducted to the Baghouse (#165). Inside the structure, the trailer unloads the material directly into the Dry System Reclaim Bin (#504), which feeds the material into the Dry System Transfer Auger (#505). The auger then feeds the material into the Dry System Bucket Elevator (#506), which feeds into the Dry System Material Silo (#507). The material feeds from the bottom of the silo via the Dry System Silo Unloader (#508) into the Dry System Discharge Auger (#509). The Dry System Discharge Auger feeds into the Dry System Discharge Airlock (#510), which feeds into the Dry System Blowpipe (#511). The positive air pressure for this pipe is supplied by the Dry System Blower (#502), and blows the material to the Dry System Cyclone (#512). The air exiting the top of the cyclone is ducted to the Baghouse (#165) identified as Emission Point EP-3E. The material exiting the bottom of the cyclone is dropped through the Dry System Cyclone Airlock (#513) directly into the Main Material Auger (#134).

DRYER SYSTEM

From the dryer feed screw airlock (#126), the wood waste (sawdust) is transferred to the rotary dryer (#230), which has a maximum heat input rating of 45 MMBtu/hr and a conservative heat content of 8,000 BTU/lb of dried sawdust. The burner and drying system consists of the fuel scalping system (#202), fuel silo fill blower (#204), fuel storage silo (#206), fuel feed screw (#208), fuel air lock (#210), fuel grinder (#212), fuel blower (#214), wood burner (#220), natural gas burner (#250), furnace (#240) and wood burner air intake stack (#222).

The rotary dryer (#230) has a maximum input capacity of 63,000 pounds per hour (PPH) based on a green raw material (sawdust) moisture content of 50%. The rotary dryer's maximum rated output capacity is 22 oven dried tons per hour (TPH) and 192,720 tons per year (TPY). However, the potential throughput calculations assume 7,680 operating hours per year due to the nature of the process, intermittent process flows and operational limitations. Therefore, the maximum potential rotary dryer output is limited to 19 TPH and 145,920 TPY. The rotary dryer has the capability of using two different fuel sources: natural gas or wood waste (sawdust). The maximum capacities of the burners are 48,200 cubic feet per hour (ft^3/hr) or 370,176,000 cubic feet per year (ft^3/yr) of natural gas or 5,625 pounds per hour (lb/hr) or 21,600 TPY of dried wood

waste/sawdust.

When the facility was originally built, natural gas was used to fire the burner. In permit determination PD05-034 approved April 15, 2005, Lignetics requested to switch to burning wood waste (sawdust) because the price of natural gas was rising too high. The original burner was designed to use natural gas and because of the relatively small amount of combustion air needed, the system used a recycle gas loop. The recycle gas loop pulling 50 to 60% of the exhaust gas flowing through the dryer and returning it back to the inlet of the dryer. The remaining 40 to 50% of the exhaust gas was vented to the atmosphere through the main stack at emission point EP-1E. Wood burners require more combustion air and a larger amount of air flow to evacuate the heat from the combustion chamber. Therefore, the recycle gas loop was removed, the air flow across the dryer was increased from approximately 47,000 cfm to 60,000 cfm and 100% of the exhaust gas is vented to the atmosphere through the main stack at emission point EP-1E. This increase in vented air flow required the addition of a larger and more efficient stack gas clean-up system, which was manufactured by Onix Corporation. The new stack gas clean-up system consisted of an increase in the duct sizing, refining the main cyclone, replacing the multi-clones with larger and more efficient ones and replacing the ID fan with a larger one. It is not clear when this work began or when it was completed.

The process to convert back from burning wood waste to natural gas would involve bricking up the inlet duct from the wood burner to the natural gas chamber and reinstalling a recycle gas loop. This change-over would take approximately one week to complete. Permit R13-1965E will contain maximum emission rates for burning wood waste/sawdust or natural gas.

DRIED MATERIAL FUEL FEED SYSTEM

Dried material exits the dryer and enters the main or primary cyclone (#130). Emissions from the main or primary cyclone (#130) are vented to four multi-clone collectors (#138), which are vented to the main stack identified as emission point EP-1E, by an induced draft fan (#128). Material collected by the multi-clone (#138) is pneumatically conveyed to the fines cyclone (#160).

Dried material from the main cyclone (#130) is transferred to the main cyclone airlock (#132), the main material auger (#134), the grinder airlock (#136) and then the grinder (#140). The grinder (#140) is a hammermill crusher that reduces the particle sizes from 1.5 inches to minus 1/4 inch. From the grinder (#140), material drops into the grinder collection auger (#141) and is transferred to the grinder discharge auger (#142) and then to bucket elevator (#146). The grinder (#140) vents to the fines cyclone (#160). Material from the bucket elevator (#146) flows to the mill surge bin feeder auger (#148) and then to the mill surge bin (#150). The grinder (#140) and mill surge bin (#150) vent to the fines cyclone (#160). The material collected by the fines cyclone (#160) drops through the fines cyclone airlock (#161) into the main material auger. The fines fan (#155) moves material from the fines cyclone (#160) into the baghouse (#165), which is vented through the baghouse stack identified as emission point EP-3E.

PELLET PRODUCTION

From the mill surge bin (#150), material intermittently moves into pellet mill #! (#304), pellet mill #2 (#306), pellet mill #3 (#308) or pellet mill #4 (#310). These mills form pellets of 1/4 inch size. Each mill can operate at a maximum of 4.7 TPH. However, normal production flows vary by running only three mills while the fourth is down for repairs or running four mills at a production rate of less than 4 TPH. The operators of the pellet mills are instructed to never exceed a combined production rate of 16 TPH. The weigh belt measures the production rate and the reading is monitored to insure that the production rate doesn't exceed 16 TPH.

Wood pellets from pellet mill #2 (#306) and pellet mill #3 (#308) flow into pellet cooler #1 (#320). Wood pellets from pellet mill #1 (#304) and pellet mill #4 (#310) flow into pellet cooler #2 (#322). Pellet coolers (#320 and #322) use ambient air to cool the pellets. Both pellet coolers are vented under negative pressure by sealed connections to cooler cyclone (#350) to remove particulate matter from the air. This mechanical collector integrally returns collected material back to the process at the main material auger (#134). Cooler cyclone (#350) is vented by a cooler fan (#340) to the cooler stack identified as emission point EP-2E. Wood pellets from pellet cooler #1 (#320) flows to cooler discharge auger #1 (#330). Wood pellets from pellet cooler #2 (#322) flows to cooler discharge auger #2 (#332), which then discharges to cooler discharge auger #1 (#330). Cooler discharge auger #1 (#330) transfers the wood pellets into the pellet surge bin (#404).

PRODUCT BAGGING AND STORAGE

From the pellet surge bin (#404), material flows to the pellet screen (#406) and then to the weigh belt (#408). Bucket elevator B (#410) then transfers the wood pellets to the bulk pellet storage bins, which are pellet bin #1 (#420) and pellet bin #2 (#430). Each pellet bin has a storage capacity of 180 tons, for a combined total storage capacity of 360 tons. From the bulk pellet storage bins, wood pellets are fed to the pellet bin discharge augers (#432), to bucket elevator C (#440), to the bagging screen (#444) and then to the pellet bagger machine (#448). The pellet screen (#406) removes fines and dust with particulate sizes of 15/64 of an inch or less. The pellet surge bin (#404), the pellet screen (#406), bucket elevator B (#410) and the bagging screen (#444) are all vented to the fines cyclone (#160). From the pellet bagging machine (#448), final packaged material is sent to the automatic pallet stacker (#452), the automatic shrink wrapper (#456) and then to the staging area for forklift pickup. A forklift transports the loaded pallets to the warehouse for storage and then shipment.

EMISSION POINTS AND DUST CONTROL EQUIPMENT

The main stack is emission point EP-1E. Fugitive emissions and the products of combustion from burning wood waste (sawdust) or natural gas the dry the woodwaste in Rotary Drum Dryer (#230) are first ducted to the Main Cyclone (#130) and then through the Multi-Clone (#138) before being vented to the atmosphere through the main stack at emission point EP-1E.

The pellet cooler system vents through emission point EP-2E. Fugitive emissions from Pellet Cooler #1 (#320) and Pellet Cooler #2 (#322) are ducted to Cooler Cyclone #350 and the fine particles which are not captured are pulled by the Cooler Fan (#340) and vented to the atmosphere

through the main stack at emission point EP-2E with maximum permitted rates of 3.1 lb/hour and 11.9 TPY.

Much of the equipment within the building vent through emission point EP-3E. Fugitive emissions from the following equipment are ducted to the Fines Cyclone (#160): new Dry Raw Material System Silo (#507), Multi-Clone (#138), Grinder (#140), Mill Surge Bin Feeder Auger (#148), Mill Surge Bin (#150), Pellet Surge Bin (#404), Pellet Screen (#406), Bucket Elevator B (#410), Pellet Bin #1 (#420), Pellet Bin #2 (#430), Bucket Elevator C (#440), Bagging Screen (#444), and Pellet Bagging Machine (#448).

Fugitive emissions from Fines Cyclone (#160), new Dry Raw Material System Receiving Structure (#503) and Cyclone (#512) are ducted to the Baghouse (#165). Fugitive emissions from the Baghouse (#165) vent to the atmosphere at emission point EP-3E at maximum permitted rates of 2.0 lb/hour and 7.7 TPY.

The Grinder Collection Auger (#141) was added at the time the Dry Raw Material Feed System was added to provide better evacuation of material from the Grinder (#140) and to allow for a larger negative air plenum, which reduces the velocity of the negative air being pulled from the discharge of the Grinder (#140). The lower velocity entrains less particulate matter in the airflow and reduces the loading of the Fines Cyclone (#160). The new Dry System Material Silo (#507) vent provides negative airflow to alleviate fugitive dust and adds very little loading to the Fines Cyclone (#160). The new larger air plenum for the Grinder (#140) will reduce the loading of the Fines Cyclone (#160) far more than the new Dry System Material Silo (#507) vent will add. The current airflow into the Baghouse (#165) is 21,500 CFM, while it is actually sized for 26,500 CFM.

The facility shall be modified and operated in accordance with the following equipment and control device information taken from permit applications R13-1965E, R13-1965D, R13-1965C, PD05-034, R13-1965B, R13-1965A and R13-1965:

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
Green Raw Material Feed System					
Yard Storage	1995	Open Storage Pile - maximum capacity of 37,000 tons - received wood waste from trucks, stores it and then a front-end loader transfers it to the In-feed Bin (110)	-----	241,920	N
104	1995	Covered Wood Waste Storage Building - maximum capacity of 8,000 tons - receives wood waste from a front-end loader after trucks dump it onto a concrete pad, stores it and then a front-end loader transfers it to the In-feed Bin (110)	-----	241,920	N
110	1995	In-feed Bin - maximum capacity of 16 tons - receives wood waste from a front-end loader and then feeds it to the scalper screen (112)	31.50	241,920	PE
112	1995	Scalper Screen - receives wood waste from the in-feed bin (110), sizes it and material > 3" drops to the overs bunker (114) and material < 3" drops to the cross-over belt (116)	31.50	241,920	PE

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
114	1995	Overs Bunker - receives <1.5" wood waste from the scalper screen (112) and the shaker screen (120)	31.50	241,920	N
116	1995	Cross-over Belt - receives wood waste from the scalper screen (112) and transfers it to the in-feed belt (118)	31.50	241,920	N
118	1995	In-feed Belt - receives wood waste from the cross-over belt (116) and transfers it to the shaker screen (120)	31.50	241,920	FE [3]
120	1995	Shaker Screen - receives wood waste from the in-feed belt (118), sizes it and material >1.5" drops to the overs bunker (114) and material <1.5" drops to the surge bin (122)	31.50	241,920	FE [3]
122	1995	Surge Bin - maximum capacity of 8 tons - receives <1.5" wood waste from the shaker screen and then drops it to the dryer (230) - see Dryer Raw Material Feed System below	31.50	241,920	FE [3]
Dry Raw Material Feed System					
503	2007	Dry Raw Material Feed System Receiving Structure - receives dry wood waste from self unloading truck trailers and it drops into the Reclaim Bin (504). The Negative Draft Fan (501) creates a negative pressure system and draws fugitive particulate matter to the Baghouse (165). In the event that this system is down or full, the truck trailers will be backed into a hanging/sliding tarp area under an overhead high pressure water spray system for unloading in the Green Raw Material storage area.	50	92,160	FE, 165
504	2007	Dry Raw Material Feed System Reclaim Bin - 20 ton capacity - receives dry wood waste from self unloading truck trailers and feeds it to the Bucket Feed Auger (505). The Enclosure (503) encloses this process and the Negative Draft Fan (501) creates a negative pressure system and draws fugitive particulate matter to the Baghouse (165)	50	92,160	FE, 165
505	2007	Dry Raw Material Feed System Bucket Feed Auger - receives dry wood waste from the Reclaim Bin (504) and transfers it to the Bucket Elevator (506)	60	92,160	FE
506	2007	Dry Raw Material Feed System Bucket Elevator - receives dry wood waste from the Bucket Feed Auger (505) and transfers it to the Silo (507)	75	92,160	FE
507	2007	Dry Raw Material Feed System Silo - 80 ton capacity - receives dry wood waste from the Bucket Elevator (506), stores it and then the Silo Unloader (508) reclaims the material. The Silo is vented to the Fines Cyclone (160)	75 in 12 out	92,160	FE, 160
508	2007	Dry Raw Material Feed System Silo Unloader - receives dry wood waste from the Silo (507) and feeds it to the Discharge Auger (509)	12	92,160	FE

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
509	2007	Dry Raw Material Feed System Discharge Auger - receives dry wood waste from the Silo Unloader and transfers it through the Discharger Airlock (510) and into the Blowpipe (511)	12	92,160	FE
511	2007	Dry Raw Material Feed System Blowpipe - powered by the Blower (502) - receives dry wood waste from the Discharge Auger (509) and transfers it to the Cyclone (512)	12	92,160	FE
512	2007	Dry Raw Material Feed System Cyclone - Mac Model No. CT30 -single stage dry cyclone - 99.88 % collection efficiency - 5.7 in. H_2O pressure drop - receives dry wood waste from the Blowpipe (511) and it separates the fines material out to the Baghouse (165) and the course material is transferred through the Cyclone Airlock (513) to the main material auger (134)	12	92,160	FE, 165
Dryer System					
202	2005	Fuel Scalping System - feeds dried wood waste to the fuel silo fill blower (204)	3	23,040	FE [3]
204	2005	Fuel Silo Fill Blower - receives dried wood waste from the fuel scalping system (202) and transfers it to the fuel storage silo (206)	3	23,040	FE
206	2005	Fuel Storage Silo - receives dried wood waste from the fuel silo fill blower (204), stores it and then feeds it to the fuel feed screw (208)	3	23,040	FE
208	2005	Fuel Feed Screw - receives dried wood waste from the fuel storage silo (206) and transfers it to fuel grinder (212)	2.4	18,432	FE
212	2005	Fuel Grinder - receives dried wood waste from the fuel feed screw (208) and then feeds it to the fuel blower (214)	2.4	18,432	FE
214	2005	Fuel Blower - receives sized dried wood waste from the fuel grinder (212) and transfers it to the wood burner (220)	2.4	18,432	FE
220	2005	Wood Burner - maximum heat input of 45MM Btu/hr - receives sized dried wood waste from the fuel blower (214) and combusts it in the furnace (240)	-----	-----	FE
250	1995	Natural Gas Burner - maximum heat input of 48MM Btu/hr - uses pipeline quality natural gas and combusts it in the furnace (240)	-----	-----	FE
240	1995	Furnace - combustion zone for the wood burner (220) or natural gas burner (250) and the combustion gases pass through to the dryer (230)	-----	-----	FE
230	1995	Dryer - receives combustion air from the furnace (240) and uses it to dry the <1.5" wood waste received from the surge bin (122) - see Raw Material Feed System above - and then transfers the dried wood waste to the main cyclone (130)	22	168,960	130
Dried Material Fuel Feed System					

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
130	1995	Main Cyclone - M.E.C. Product Cyclone - 99.99 % collection efficiency - receives the dried wood waste from the dryer (230) and it separates the fines material out to a multi-clone (138) and the course material is transferred to the main material auger (134)	22	168,960	138
138	2006	Multi-Clone - Onix Corporation Model No. ONL-150-4-PEC - 85.0 % collection efficiency - receives fine wood waste from the main cyclone (130) and it removes the course material back to the fines cyclone (160) and then the fine material is removed by an induced draft fan where it is then vented through the main stack (EP-1E)	0.0375	288	160
134	1995	Main Material Auger - receives dried wood waste from the main cyclone (130), the cooler cyclone (350) and the fines cyclone (160) and transfers it to the grinder (140)	19	145, 920	FE
140	1995	Hammermill Grinder - receives dried wood waste from the main material auger (134), grinds it from -1.5" to 0.25" and then it is fed to the grinder collection auger (141). Fugitive emissions ducted to the fines cyclone (160).	22	168, 960	FE, 160
141	2007	Grinder Collection Auger - receives dried wood waste from the grinder (140) and transfers it to grinder discharge auger (142) (Added in 2007 inconjunction with the Dry Raw Material Feed System)	22	168, 960	FE
142	1995	Grinder Discharge Auger - receives dried wood waste from the grinder collection auger (141) and transfers it to bucket elevator A (146)	22	168, 960	FE
146	1995	Bucket Elevator A - receives dried wood waste from the grinder discharge auger (142) and transfers it to the mill surge bin feeder auger (148). The fines are vented to the fines cyclone (160).	22	168, 960	160
148	1995	Mill Surge Bin Feeder Auger - receives dried wood waste from bucket elevator A (146) and transfers it to the mill surge bin (150). Fugitive emissions ducted to the fines cyclone (160).	22	168,960	FE, 160
150	1995	Mill Surge Bin - maximum capacity of 8 tons - receives dried wood waste from the mill surge bin feeder auger (148), stores it temporarily and then it is transferred to one of the pellet mills. Fugitive emissions ducted to the fines cyclone (160).	22	168, 960	160
Pellet Production System					
306	1995	Pellet Mill #2 - receives dried wood waste from the mill surge bin (150) and pushes it through a dye and compresses it to form the pellets which drop to pellet cooler #1 (320)	16 (combined)	122,880 (combined)	FE [3]
308	1995	Pellet Mill #3 - receives dried wood waste from the mill surge bin (150) and pushes it through a dye and compresses it to form the pellets which drop to pellet cooler #1 (320)			FE [3]

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
304	between 1995 and 1999	Pellet Mill #1 - receives dried wood waste from the mill surge bin (150) and pushes it through a dye and compresses it to form the pellets which drop to pellet cooler #2 (322)			FE [3]
310	2005	Pellet Mill #4 - receives dried wood waste from the mill surge bin (150) and pushes it through a dye and compresses it to form the pellets which drop to pellet cooler #2 (322)			FE [3]
320	1995	Pellet Cooler #1 - receives wood pellets from pellet mills #2 and #3 (304 and 306), cools them and then feeds them to cooler discharge auger #1 (330). The fines are vented to the cooler cyclone (350).	10	76,800	350
322	2005	Pellet Cooler #2 - receives wood pellets from pellet mills #1 and #4 (308 and 310), cools them and then feeds them to cooler discharge auger #2 (332). The fines are vented to the cooler cyclone (350).	10	76,800	350
330	1995	Cooler Discharge Auger #1 - receives cooled wood pellets from pellet cooler #1 (320) and cooler discharge auger #2 (332) and transfers them to the pellet surge bin (404)	16 (combined)	122,880 (combined)	FE
332	2005	Cooler Discharge Auger #2 - receives cooled wood pellets from pellet cooler #2 (322) and transfers them to cooler discharge auger #1 (330)			FE
350	2005	Cooler Cyclone - Groebel Consulting - 85 % collection efficiency - receives fine material from pellet coolers #1 and #2 (320 and 322) and the course material is directed back to the main material auger (134) while the fine material is vented through the cooler stack (EP-2E)	0.25	1,920	-----
404	1995	Pellet Surge Bin - receives wood pellets from cooler discharge auger #1 (330), stores them temporarily and then drops them to the pellet screen (406). Fugitive emissions ducted to the fines cyclone (160).	16	122,880	160
406	1995	Pellet Screen - receives wood pellets from the pellet surge bin (404), sizes them and removes the less than 0.188" pellets and feeds the rest to the weight belt (408). Fugitive emissions ducted to the fines cyclone (160).	16	122,880	160
408	1995	Weight Belt - receives sized wood pellets from the pellet screen (406) and transfers them to bucket elevator B (410). The operators monitor the production rate through this weight belt.	16	122,880	FE [3]
410	1995	Bucket Elevator B - receives sized wood pellets from the weight belt (408) and transfers it to pellet bins #1 or #2. Fugitive emissions ducted to the fines cyclone (160).	16	122,880	160
420	1995	Pellet Bin #1 - maximum capacity of 180 tons - receives sized wood pellets from bucket elevator B (410), stores them temporarily and then feeds them to the pellet bin discharge auger (432). Fugitive emissions ducted to the fines cyclone (160).	16 combined	122,880 combined	FE [3], 160

Equipment ID #	Date of Installation or Manufacture [1]	Emission Unit Description	Design Capacity		Control Device(s) [2]
			TPH	TPY	
430	1995	Pellet Bin #2 - maximum capacity of 180 tons - receives sized wood pellets from bucket elevator B (410), stores them temporarily and then feeds them to the pellet bin discharge auger (432). Fugitive emissions ducted to the fines cyclone (160).			FE [3], 160
432	1995	Pellet Bin Discharge Auger - receives sized wood pellets from pellet bins #1 and #2 (420 and 430) and transfers them to bucket elevator C (440). Fugitive emissions ducted to the fines cyclone (160).	16	122,880	FE, 160
440	1995	Bucket Elevator C - receives sized wood pellets from the pellet bin discharge auger (432) and transfers them to the bagging screen (444). Fugitive emissions ducted to the fines cyclone (160).	16	122,880	FE [3], 160
444	1995	Bagging Screen - receives sized wood pellets from bucket elevator C (440), sizes them and removes the less than 0.188" pellets and feeds the rest to the pellet bagger machine (448). Fugitive emissions ducted to the fines cyclone (160).	16	122,880	160
448	1995	Pellet Bagger Machine - receives sized wood pellets from the bagging screen (444) and bags them. Fugitive emissions ducted to the fines cyclone (160).	16	122,880	FE [3], 160
452	1995	Automatic Stacker - stacks the bags of wood pellets	16	122,880	FE [3]
456	1995	Automatic Wrapper - wraps the bags of wood pellets	16	122,880	FE [3]
460	1995	Staging Rolls for Forklift Pickup - prepares the bags of wood pellets for storage and them shipment	16	122,880	FE [3]
Fines Collection					
160	2001	Fines Cyclone - Groebel Consulting - 99.83 % collection efficiency - receives fines from the multi-clone (138), bucket elevator A (146), mill surge bin (150), pellet surge bin (404), pellet screen (406), bucket elevator B (410) and the bagging screen (144) and it removes the course material back to the main material auger (134) and then the fine material is removed by an induced draft fan to the baghouse (165)	2.5	19,200	165
165	2001	Baghouse - Wiedenmann Model No. 144MCF255-255 - 99.99 % collection efficiency - receives fines from the fines cyclone (160) and filter fabric bags remove the larger particles and the fine material is then vented through the baghouse stack (EP-3E)	0.01007	77.34	-----

[1] These dates were obtained from the forms contained within application R13-1965E. However, the original permit to construct R13-1965 was received on October 20, 1995 and approved on June 3, 1996.

[2] Control Device Abbreviations: FE - Full Enclosure; PE - Partial Enclosure; WS - Water Sprays; N - None; numbers indicate the control equipment ID #.

[3] These pieces of equipment are fully enclosed (FE) within a building.

SITE INSPECTION

Eric Ray of the DAQ's Compliance and Enforcement Section performed an unannounced full compliance inspection on July 29, 2011. The contact person at the facility was John Udder, Plant Manager. Here are Mr. Ray's notes: "No VE problems, fugitive or otherwise, except that M22 checks were not properly escalated to M9 after three consecutive monthly detections and no one was M9 certified. Permit update agreed to in 2009 NOV response was not done but, subsequent to site visit, was started. Improved fugitive controls agreed to in 2009 NOV response were implemented."

The nearest residences are approximately 900 feet away and are located across State Route 5. The facility is located in the valley along the Little Kanawha River and the nearest residences are scattered across the hillside across State Route 5 at a higher elevation.

Directions from Charleston are to take I-77 North, take I-79 North and travel approximately 78 miles, take Exit 79 for Burnsville, turn left onto State Route 5 and travel approximately 6.5 miles, turn left into the Gilmer County Industrial Park and travel approximately 0.2 miles to the facility's office.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Information to calculate the emission rates for the wood burner were obtained from AP-42 5th Edition Section 1.6 Wood Residue Combustion in Boilers and other information and stack test results submitted with the application. Although the wood waste fired burner is operationally very different from a wood residue fired boiler, the AP-42 emission factor provides the most representative sulfur dioxide (SO_2) emission factor. The applicant submitted stack test results from tests conducted at their Stouts Mill facility on January 14, 2000, December 13, 2000 and October 24, 2001. SO_2 emission rates should be consistent for all wood burning equipment burning similar wood species because they depend solely on the sulfur content of the wood waste and are not influenced by the method of combustion. With the exception of the SO_2 emission factor, AP-42 Section 1.6 is not applicable to the wood waste fired burner due to the differences in combustion methodology. Wood residue fired boilers typically burn a pile of green wood (35 to 60 percent moisture content) on some variety of platform or grate, while the wood waste fired burner burns dried wood waste (6 to 12 percent moisture content) in suspension.

The applicant also submitted stack test results from tests performed in August 2006 for a similar wood-fired burner and rotary dryer operating at the New England Wood Pellet facility located in Jaffrey New Hampshire. Based on Lignetics' permitted pellet production rate of 16 oven dried tons (ODT) of wood waste/sawdust per hour and the calculated maximum dried wood waste/sawdust feed rate of approximately 3 ODT per hour to the wood waste burner, the maximum hourly throughput for the Rotary Dryer (230) is 19 ODT per hour. The heat content of the dried wood waste/sawdust is conservatively estimated at 8,000 Btu/lb. The maximum amount of wood waste/sawdust to be fired by the Wood Burner (#220) shall not exceed 5,625 pounds per hour (lb/hr) or 21,600 TPY. Also, Lignetics is proposing new annual emission rates based on 7,680 hours of operation per year. The emission calculations were performed by the applicant and checked by the writer for accuracy and completeness.

Here are the emission factors used in the calculations for using the 45 MMBtu/hr wood

waste/sawdust fired burner and rotary dryer:

Wood Waste/Sawdust Burner in Use			
Pollutant	**Emission Factor**	**Source**	**Safety Factor Applied**
PM (Particulate Matter)	0.89 lb/ODT [1]	Stack Test [2]	1.2
SO_2 (Sulfur Dioxide)	0.025 lb/MMBtu	AP-42 [3]	-----
NO_X (Oxides of Nitrogen)	0.67 lb/ODT [1]	Stack Test [2]	2.0
CO (Carbon Monoxide)	1.15 lb/ODT [1]	Stack Test [2]	-----
VOCs (Volatile Organic Compounds)	0.53 lb/ODT [1]	Stack Test [2]	2.0

[1] ODT stands for oven dried ton of wood waste/sawdust throughput
[2] Emission Factors are based on the August 2006 stack test on a similar wood waste fired burner and rotary dryer at the New England Wood Pellet facility in Jaffrey, New Hampshire.
[3] Emission factor for SO_2 was obtained from AP-42 5th Edition - Section 1.6 Wood Residue Combustion in Boilers (9/03) Table 1.6-2.

The writer calculated the individual and cumulative potential to emit Hazardous Air Pollutants (HAPs) emissions based on the emission factors found in AP-42 5th Edition Section 1.6 Wood Residue Combustion in Boilers (9/03) - Table 1.6-3. The cumulative total potential to emit HAPs are 0.78 pounds per hour and 3.00 TPY. Please refer to the attached calculations for more information.

The applicant has proposed the following maximum emissions based on the emission factors listed above, 7,680 hours of operation per year and use of the 45 MMBtu/hr wood waste/sawdust burner and rotary dryer which uses the main cyclone (130) and multi-clones (138) as control devices and vents at emission point EP-1E:

Emission Point EP-1E - Wood Waste/Sawdust Burner In Use							
	PM	**PM_{10}**	**SO_2**	**NO_X**	**CO**	**VOCs**	**HAPs**
lb/hr	16.9	16.9	1.1	12.7	21.9	10.0	0.78
TPY	64.9	64.9	4.3	48.7	84.1	38.4	3.00

The writer calculated the individual and cumulative potential to emit HAPs emissions based on the emission factors found in AP-42 5th Edition Section 1.4 Natural Gas Combustion (7/98) - Table 1.4-3. The cumulative total potential to emit HAPs are 0.09 pounds per hour and 0.35 TPY. Please refer to the attached calculations for more information.

The applicant has the capability to use the natural gas burner and has proposed the following maximum emissions based on 7,680 hours of operation per year and the potential use of the 48 MMBtu/hr natural gas burner and rotary dryer which uses the main cyclone (130) and multi-clones (138) as control devices and would also vent at emission point EP-1E:

Emission Point EP-1E - Natural Gas Burner In Use							
	PM	**PM_{10}**	**SO_2**	**NO_X**	**CO**	**VOCs**	**HAPs**

lb/hr	10.6	10.6	0.1	20.0	18.0	5.7	0.09
TPY	40.7	40.7	0.38	76.8	69.1	21.9	0.35

Lignetics has proposed the hourly emission rate for PM (particulate matter) for the pellet cooler cyclone (350) at emission point EP-2E to remain the same at 3.1 lb/hr and to change the annual limit to 11.9 TPY based on 7,680 hours of operation per year. As a conservative approach, it is assumed that all of the PM emissions are also less than 10 microns in diameter (PM_{10}). Therefore, the hourly emission rate for PM_{10} at emission point EP-2E will be assumed to also be 3.1 lb/hr and 11.9 TPY.

Lignetics has also proposed to revise the hourly and annual emission rates for the fines cyclone (160) and fines baghouse (165) at emission point EP-3E to now be 2.0 lb/hr and 7.7 TPY based on 7,680 hours of operation per year. These emission rates are being revised to reflect the data collected during stack tests conducted at the facility in October 2001 and an added safety factor. As a conservative approach, it is assumed that all of the PM emissions are also less than 10 microns in diameter (PM_{10}). Therefore, the hourly emission rate for PM_{10} at emission point EP-3E will be assumed to also be 2.0 lb/hr and 7.7 TPY.

The writer calculated the fugitive emissions from transfer points located outside of the building based on the emission factors and the batch or continuous drop equations found in AP-42 5th Edition Section 13.2.4 Aggregate Handling and Storage Piles (11/06). The potential to discharge fugitive emissions are 0.05 pounds per hour and 0.14 TPY of PM, of which 0.02 pounds per hour and 0.07 TPY will be PM_{10}. Please refer to the attached calculations for more information.

The writer calculated the fugitive emissions from vehicular traffic on haulroads based on the emission factors and equations found in AP-42 5th Edition Section 13.2.1 Paved Haulroads (11/06) and information from application R13-1965. The potential to discharge fugitive emissions are 6.00 pounds per hour and 7.68 TPY of PM, of which 1.17 pounds per hour and 1.50 TPY will be PM_{10}. Please refer to the attached calculations for more information.

The writer also calculated the fugitive emissions from open stockpiles based on the emission factors and equations found in AP-42 4th Edition Section 11.2.3 Aggregate Handling and Storage Piles (5/83). The potential to discharge fugitive emissions are 0.05 pounds per hour and 0.15 TPY of PM, of which 0.05 pounds per hour and 0.16 TPY will be PM_{10}. Please refer to the attached calculations for more information.

Refer to the following table for a summary of the maximum potential to discharge for the facility:

Maximum Potential to Discharge													
Pollutant	**Emission Point EP-1E**		**Emission Point EP-2E**		**Emission Point EP-3E**		**Transfer Points**		**Paved Haulroads**		**Open Stockpiles**		**Facility Wide Potential to Discharge** [1]
	lb/hr	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**lb/hr**	**TPY**	**TPY**
PM [2]	16.9	64.9	3.1	11.9	2.0	7.7	0.05	0.15	5.27	8.64	0.05	0.20	93.52

PM_{10} [2]	16.9	64.9	3.1	11.9	2.0	7.7	0.05	0.16	1.03	1.69	0.02	0.10	86.45
SO_2	1.1	4.3	---	---	---	---	---	---	---	---	---	---	4.3
NO_x	20.0	76.8	---	---	---	---	---	---	---	---	---	---	76.8
CO	21.9	84.1	---	---	---	---	---	---	---	---	---	---	84.1
VOCs	10.0	38.4	---	---	---	---	---	---	---	---	---	---	38.4
HAPs	0.78	3.00	---	---	---	---	---	---	---	---	---	---	3.00

[1] The worst case Facility Wide Potential to Discharge for the listed pollutants occurs when the facility is using the woodwaste/sawdust burner, except for NO_X which occurs when the facility would be using the natural gas burner

[2] As a conservative approach, it is assumed that all of the PM emissions are also less than 10 microns in diameter (PM_{10}) for emission points EP-1E, EP-2E and EP-3E

REGULATORY APPLICABILITY

The proposed modification of an existing wood pellet manufacturing plant is subject to the following state and federal rules:

45CSR4: *To Prevent and Control the Discharge of Air Pollutants Into the Open Air Which Causes or Contributes to an Objectionable Odor or Odors*

The facility is subject to the requirements of 45CSR4 and shall not allow the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

45CSR7: *To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations*

45CSR7 applies to "source operations" located at "manufacturing processes" that, excluding those manufacturing processes specified under §45-7-10.5 and §45-7-10.6, have the potential to emit particulate matter and acid gases. The facility is subject to the requirements of 45CSR7 because it meets the definition of a "manufacturing process" as defined in Section 2.20.

Section 3.1 of 45CSR7 sets an opacity limit of 20% on all applicable source operations. The facility should be able to be in compliance with this requirement.

Section 4.1 of 45CSR7 requires that each manufacturing process meet a particulate matter stack emission limit based on the weight of material processed through the source operation. The emission limits are given under Table 45-7A and are based on the type source operation as defined in this Rule.

Under Section 2.39 of 45CSR7, this operation would be defined as a "type 'a'" source operation. Based on the maximum process weight rate of 65,000 pounds per hour (32.5 TPH), the maximum allowable emission of 31.6 pounds per hour is derived from Table 45-7A. The maximum permitted emission rate will be 22.0 pounds per hour, or approximately 70% of the maximum allowable emission rate. Therefore, the facility should be in

compliance with this requirement.

Section 5.1 of 45CSR7 states that each manufacturing process must include a system to minimize the emissions of fugitive particulate matter.

Section 5.2 of 45CSR7 states that the owner or operator of a plant shall maintain particulate matter control of the plant premises, and plant owned, leased or controlled access roads, and use good operating practices in relation to stockpiling and general material handling to minimize particulate matter generation and atmospheric entrainment. The only fugitive source of emissions will be the unpaved haulroads and wood waste open storage piles. The facility has proposed the use of a water truck to minimize emissions from the unpaved haulroads and work areas and, therefore, the facility should be in compliance with this requirement.

45CSR13: Permits For Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures For Evaluation

The permittee has applied for an after-the-fact modification to their existing permit. The applicant submitted the required $1,000 application fee on January 20, 2012 and published a Class I legal advertisement in *The Glenville Democrat* on January 5, 2012.

45CSR22: Air Quality Management Fee Program

The facility is subject to the requirements of 45CSR22 and shall pay all fees according to the application fee schedule and Certificate to Operate fee schedule. The proper application fee for a modification application ($1,000) was received on January 20, 2012.

The proposed modification of an existing wood pellet manufacturing plant is <u>not</u> subject to 45CSR27 (Toxic Air Pollutants), 45CSR14 (PSD), 40 CFR 60 (NSPS), NESHAPS or the following state and federal rules:

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

This facility is not subject to the requirements of 45CSR2 because it does not utilize an indirect heat exchanger. 45CSR2 subsection 2.14 defines an indirect heat exchanger as a "device that combusts any fuel and produces steam or heats water or any other heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in subsection 2.26."

This facility is equipped with a wood waste (sawdust) dryer which can be fueled by natural gas or dried wood waste (sawdust) and is used to dry green wood waste (sawdust) from an around of 50% moisture content to 10% moisture content. Therefore, this facility is not subject to the requirements of 45CSR2.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This facility is not subject to the requirements of 45CSR10 because it does not utilize a "Fuel Burning Unit" as defined in subsection 2.8 as "any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer." 45CSR10 subsection2.9 defines an indirect heat exchanger as a "device that combusts any fuel and produces steam or heats water or any other heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in subsection 2.18.."

This facility is equipped with a wood waste (sawdust) dryer which can be fueled by natural gas or dried wood waste (sawdust) and is used to dry green wood waste (sawdust) from an around of 50% moisture content to 10% moisture content.

It was determined through the DAQ that the operation of dryers are defined as manufacturing processes source operations and not as fuel burning units within the definition and intent of Regulation 10 (45CSR10). Therefore, dryers must comply with Subsection 4.1, unless the potential to emit for sulfur oxides is less than 500 pounds per year. The estimated maximum potential to emit sulfur oxides for the heater is 4.3 pounds per year. Therefore, this facility is not subject to the requirements of 45CSR10 and Subsection 4.1.

45CSR17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage And Other Sources of Fugitive Particulate Matter

This facility is not subject to the requirements of 45CSR17 because it does not handle, prepare or store any of the materials defined in Subsection 2.4 as "limestone, dolomite, iron ore, slag, coke, coal, sandstone, magnetite, sinter, sand, coal refuse, soda ash, ash, cement or earth."

Also, subsection 6.1 states: "Sources that are subject to the fugitive particulate matter emission requirements of 45CSR2, 45CSR3, 45CSR5 and 45CSR7 shall be exempt from the provisions of this rule, provided that such sources shall not be exempt from the provisions of W. Va. Code §§22-5-1 et seq., including the provisions of §22-5-3 relating to statutory air pollution. This facility is subject the fugitive particulate matter emission requirements of 45CSR7.

Therefore, this facility is not subject to the requirements of 45CSR17.

45CSR27: To Prevent and Control the Emission of Toxic Air Pollutants

The facility is not subject to the requirements of 45CSR27 because it does not meet the definition of a Chemical Processing Unit as defined in Section 2.4. This issue was discussed with Renu Chakrabarty, the DAQ's Air Toxics Coordinator, on June 15, 2009.

45CSR30: Requirements for Operating Permits

The facility is not subject to the requirements of 45CSR30. The facility's potential to emit will be 93.52 TPY for PM, 86.45 TPY for PM_{10}, 4.3 TPY for SO_2, 76.8 TPY for NO_X, 84.1 TPY for CO, 38.4 TPY for VOCs and 3.0 TPY for combined HAPs, not including fugitive emissions, which will all be less than the threshold of 100 TPY for any regulated criteria pollutants and the potential to emit for Hazardous Air Pollutants (HAPs) will be less than ten (10) tons per year for any listed HAP and less than 25 tons per year for any combination of such HAPs.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

A toxicity analysis was not performed because the pollutants being emitted from this facility are PM, PM_{10} and the normal products of combustion (CO, NO_X and VOCs) and as such, should not pose any adverse health effects to the general public.

AIR QUALITY IMPACT ANALYSIS

Air dispersion modeling was not performed due to the size of the proposed modification and the location of this existing facility. This wood pellet manufacturing plant is located in Gilmer County, WV, which is in attainment for all criteria pollutants.

MONITORING OF OPERATIONS

The opacity from emission points EP-1E, EP-2E and EP-3E will be required to be maintained at or below twenty percent. The facility will be required to maintain monthly and yearly records of wood pellet production. These records shall be maintained on site for a period of no less than five years and certified by a responsible official.

CHANGES TO PERMIT R13-1965D

- Update the Emissions Unit table in Section 1.0 to include the Dry Raw Material Feed System
- Update the Emissions Unit table in Section 1.0 to include where the fugitive emissions from each piece of equipment is being ducted to which control device
- Add permit condition 4.1.20 regarding the Dry Raw Material Delivery
- Removed the word "normal" from the phrase "normal facility operation" in permit condition 4.2.1
- Removed the word "normal" from the phrase "normal monthly evaluation" in permit condition 4.4.5

RECOMMENDATION TO DIRECTOR

The information contained in this permit application indicates that compliance with all

applicable regulations should be achieved when all of the proposed particulate matter control methods are in operation. Due to the location, nature of the process, and control methods proposed, adverse impacts on the surrounding area should be minimized. Therefore, the granting of a permit to Lignetics of West Virginia, Inc. for the modification of an existing wood pellet manufacturing plant located near Stouts Mill, Gilmer County, WV is hereby recommended.

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Daniel P. Roberts, Engineer Trainee
NSR Permitting Section

October 29, 2012
Date