THE FREEMAN CORPORATION
AIR QUALITY PERMIT
RENEWAL APPLICATION

Permittee Name:	The Freeman Corporation
Mailing Address:	P.O. Box 96, 415 Magnolia Street Winchester, KY 40392-0096
Source Name:	The Freeman Corporation
Mailing Address:	P.O. Box 96 415 Magnolia Street Winchester KY 40392-0096
Permit:	V-14-007
Agency Interest:	811
Activity:	APE20140001
Source ID:	21-049-00004

28 June 2019

The Freeman Corporation
Air Quality Permit Renewal Application

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Section

Air Permit Renewal Application
The Freeman Corporation
Permit Discussion
28 June 2019

The Freeman Corporation has prepared this air permit renewal application for the Kentucky Division for Air Quality in accordance with 401 KAR 52. The application reflects the following changes relative to the 2014 permit application and Permit V-14-007, issued February 25, 2015:

- ➢ Emission Units 05, 09, and 13, natural gas-fired boilers, were listed in the previous permit application but were never installed. They were omitted from Permit V-14-007, and are omitted from this permit renewal application.
- ➢ Three new Emission Units are added here: Paul Saw_01, Paul Saw_02, and Veneer Sizing Bandsaw. Paul Saw_01 was installed in July 2017. The other two units are planned for future installation.
- ➢ Emission factors for the three operating wood waste boilers have been adjusted to reflect results of stack testing conducted by FBT Environmental Services, LLC.

Note that log cooking vats, included on DEP 7007D, Insignificant Activities, have been reconstructed since the prior permit application. Although the new units are larger, it is assumed that the change has no material affect on emissions.

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The Freeman Corporation manufactures wood veneer products under SIC code 2435. Operations include receipt of logs, storage of logs in an outside log yard, processing of logs in cooking vats, debarking operations, trimming operations, sawing operations, slicing operations, and drying operations. The Freeman Corporation collects bark and round-up waste to sell to mulch producers. All other wood waste is utilized as fuel in three wood waste fired boilers. During the winter months, some sawdust and wood chips are purchased from outside suppliers to supplement internally generated wood waste.

Because of self imposed limitations, the entire facility continues to be a non-major source of regulated air pollutants. The principal sources of regulated air emissions are:

- three wood waste boilers (EP11, EP12, EP15)
- four cyclone separators for wood waste collection (EP08, EP44, EP45, EP46)
- outdoor operations including wood grinding (EP42, EP48)

A DEP 7007N is provided for each of the cyclones and boilers.

Insignificant sources of emissions include:

- initial log preparation stations, including debarking
- veneer gluing and drying operations
- log cooking vats
- log watering operations using pond water
- exhaust fans
- log yard road dust

A complete list of insignificant sources is included on DEP 7007DD. A listing of all emission points is given as Table 1.Total plant emissions, both boiler and wood processing operations, are summarized in Table 2.

Table 3 presents boiler information. Table 3a presents boiler operating specifications, emission factors, and assumptions for the six units; Table 3b summarizes emissions from the boilers. Fuel input rates for the boilers are those provided in earlier applications. Emission factors used are those for wood waste boilers from and "*Wood Residue Combustion in Boilers*" (AP-42) prepared for the USEPA, and results of on-site stack testing conducted in February 2018.

Table 4 provides summaries of inputs and emissions from the four cyclone separators used to capture wood waste. As noted, wood waste is collected from various operations around the plant for boiler fuel. This waste is reduced by chippers, transferred to the cyclones by blowers, then stored for future use in the boilers. Emission factors for the cyclones are from *"Emission Factors Wood Products"* (AQ-EF02) published by the Oregon Department of Environmental Quality.

Table 5 details emissions from EP42, wood loading to the boilers, EP48, the Nicholson Chipper, and EP10, the log yard and haul roads.

It is assumed that the maximum operation of the boilers will be 8,760 hours per year; the maximum wood processing production operations are assumed to be 8,400 hours per year, reflecting a standard 7 day per week, 24 hour per day, 50 week year.

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PARP
0018652
Alison Lundergan Grimes
KY Secretary of State
Received and Filed
5/8/2019 10:46:21 AM
Fee receipt: $15.00

Commonwealth of Kentucky
Alison Lundergan Grimes, Secretary o

Alison Lundergan Grimes
Secretary of State
P. O. Box 1150
Frankfort, KY 40602-1150
(502) 564-3490
http://www.sos.ky.gov

Annual Report
Online Filing

ARP

Company: THE FREEMAN CORPORATION
Company ID: 0018652
State of origin: Kentucky
Formation date: 11/30/1955 12:00:00 AM
Date filed: 5/8/2019 10:46:21 AM
Fee: $15.00

Principal Office

P. O. BOX 96
415 MAGNOLIA ST.
WINCHESTER, KY 40391

Registered Agent Name/Address

SCOTT S. HISLE
415 MAGNOLIA ST
WINCHESTER, KY 40391

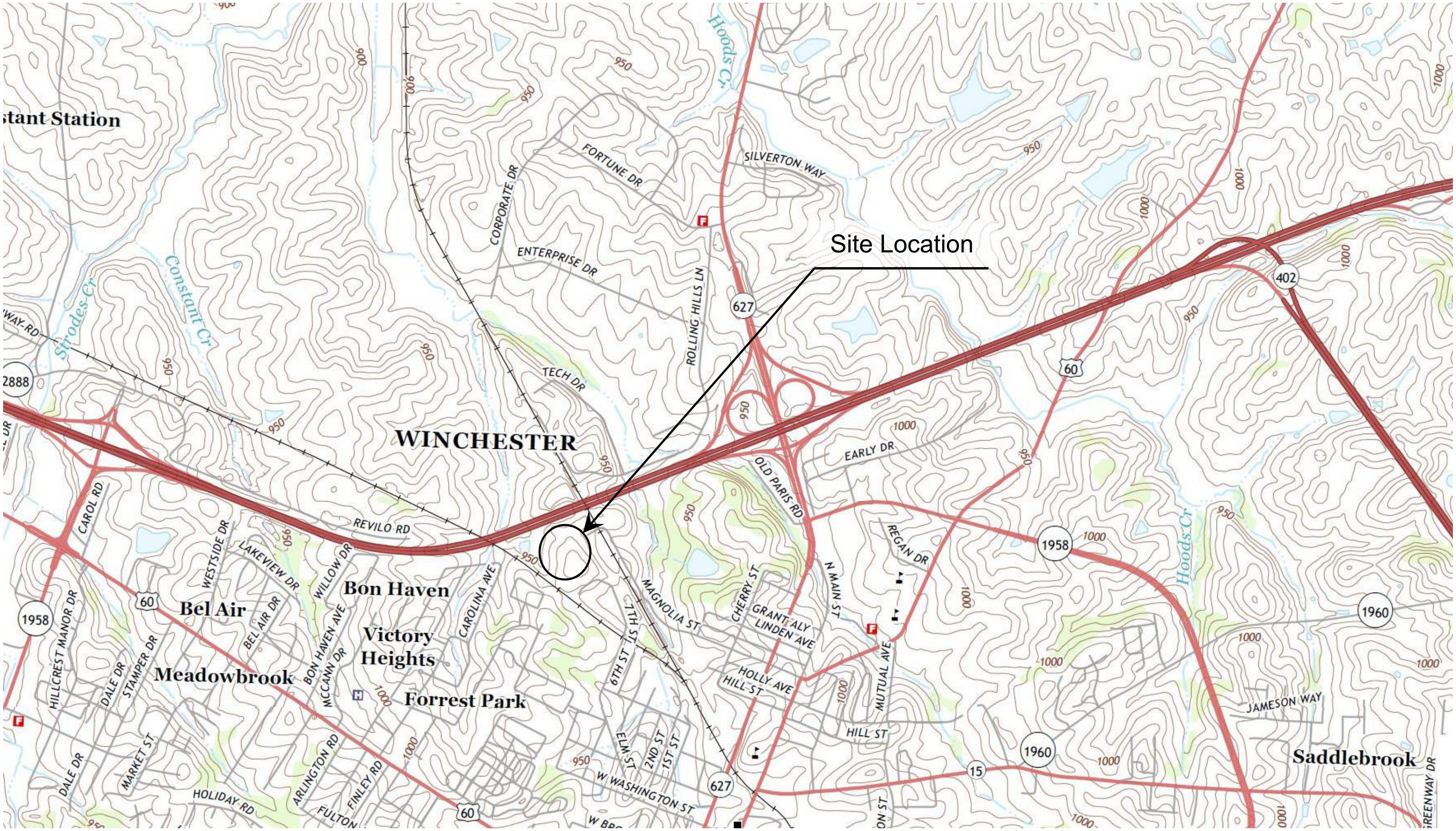
Current Officers

CEO	George T. Freeman	PO Box 96
CFO	Scott S. Hisle	PO Box 96
President	E Reid Freeman	PO Box 96

County: Clark
Business size: Large
Business type: Lumber and Wood Products, Except Furniture

Signatures

Signature SCOTT HISLE
Title CFO



CEDAR CREEK ENGINEERING INC

Winchester, Kentucky

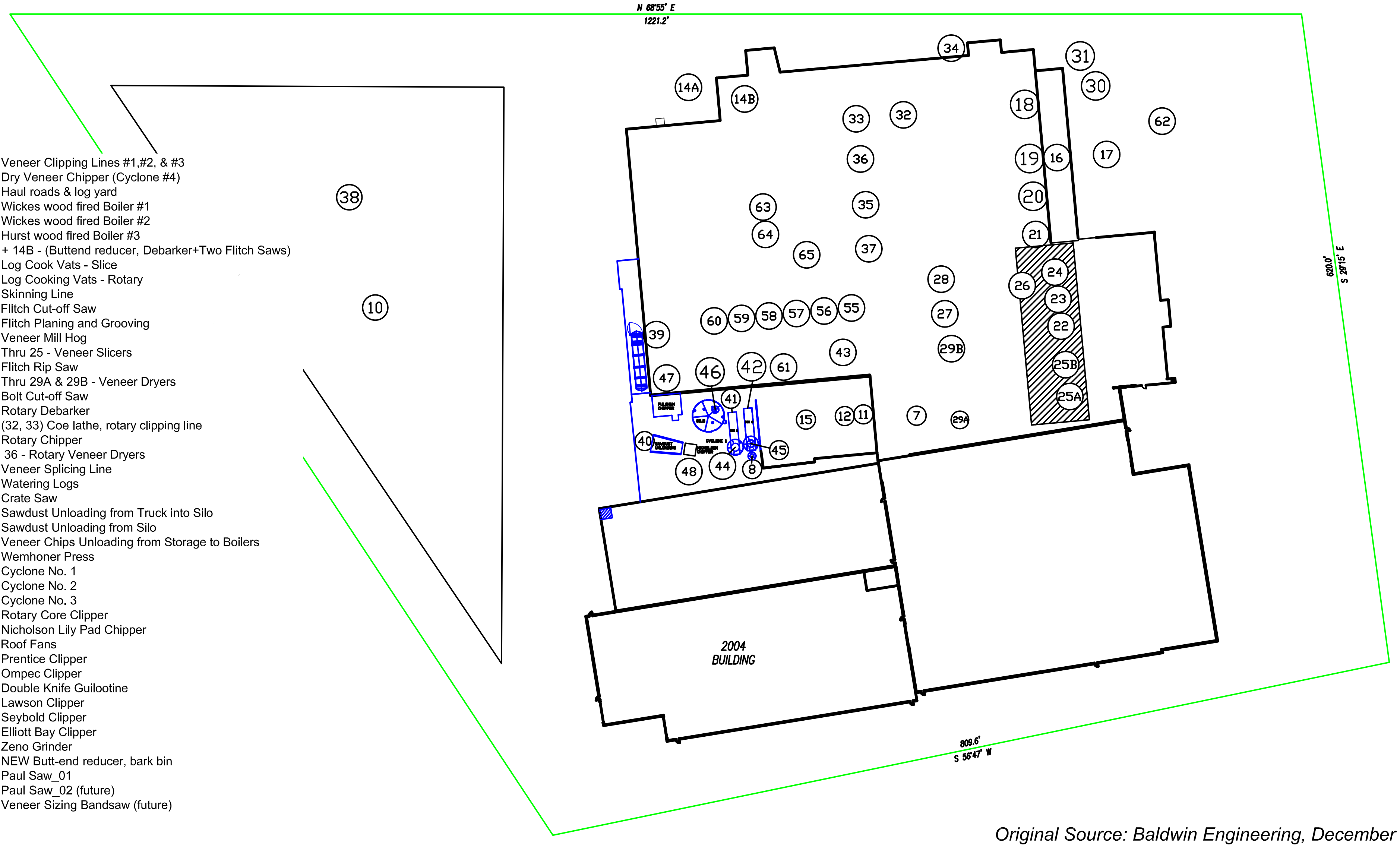
The Freeman Corporation
415 Magnolia Street
Winchester, KY 40392
AI No. 811

Location Map

Drawing Date: 17FEB14

Drawn by: PR

Figure 1



EP 07 - Veneer Clipping Lines #1,#2, & #3
EP 08 - Dry Veneer Chipper (Cyclone #4)
EP 10 - Haul roads & log yard
EP 11 - Wickes wood fired Boiler #1
EP 12 - Wickes wood fired Boiler #2
EP 15 - Hurst wood fired Boiler #3
EP 14A + 14B - (Buttend reducer, Debarker+Two Flitch Saws)
EP 16 - Log Cook Vats - Slice
EP 17 - Log Cooking Vats - Rotary
EP 18 - Skinning Line
EP 19 - Flitch Cut-off Saw
EP 20 - Flitch Planing and Grooving
EP 21 - Veneer Mill Hog
EP 22 - Thru 25 - Veneer Slicers
EP 26 - Flitch Rip Saw
EP 27 - Thru 29A & 29B - Veneer Dryers
EP 30 - Bolt Cut-off Saw
EP 31 - Rotary Debarker
EP 32 - (32, 33) Coe lathe, rotary clipping line
EP 34 - Rotary Chipper
EP 35 + 36 - Rotary Veneer Dryers
EP 37 - Veneer Splicing Line
EP 38 - Watering Logs
EP 39 - Crate Saw
EP 40 - Sawdust Unloading from Truck into Silo
EP 41 - Sawdust Unloading from Silo
EP 42 - Veneer Chips Unloading from Storage to Boilers
EP 43 - Wemhoner Press
EP 44 - Cyclone No. 1
EP 45 - Cyclone No. 2
EP 46 - Cyclone No. 3
EP 47 - Rotary Core Clipper
EP 48 - Nicholson Lily Pad Chipper
EP 50 - Roof Fans
EP 55 - Prentice Clipper
EP 56 - Ompec Clipper
EP 57 - Double Knife Guilootine
EP 58 - Lawson Clipper
EP 59 - Seybold Clipper
EP 60 - Elliott Bay Clipper
EP 61 - Zeno Grinder
EP 62 - NEW Butt-end reducer, bark bin
EP 63 - Paul Saw_01
EP 64 - Paul Saw_02 (future)
EP 65 - Veneer Sizing Bandsaw (future)

Original Source: Baldwin Engineering, December 2008

CEDAR CREEK
ENGINEERING INC
Winchester, Kentucky

The Freeman Corporation
415 Magnolia Street
Winchester, Kentucky

Emission Point Locations

Drawing Date: 28JUN19
Drafted by: PR

Figure 2

Freeman Corp Process Flow

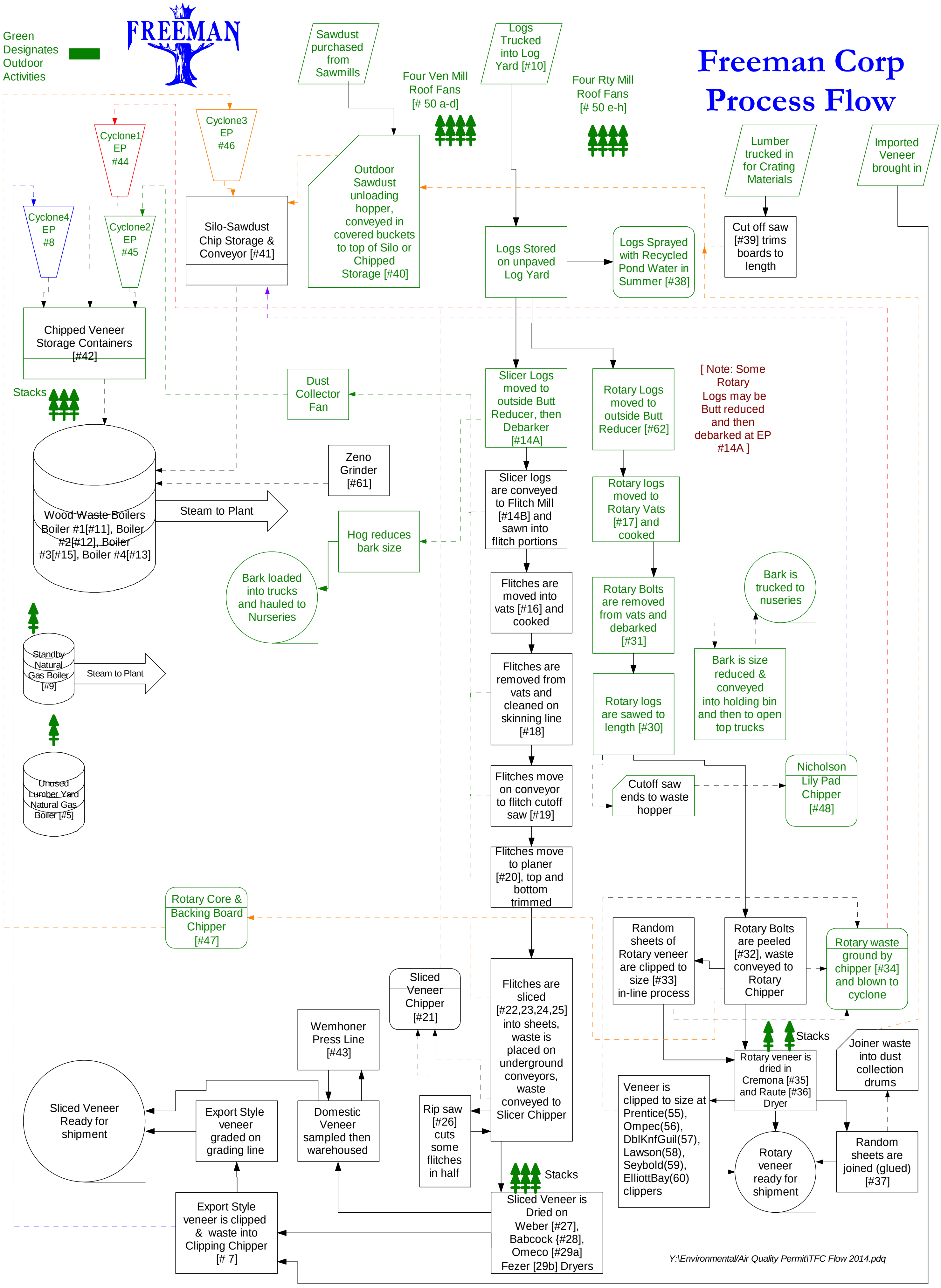


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Table 1
Listing of Emission Points
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Unit Type	Emission Type	Control
EP 07	Veneer Clipping Lines 1, 2, & 3 & Chipper	ACTIVE	WOOD CUTTING	PM	08 CYCLONE 4
EP 08	CYCLONE 4 - Dry Veneer Hog Cyclone	ACTIVE	CYCLONE	PM	NONE
EP 10	Haul Roads & Log Yard	ACTIVE	ROAD	PM	NONE
EP 11	Boiler No.1	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	11 CYCLONE
EP 12	Boiler No. 2	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	12 CYCLONE
EP 14a	Butt-end Reducer, Debarker, Hog & Bark Loading	ACTIVE	WOOD CUTTING	PM	NONE
EP 14b	SAT Flitch Saws	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 15	Boiler No. 3	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	15 CYCLONE
EP 16	Log Cooking Vats - Sliced	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 17	Log Cooking Vats - Rotary	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 18	Skinning Line	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 19	Flitch Cut-off Saw	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 20	Flitch Planing and Grooving	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 21	Veneer Mill Hog	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 22	Slicer # 3 - Capital half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 23	Slicer # 4 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 24	Slicer # 3 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25a	Slicer # 1 - Fezer slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25b	Slicer # 2 - Fezer half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 26	Flitch Rip Saw	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 27	Weber Dryer - # 4	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 28	Babcock Dryer - # 5	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29a	Omeco Dryer - # 1	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29b	Fezer Dryer - # 3	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 30	Rotary Cut-off Saw (transferred via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 31	Rotary Debarker, Williams Hog (via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 32	Rotary Peeler - Coe 4-ft Lathe	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 33	Rotary Clipping Line	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 34	Rotary Veneer Chipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 35	Cremona Dryer - #7	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 36	Raute Dryer - #8	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 37	Splicing/Jointing/Gluing Line (glue vapor)	ACTIVE	GLUING	INSIGNIFICANT	NONE
EP 37	Splicing/Jointing/Gluing Line (wood waste)	ACTIVE	WOOD CUTTING	INSIGNIFICANT	NONE
EP 38	Watering Logs with Pond Water	ACTIVE	POND	INSIGNIFICANT	NONE
EP 39	Crating Trim Saw	ACTIVE	WOOD CUTTING	INSIGNIFICANT	NONE
EP 40	Sawdust unloading into silo	ACTIVE	TRANSFER	INSIGNIFICANT	NONE
EP 41	Sawdust unloading from Silo to Boilers	ACTIVE	TRANSFER	INSIGNIFICANT	NONE
EP 42	Veneer Chips unloading from Storage to Boilers	ACTIVE	TRANSFER	PM	NONE
EP 43	Wemhoner Press Line	ACTIVE	PRESS	INSIGNIFICANT	NONE
EP 44	CYCLONE 1	ACTIVE	CYCLONE	PM	NONE
EP 45	CYCLONE 2	ACTIVE	CYCLONE	PM	NONE
EP 46	CYCLONE 3	ACTIVE	CYCLONE	PM	NONE
EP 47	Rotary Core Chipper	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 48	Nicholson Chipper (Lilly pad)	ACTIVE	WOOD CUTTING	PM	NONE
EP 50 a-h	Rotary & Veneer Mill Roof Vent Fans (8)	ACTIVE	ROOF FAN	INSIGNIFICANT	NONE

6/28/2019

Table 1
Listing of Emission Points
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Unit Type	Emission Type	Control
EP 55	Prentice Clipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 56	Ompec Clipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 57	Double Knife Guillotine	INACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 58	Lawson Clipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 59	Seybold Clipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 60	Elliot Bay Clipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 61	Zeno Grinder	ACTIVE	WOOD CUTTING	PM	NONE
EP 62	NEW Butt-end Reducer, Bark Bin	ACTIVE	WOOD CUTTING	PM	NONE
EP 63	Paul Saw_01	ACTIVE	WOOD CUTTING	PM	NONE
EP 64	Paul Saw_02	FUTURE	WOOD CUTTING	PM	NONE
EP 65	Veneer Sizing Bandsaw	FUTURE	WOOD CUTTING	PM	NONE

Table 2
Summary of Maximum Potential Emissions
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

Source	Pollutant	Uncontrolled Emissions		Controlled Emissions	
		LB/HR	TON/YR	LB/HR	TON/YR
Combustion	NOX	11.2	48.9	11.2	48.9
Combustion	CO	30.4	133.2	30.4	133.2
Combustion	SO2	1.3	5.6	1.3	5.6
Combustion	VOC	0.9	3.8	0.9	3.8
Combustion	PM-10	400.5	1754.3	13.0	56.7
Combustion	PM Total	446.2	1954.2	14.2	62.4
Wood Process Operations	NOX	0.0	0.0	0.0	0.0
Wood Process Operations	CO	0.0	0.0	0.0	0.0
Wood Process Operations	SO2	0.0	0.0	0.0	0.0
Wood Process Operations	VOC	0.00015	0.00066	0.00015	0.00066
Wood Process Operations	Ammonia	0.051	0.223	0.051	0.223
Wood Process Operations	PM-10	9.0	37.9	9.0	37.9
Wood Process Operations	PM Total	9.0	37.9	9.0	37.9
Total Plant Sources	NOX	11.2	48.9	11.2	48.9
Total Plant Sources	CO	30.4	133.2	30.4	133.2
Total Plant Sources	SO2	1.3	5.6	1.3	5.6
Total Plant Sources	VOC	0.9	3.8	0.9	3.8
Total Plant Sources	Ammonia	0.1	0.2	0.1	0.2
Total Plant Sources	PM-10	409.5	1792.2	22.0	94.6
Total Plant Sources	PM Total	455.2	1992.0	23.3	100.3

Table 3a
Emission Factors and Control Efficiencies for Combustion Units

The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Install Date	Status	Operating Basis (HR/YR)	Fuel	Control	Maximum Input (MMBTU/HR)	Uncontrolled Emission Factors (LB/MMBTU)[1]						Post-Control Emission Factors (LB/MMBTU)[1]					
								NOX	CO	PM 10	PM	SO2	VOC	NOX	CO	PM 10[3]	PM	SO2	VOC
11	Boiler # 1	Feb-91	Active	8760	WOOD	11 MULTICLONE	12.0	0.220	0.600	7.900	8.800	0.025	0.017	0.220	0.600	0.389	0.428 [2]	0.025	0.017
12	Boiler # 2	May-91	Active	8760	WOOD	11 MULTICLONE	10.0	0.220	0.600	7.900	8.800	0.025	0.017	0.220	0.600	0.189	0.208 [2]	0.025	0.017
15	Boiler # 3	Aug-96	Active	8760	WOOD	11 MULTICLONE	28.7	0.220	0.600	7.900	8.800	0.025	0.017	0.220	0.600	0.223	0.245 [2]	0.025	0.017

1 *AP-42 Fifth Edition Section 1.6 "Wood Residue Combustion in Boilers," September 2003*

2 *Emission factors from Particulate Emissions Evaluation Report (March 24, 2018)*

3 *Assumes PMTOT/PM10 = 1.1 per values in AP-42 Fifth Edition Section 1.6 "Wood Residue Combustion in Boilers," September 2003*

Table 3b
Maximum Potential Emissions for Combustion Units - 8760 Hours Per Year

The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Fuel	Maximum Potential UNCONTROLLED Emissions (TON/YR)						Maximum Potential CONTROLLED Emissions (TON/YR)					
				NOX	CO	PM 10	PM TOT	SO2	VOC	NOX	CO	PM 10	PM TOT	SO2	VOC
11	Boiler # 1	Active	WOOD	11.56	31.54	415.22	462.53	1.31	0.89	11.56	31.54	20.45	22.50	1.31	0.89
12	Boiler # 2	Active	WOOD	9.64	26.28	346.02	385.44	1.10	0.74	9.64	26.28	8.28	9.11	1.10	0.74
15	Boiler # 3	Active	WOOD	27.66	75.42	993.08	1106.21	3.14	2.14	27.66	75.42	28.00	30.80	3.14	2.14
TOTALS				48.9	133.2	1754.3	1954.2	5.6	3.8	48.9	133.2	56.7	62.4	5.6	3.8

EP No.	Name	Status	Fuel	Maximum Potential UNCONTROLLED Emissions (LB/HR)						Maximum Potential CONTROLLED Emissions (LB/HR)					
				NOX	CO	PM 10	PM TOT	SO2	VOC	NOX	CO	PM 10	PM TOT	SO2	VOC
11	Boiler # 1	Active	WOOD	2.64	7.20	94.80	105.60	0.30	0.20	2.64	7.20	4.67	5.14	0.30	0.20
12	Boiler # 2	Active	WOOD	2.20	6.00	79.00	88.00	0.25	0.17	2.20	6.00	1.89	2.08	0.25	0.17
15	Boiler # 3	Active	WOOD	6.31	17.22	226.73	252.56	0.72	0.49	6.31	17.22	6.39	7.03	0.72	0.49
TOTALS				11.2	30.4	400.5	446.2	1.3	0.9	11.2	30.4	13.0	14.2	1.3	0.9

6/28/2019

Table 4a
Maximum Potential Emissions from Cyclone 1
The Freeman Corporation
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[2,3]	Units	Note
EP 22	Slicer # 3 - Capital half round	FLITCHES	VENEER	CLIPPINGS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 23	Slicer # 4 - Capital slicer	FLITCHES	VENEER	CLIPPINGS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 24	Slicer # 5 - Capital slicer	FLITCHES	VENEER	CLIPPINGS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 25a	Slicer # 1 - Fezer slicer	FLITCHES	VENEER	CLIPPINGS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 25b	Slicer # 2 - Fezer half round	FLITCHES	VENEER	CLIPPINGS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 26	Flitch Rip Saw	FLITCHES	RIPPED FLITCHES	SAWDUST	600	DF/HR	1.000	DF/DF	600	DF/HR	0.0	LB/DF	0.000	LB/HR	TO EP 21; waste included in above
EP 21	Veneer Mill Hog	CLIPPINGS AND SAWDUST	BOILER FUEL	NA	1,143	LB/HR	1.000	LB/LB	**1,143**	LB/HR	0.0	LB/LB	0.000	LB/HR	assume 100% chips transferred to EP44
EP 32	Rotary Peeler - Coe 4-ft Lathe	DEBARKED BLOCKS	VENEER	CORES	4,000	DF/HR	0.860	DF/DF	3,440	DF/HR	0.392	LB/DF	1,568	LB/HR	Product TO EP33; Cores TO EP47
EP 33	Rotary Clipping	VENEER	VENEER	CLIPPINGS	3,440	DF/HR	0.860	DF/DF	2,958	DF/HR	0.538	LB/DF	1,851	LB/HR	TO EP34; includes EP32 peeling waste
EP 55	Prentice Clipper	VENEER	VENEER	CLIPPINGS	9,750	SF/HR	1.000	DF/DF	9,750	DF/HR	0.0140	LB/SF	137	LB/HR	TO EP34
EP 56	Ompec Clipper	VENEER	VENEER	CLIPPINGS	1,500	SF/HR	1.000	DF/DF	1,500	DF/HR	0.0140	LB/SF	21	LB/HR	TO EP34
EP 57	Double Knife Guillotine	VENEER	VENEER	CLIPPINGS	2,500	SF/HR	1.000	DF/DF	2,500	DF/HR	0.0140	LB/SF	35	LB/HR	TO EP34
EP 58	Lawson Clipper	VENEER	VENEER	CLIPPINGS	6,000	SF/HR	1.000	DF/DF	6,000	DF/HR	0.0140	LB/SF	84	LB/HR	TO EP34
EP 59	Seybold Clipper	VENEER	VENEER	CLIPPINGS	4,500	SF/HR	1.000	DF/DF	4,500	DF/HR	0.0140	LB/SF	63	LB/HR	TO EP34
EP 60	Elliott Bay Clipper	VENEER	VENEER	CLIPPINGS	12,000	SF/HR	1.000	DF/DF	12,000	DF/HR	0.0140	LB/SF	168	LB/HR	TO EP34
EP63	Paul Saw_01	VENEER	VENEER	CLIPPINGS	600	DF/HR	0.970	DF/DF	582	DF/HR	0.084	LB/DF	50	LB/HR	
EP64	Paul Saw_02	VENEER	VENEER	CLIPPINGS	600	DF/HR	0.970	DF/DF	582	DF/HR	0.084	LB/DF	50	LB/HR	
EP65	Veneer Sizing Bandsaw	VENEER	VENEER	CLIPPINGS	600	DF/HR	0.970	DF/DF	582	DF/HR	0.084	LB/DF	50	LB/HR	
EP 34	Rotary Veneer Chipper	SL BCKBDS, CLIPPNGS	BOILER FUEL	NA	2,509	LB/HR	1.000	LB/LB	**2,509**	LB/HR	0.000	LB/LB	0.000	LB/HR	TO EP44
EP 44	CYCLONE 1	EP21, EP34	BOILER FUEL	PM TO ATMOSPHERE	3,652	LB/HR	0.99975	LB/LB	**3,652**	LB/HR	0.00025	LB/LB	0.913	LB/HR	8,400 HR/YR
													3.84	TON/YR	

(1) emission factors from in-house measurements
(2) 1 DF = 2.8 LB
(3) cyclone efficiency = 0.5/2000 LB/LB per AQ-EF02

Table 4b
Maximum Potential Emissions from Cyclone 2
The Freeman Corporation
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions [2,3]	Units	Note
EP 14b	Flitch Saws	DEBARKED LOGS	FLITCHES	SAWDUST	1,428	DF/HR	0.98	DF/DF	1,399	DF/HR	0.116	LB/DF	166	LB/HR	
EP 18	Skinning Line	DEBARKED LOGS	SKINNED LOGS	WOOD CHIPS	2,400	DF/HR	0.97	DF/DF	2,328	DF/HR	0.178	LB/DF	427	LB/HR	Product to EP19
EP 19	Flitch Cut-off Saw	SKINNED LOGS	FLITCHES	SAWDUST	2,400	DF/HR	0.96	DF/DF	2,304	DF/HR	0.025	LB/DF	60	LB/HR	Product to EP20
EP 20	Flitch Planing and Grooving	FLITCHES	FLITCHES	SAWDUST	2,304	DF/HR	0.92	DF/DF	2,120	DF/HR	0.474	LB/DF	1,092	LB/HR	
EP 45	CYCLONE 2	COARSE CHIPS, SAWDUST	BOILER FUEL	PM	1,745	LB/HR	0.99975	LB/HR	1,745	LB/HR	0.00025	LB/HR	0.436	LB/HR	
					0.872	TON/HR							1.83	TON/YR	

(1) wood processing emission factors from in-house measurements

(2) 1 DF = 2.8 LB

(3) cyclone efficiency = 0.5/2000 LB/LB per AQ-EF02

Table 4c
Maximum Emissions from Cyclone 3
The Freeman Corporation
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emission Factor[1]	Units	Waste Emissions[2,3]	Units	Note	
EP 22	Slicer # 3 - Capital half round	FLITCHES	VENEER	BACKERBOARDS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.560	LB/DF	336	LB/HR	TO EP47	
EP 25b	Slicer # 2 - Fezer half round	FLITCHES	VENEER	BACKERBOARDS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.560	LB/DF	336	LB/HR	TO EP47	
EP 23	Slicer # 2 - Capital slicer	FLITCHES	VENEER	SL BACKERBOARDS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.560	LB/DF	336	LB/HR	TO EP47	
EP 24	Slicer # 3 - Capital slicer	FLITCHES	VENEER	SL BACKERBOARDS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.560	LB/DF	336	LB/HR	TO EP47	
EP 25a	Slicer # 4 - Fezer slicer	FLITCHES	VENEER	SL BACKERBOARDS	600	DF/HR	0.800	DF/DF	480	DF/HR	0.560	LB/DF	336	LB/HR	TO EP47	1,008
EP 32	Rotary Peeler - Coe 4-ft Lathe	DEBARKED BLOCKS	VENEER	CORES	4,000	DF/HR	0.860	DF/DF	3,440	DF/HR	0.392	LB/DF	1,568	LB/HR	TO EP47	
EP 30	*Rotary Cut-off Saw*	*RAW MATERIAL - LOGS*	*CUT BLOCKS*	*BULK WOOD WASTE*	*4,000*	*DF/HR*	*0.770*	*DF/DF*	*3,080*	*DF/HR*	*1.166*	*LB/DF*	*4,664*	*LB/HR*	*Product to EP31; Waste to EP48 - NOT INCLUDED BELOW*	
EP 31	*Rotary Debarker*	*CUT BLOCKS*	*DEBARKED BLOCKS*	*BULK WOOD WASTE*	*3,080*	*DF/HR*	*0.950*	*DF/DF*	*2,926*	*DF/HR*	*0.175*	*LB/DF*	*539*	*LB/HR*	*Product to EP32; Waste to Mulch Buyer - NOT INCLUDED BELOW*	
EP 47	Fulghum Chipper	HR BACKBDS, CORES	BOILER FUEL	NA	3,248	LB/HR	1.000	LB/LB	3,248	LB/HR	0.000	LB/LB	0	LB/HR	ASSUMES 100% CHIPS TRANSFERRED TO EP46	
EP 46	CYCLONE 3	PM	BOILER FUEL	PM	3,248	LB/HR	0.99975	LB/HR	3,247	LB/HR	0.00025	LB/HR	0.812	LB/HR		
					1.624	TON/HR							3.41	TON/YR		

(1) *wood processing emission factors from in-house measurements*
(2) *1 DF = 2.8 LB*
(3) *cyclone efficiency = 0.5/2000 LB/LB per AQ-EF02*

Table 4d
Maximum Emissions from Cyclone 4
The Freeman Corporation
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 07	Clipping Line Chipper	DRIED VENEER	VENEER	CLIPPINGS	120,000	SF/HR	1.00	SF/SF	120,000	SF/HR	0.014	LB/SF	1,680	LB/HR	
EP 08	CYCLONE 4	CLIPPINGS	BOILER FUEL	PM	1,680	LB/HR	0.99975	LB/HR	1,680	LB/HR	0.0002	LB/LB	0.420	LB/HR	

Table 5
Maximum Potential Emissions - Log Debarking and Haul Roads
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 19	Flitch Cut-off Saw	SKINNED LOGS	FLITCHES	BULK WOOD WASTE	2,400	DF/HR	0.96	DF/DF	2,304	DF/HR	0.240	LB/DF	576	LB/HR	Product to EP20
EP 30	Rotary Cut-off Saw	RAW MATERIAL - LOGS	CUT BLOCKS	BULK WOOD WASTE	2,360	DF/HR	0.77	DF/DF	1,817	DF/HR	1.166	LB/DF	2,752	LB/HR	Product to EP31; Waste to EP48
EP 48	Nicholson Chipper	BULK WOOD WASTE	BOILER FUEL	PM	3,328	LB/HR	0.999	LB/HR	3,324	LB/HR	0.001	LB/HR	3.328 13.98	LB/HR TON/YR	

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 10	Haul Roads & Log Yard	MILES DRIVEN	NA	PM	2,000	MI/YR	NA	NA	NA	NA	2.257	LB/MI	0.54 2.26	LB/HR TON/YR	

(1) *wood processing emission factors from in-house measurements*
(2) *chipper emission factor from 2009 permit application*

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 42	Wood waste loading to boi	WOOD WASTE	BOILER FUEL	PM	6.6	TON/HR	NA	NA	NA	NA	0.389	LB/TON	2.57 10.8	LB/HR TON/YR	

(1) *wood processing emission factors from in-house measurements*
(2) *chipper emission factor from 2009 permit application*

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

Division for Air Quality
803 Schenkel Lane
Frankfort, Kentucky 40601

DEP7007AI

Administrative Information

Enter if known

AFS Plant ID# 102-0720-0004

Agency Use Only

Date Received

Log#

Permit#

PERMIT APPLICATION

The completion of this form is required under Regulations 401 KAR 52:020, 52:030, and 52:040 pursuant to KRS 224. Applications are incomplete unless accompanied by copies of all plans, specifications, and drawings requested herein. Failure to supply information required or deemed necessary by the division to enable it to act upon the application shall result in denial of the permit and ensuing administrative and legal action. Applications shall be submitted in triplicate.

1) APPLICATION INFORMATION

Note: The applicant must be the owner or operator. (The owner/operator may be individual(s) or a corporation.)

Name: The Freeman Corporation

Title: ______ **Phone:** 859-744-4311

(If applicant is an individual)

Mailing Address: Company P.O. Box 96

Street or P.O. Box: 415 Magnolia St.

City: Winchester **State:** KY **Zip Code:** 40392-0096

Is the applicant (check one): ☐ Owner ☐ Operator ☐ Owner & Operator ☒ Corporation/LLC* ☐ LP**

* If the applicant is a Corporation or a Limited Liability Corporation, submit a copy of the current Certificate of Authority from the Kentucky Secretary of State.

** If the applicant is a Limited Partnership, submit a copy of the current Certificate of Limited Partnership from the Kentucky Secretary of State.

Person to contact for technical information relating to application:

Name: Scott Hisle

Title: Treasurer and CFO **Phone:** 859-355-1421

2) OPERATOR INFORMATION

Note: The applicant must be the owner or operator. (The owner/operator may be individual(s) or a corporation.)

Name: Same as Applicant

Title: ______ **Phone:** ______

Mailing Address: Company ______

Street or P.O. Box: ______

City: ______ **State:** ______ **Zip Code:** ______

DEP7007AI
(Continued)

3) TYPE OF PERMIT APPLICATION

For new sources that currently *do not* hold *any* air quality permits in Kentucky and are required to obtain a permit prior to construction pursuant to 401 KAR 52:020, 52:030, or 52:040.

☐ Initial Operating Permit (the permit will authorize both construction and operation of the new source)

Type of Source (*Check all that apply*): ☐ Major ☐ Conditional Major ☐ Synthetic Minor ☐ Minor

For existing sources that do not have a source-wide Operating Permit required by 401 KAR 52:020, 52:030, or 52:040.

Type of Source (*Check all that apply*): ☐ Major ☐ Conditional Major ☐ Synthetic Minor ☐ Minor

(*Check one only)*

☐ Initial Source-wide Operating Permit ☐ Construction of New Facilities at Existing Plant

☐ Construction of New Facilities at Existing Plant ☐ Modification of Existing Facilities at Existing Plant

☐ Other (explain) ____

For existing sources that currently have a source-wide Operating Permit.

Type of Source (*Check all that apply*): ☐ Major ☐ Conditional Major ☐ Synthetic Minor ☒ Minor

Current Operating Permit # V-08-047

☐ **Administrative Revision** (describe type of revision requested, e.g. name change): ____

☒ **Permit Renewal** ☐ **Significant Revision** ☐ **Minor Revision**

☐ Addition of New Facilities ☐ Modification of Existing Facilities

For all construction and modification requiring a permit pursuant to 401 KAR 52:020, 52:030, or 52:040.

Proposed Date for Start of Construction or Modification: ____ Proposed date for Operation Start-up: ____

4) SOURCE INFORMATION

Source Name: **The Freeman Corporation**

Source Street Address: **415 Magnolia St.**

City: **Winchester** **Zip Code:** **40391** **County:** **Clark**

Primary Standard Industrial Classification (SIC) Category: **Hardwood Veneer & Plywood** **Primary SIC #:** **2435**

Property Area (Acres or Square Feet): **43.88 acres** **Number of Employees:** **220**

Description of Area Surrounding Source (*check one*)**:**

☐ Commercial Area ☐ Residential Area ☒ Industrial Area ☐ Industrial Park ☐ Rural Area ☐ Urban Area

Approximate Distance to Nearest Residence or Commercial Property: ____

UTM or Standard Location Coordinates: (*Include topographical map showing property boundaries*)

UTM Coordinates:	Zone ____	Horizontal (km) ____		Vertical (km) ____		
Standard Coordinates:	Latitude 38	Degrees	00	Minutes	30	Seconds
	Longitude 84	Degrees	11	Minutes	00	Seconds

DEP7007AI
(Continued)

4) SOURCE INFORMATION (CONTINUED)

Is any part of the source located on federal land? ☐ **Yes** ☒ **No**

What other environmental permits or registrations does this source currently hold in Kentucky?

Stormwater: KPDES KY-0054691 **Air Permit – V-08-047**

POTW Permit: WMU-POTW Permit 12-14 (6/16/2011)

What other environmental permits or registrations does this source need to obtain in Kentucky?

5) OTHER REQUIRED INFORMATION

Indicate the type(s) and number of forms attached as part of this application.

X	DEP7007A	Indirect Heat Exchanger, Turbine, Internal Combustion Engine	___	DEP7007R	Emission Reduction Credit
			___	DEP7007S	Service Stations
X	DEP7007B	Manufacturing or Processing Operations	___	DEP7007T	Metal Plating & Surface Treatment Operations
___	DEP7007C	Incinerators & Waste Burners	X	DEP7007V	Applicable Requirements & Compliance Activities
___	DEP7007F	Episode Standby Plan			
___	DEP7007J	Volatile Liquid Storage	___	DEP7007Y	Good Engineering Practice (GEP) Stack Height Determination
___	DEP7007K	Surface Coating or Printing Operations			
___	DEP7007L	Concrete, Asphalt, Coal, Aggregate, Feed, Corn, Flour, Grain, & Fertilizer	___	DEP7007AA	Compliance Schedule for Noncomplying Emission Units
___	DEP7007M	Metal Cleaning Degreasers	___	DEP7007BB	Certified Progress Report
X	DEP7007N	Emissions, Stacks, and Controls Information	X	DEP7007CC	Compliance Certification
___	DEP7007P	Perchloroethylene Dry Cleaning Systems	X	DEP7007DD	Insignificant Activities

Check other attachments that are part of this application.

	Required Data		**Supplemental Data**
☒	Map or Drawing Showing Location	☒	Stack Test Report
☒	Process Flow Diagram and Description	☒	Certificate of Authority from the Secretary of State (for Corporations and Limited Liability Companies)
☒	Site Plan Showing Stack Data and Locations	☐	Certificate of Limited Partnership from the Secretary of State (for Limited Partnerships)
☒	Emission Calculation Sheets	☐	Claim of Confidentiality (See 400 KAR 1:060)
☒	Material Safety Data Sheets (MSDS)	☒	Other (Specify) ____________________

Indicate if you expect to emit, in any amount, hazardous or toxic materials or compounds or such materials into the atmosphere from any operation or process at this location.

☐	Pollutants regulated under 401 KAR 57:002 (NESHAP)	☐	Pollutants listed in 401 KAR 63:060 (HAPS)
☐	Pollutants listed in 40 CFR 68 Subpart F [112(r) pollutants]	☐	Other

Has your company filed an emergency response plan with local and/or state and federal officials outlining the measures that would be implemented to mitigate an emergency release?

☐ **Yes** ☒ **No**

Check whether your company is seeking coverage under a permit shield. If "Yes" is checked, applicable requirements must be identified on Form DEP7007V. Identify any non-applicable requirements for which you are seeking permit shield coverage on a separate attachment to the application.

☐ **Yes** ☒ **No** ☐ **A list of non-applicable requirements is attached**

DEP7007AI **(Continued)**

6) OWNER INFORMATION

Note: If the applicant is the owner, write "same as applicant" on the name line.

Name: **Same as Applicant**

Title: ______ **Phone:** ______

Mailing Address:
Company ______

Street or P.O. Box: ______

City: ______ **State:** ______ **Zip Code:** ______

List names of owners and officers of your company who have an interest in the company of 5% or more.

Name	**Position (owner, partner, president, CEO, treasurer, etc.)**
George T. Freeman	**CEO**
E. Reid Freeman	**President**

(attach another sheet if necessary)

7) SIGNATURE BLOCK

I, the undersigned, hereby certify under penalty of law, that I am a responsible official, and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

BY: ______
(Authorized Signature)

6-28-19
(Date)

Scott Hisle
(Typed or Printed Name of Signatory)

CFO
(Title of Signatory)

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

(*Submit copies of this form for each individual unit.*
Make additional copies as needed)

DEP7007A

INDIRECT HEAT EXCHANGER, TURBINE, INTERNAL COMBUSTION ENGINE

Emission Point__________
Emission Unit # 15

1) **Type of Unit (Make, Model, Etc.):** Hurst 28.7 mm BTU - Boiler #3

Date Installed: 8/31/96 **Cost of Unit:** __________
(Date unit was installed, modified or reconstructed, whichever is later.)

Where more than one unit is present, identify with Company's identification or code for this unit:
____

2a) **Kind of Unit (Check one):**
1. **Indirect Heat Exchanger** X
2. **Gas Turbine for Electricity Generation** ____
3. **Pipe Line Compressor Engines:**
   - ____ **Gas Turbine**
   - ____ **Reciprocating engines**
   - **(a) 2-cycle lean burn** ____
   - **(b) 4-cycle lean burn** ____
   - **(c) 4-cycle rich burn** ____
4. **Industrial Engine** ____

2b) **Rated Capacity: (Refer to manufacturer's specifications)**
1. **Fuel input (mmBTU/hr):** 28.7
2. **Power output (hp):** ____
   Power output (MW): ____

SECTION 1. FUEL

3) **Type of Primary Fuel** (*Check*):

____ **A. Coal** ____ **B. Fuel Oil # (***Check one***)** ____ **1** ____ **2** ____ **3** ____ **4** ____ **5** ____ **6**

____ **C. Natural Gas** ____ **D. Propane** ____ **E. Butane** X **F. Wood** ____ **G. Gasoline**

____ **H. Diesel** ____ **I. Other** (*specify*) __________

4) **Secondary Fuel** (*if any, specify type*): __________

5) **Fuel Composition**

Type	Percent Ash[a]	Percent Sulfur[b]	Heat Content Corresponding to: [c, d]	
	Maximum	Maximum	Maximum Ash	Maximum Sulfur
Primary				
Secondary				

a. As received basis. Proximate Analysis for Ash. (May use values in your fuel contract)
b. As received basis. Ultimate Analysis for Sulfur. (May use values in your fuel contract)
c. Higher Heating Value, BTU/Unit. (May use values in your fuel contract)
d. Suggested units are: Pounds for solid fuel, gallon for liquid fuels, and cu. Ft. for gaseous fuels. If other units are used, please specify.

6) **Maximum Annual Fuel Usage Rate (*please specify units)*: 21,024 tons = 2.4 tons/hr X 8,760 hr***

7) **Fuel Source or supplier:** Wood waste

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

8) MAXIMUM OPERATING SCHEDULE FOR THIS UNIT*

_24_ hours/day **_7_ days/week** **_52_ weeks/year**

9) If this unit is multipurpose, describe percent in each use category:

Space Heat _____% Process Heat _100_ % Power _____ %

10) Control options for turbine/IC engine (*Check*)

- __ (1) Water Injection
- __ (2) Steam Injection
- __ (3) Selective Catalytic Reduction (SCR)
- __ (3) Non-Selective Catalytic Reduction (NSCR)
- __ (5) Combustion Modification)
- __ (5) Other (*Specify*) __________

IMPORTANT: Form DEP7007N must also be completed for this unit.

SECTION II COMPLETE ONLY FOR INDIRECT HEAT EXCHANGERS

11) Coal-Fired Units

_____ Pulverized Coal Fired:

- __ Dry Bottom
- __ Wet Bottom
- __ Wall Fired
- __ Tangentially Fired

Fly Ash Rejection: ☐ Yes ☐ No

_____ Cyclone Furnace

_____ Overfeed Stoker

_____ Fluidized Bed Combustor:
____ Circulating Bed
____ Bubbling Bed

_____ Spreader Stoker

_____ Underfeed Stoker

_____ Hand-fed

_____ Other (*specify*) __________

12) Oil-Fired Unit

____ Tangentially (Corner) Fired **____ Horizontally Opposed (Normal) Fired**

13) Wood-Fired Unit

Fly-Ash Reinjection: ☐ Yes ☒ No

____ Dutch Oven/Fuel Cell Oven **X____ Stoker** **____ Suspension Firing**

____ Fluidized Bed Combustion (FBC)

14) Natural Gas-Fired Units

__ Low NO_x Burners: ☐ Yes ☐ No

__ Flue Gas Recirculation: ☐ Yes ☐ No

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

15) Combustion Air Draft: ________ Natural ________ Induced

Forced Pressure __________ lbs/sq. in.

Percent excess air (air supplied in excess of theoretical air) __________ %

SECTION III

16) Additional Stack Data

A. Are sampling ports provided? ☒ Yes ☐ No
B. If yes, are they located in accordance with 40 CFR 60*? ☒ Yes ☐ No
C. List other units vented to this stack ____

____

17) Attach manufacturer's specifications and guaranteed performance data for the indirect heat exchanger. Include information concerning fuel input, burners and combustion chamber dimensions.

18) Describe fuel transport, storage methods and related dust control measures, including ash disposal and control.

____

____

____

____

____

*Applicant assumes responsibility for proper location of sampling ports if the Division for Air Quality requires a compliance demonstration stack test.

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

(*Submit copies of this form for each individual unit.*
Make additional copies as needed)

DEP7007A

INDIRECT HEAT EXCHANGER, TURBINE, INTERNAL COMBUSTION ENGINE

Emission Point ____________
Emission Unit # 12

1) **Type of Unit (Make, Model, Etc.):** Wickes Model 61004 - Boiler # 2

Date Installed: 5/29/91 **Cost of Unit:** ____________
(Date unit was installed, modified or reconstructed, whichever is later.)

Where more than one unit is present, identify with Company's identification or code for this unit:
____

2a) **Kind of Unit (Check one):**
1. **Indirect Heat Exchanger** X
2. **Gas Turbine for Electricity Generation** ____
3. **Pipe Line Compressor Engines:**
   - ____ **Gas Turbine**
   - ____ **Reciprocating engines**
     - **(a) 2-cycle lean burn** ____
     - **(b) 4-cycle lean burn** ____
     - **(c) 4-cycle rich burn** ____
4. **Industrial Engine** ____

2b) **Rated Capacity: (Refer to manufacturer's specifications)**
1. **Fuel input (mmBTU/hr):** 10
2. **Power output (hp):** ____
   Power output (MW): ____

SECTION 1. FUEL

3) **Type of Primary Fuel** (*Check*):

____ **A. Coal** ____ **B. Fuel Oil # (***Check one***)** ____ **1** ____ **2** ____ **3** ____ **4** ____ **5** ____ **6**

____ **C. Natural Gas** ____ **D. Propane** ____ **E. Butane** X **F. Wood** ____ **G. Gasoline**

____ **H. Diesel** ____ **I. Other** (*specify*) ____________

4) **Secondary Fuel** (*if any, specify type*): ____________

5) **Fuel Composition**

Type	**Percent Ash**[a]	**Percent Sulfur**[b]	**Heat Content Corresponding to:** [c, d]	
	Maximum	Maximum	Maximum Ash	Maximum Sulfur
Primary				
Secondary				

a. As received basis. Proximate Analysis for Ash. (May use values in your fuel contract)
b. As received basis. Ultimate Analysis for Sulfur. (May use values in your fuel contract)
c. Higher Heating Value, BTU/Unit. (May use values in your fuel contract)
d. Suggested units are: Pounds for solid fuel, gallon for liquid fuels, and cu. Ft. for gaseous fuels. If other units are used, please specify.

6) **Maximum Annual Fuel Usage Rate (*please specify units)*: 7,008 tons = 0.8 tons/hr X 8,760 hr***

7) **Fuel Source or supplier:** Wood waste
____

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

8) MAXIMUM OPERATING SCHEDULE FOR THIS UNIT*

_24_ hours/day **_7_ days/week** **_52_ weeks/year**

9) If this unit is multipurpose, describe percent in each use category:

Space Heat ________% **Process Heat _100_ %** **Power ________ %**

10) Control options for turbine/IC engine (*Check*)

- **__ (1) Water Injection**
- **__ (2) Steam Injection**
- **__ (3) Selective Catalytic Reduction (SCR)**
- **__ (3) Non-Selective Catalytic Reduction (NSCR)**
- **__ (5) Combustion Modification)**
- **__ (5) Other (*Specify*) ____________________**

IMPORTANT: Form DEP7007N must also be completed for this unit.

SECTION II COMPLETE ONLY FOR INDIRECT HEAT EXCHANGERS

11) Coal-Fired Units

________ Pulverized Coal Fired:

__ Dry Bottom **__ Wall Fired**
__ Wet Bottom **__ Tangentially Fired**

Fly Ash Rejection:

☐ Yes **☐ No**

________ Cyclone Furnace

________ Spreader Stoker

________ Overfeed Stoker

________ Underfeed Stoker

________ Fluidized Bed Combustor:
______ Circulating Bed
______ Bubbling Bed

________ Hand-fed

________ Other (*specify*) ____________________

12) Oil-Fired Unit

______ Tangentially (Corner) Fired **________ Horizontally Opposed (Normal) Fired**

13) Wood-Fired Unit

Fly-Ash Reinjection: **☐ Yes** **☒ No**

______ Dutch Oven/Fuel Cell Oven **X______ Stoker** **________ Suspension Firing**

______ Fluidized Bed Combustion (FBC)

14) Natural Gas-Fired Units

__ Low NO_x Burners: **☐ Yes** **☐ No**

__ Flue Gas Recirculation: **☐ Yes** **☐ No**

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

15) **Combustion Air** **Draft: ________ Natural ________ Induced**

Forced Pressure __________ lbs/sq. in.

Percent excess air (air supplied in excess of theoretical air) __________ %

SECTION III

16) **Additional Stack Data**

A. Are sampling ports provided? ☒ **Yes** ☐ **No**
B. If yes, are they located in accordance with 40 CFR 60*? ☒ **Yes** ☐ **No**
C. List other units vented to this stack ____

____

17) **Attach manufacturer's specifications and guaranteed performance data for the indirect heat exchanger. Include information concerning fuel input, burners and combustion chamber dimensions.**

18) **Describe fuel transport, storage methods and related dust control measures, including ash disposal and control.**

____

____

____

____

____

*Applicant assumes responsibility for proper location of sampling ports if the Division for Air Quality requires a compliance demonstration stack test.

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

(*Submit copies of this form for each individual unit.
Make additional copies as needed)*

DEP7007A

INDIRECT HEAT EXCHANGER, TURBINE, INTERNAL COMBUSTION ENGINE

Emission Point___________________
Emission Unit # ____11____

1) **Type of Unit (Make, Model, Etc.):** Wickes Model 62755 Boiler # 1

Date Installed: 2/28/91 **Cost of Unit:** ____________________
(Date unit was installed, modified or reconstructed, whichever is later.)

Where more than one unit is present, identify with Company's identification or code for this unit:
____

2a) **Kind of Unit (Check one):**
1. **Indirect Heat Exchanger** ____X____
2. **Gas Turbine for Electricity Generation** ____
3. **Pipe Line Compressor Engines:**
   ____ **Gas Turbine**
   ____ **Reciprocating engines**
      (a) 2-cycle lean burn __________
      (b) 4-cycle lean burn __________
      (c) 4-cycle rich burn __________
4. **Industrial Engine** __________

2b) **Rated Capacity: (Refer to manufacturer's specifications)**
1. **Fuel input (mmBTU/hr):** ____12____
2. **Power output (hp):** __________
   Power output (MW): __________

SECTION 1. FUEL

3) **Type of Primary Fuel** (*Check*):

________ **A. Coal** ________ **B. Fuel Oil # (***Check one***)** ______ **1** ______ **2** ______ **3** ______ **4** ______ **5** ______ **6**

________ **C. Natural Gas** ________ **D. Propane** ____________ **E. Butane** ____X____ **F. Wood** _______ **G. Gasoline**

________ **H. Diesel** ________ **I. Other** (*specify*) ______________________________

4) **Secondary Fuel** (*if any, specify type*):____

5) **Fuel Composition**

Type	**Percent Ash[a]**	**Percent Sulfur[b]**	**Heat Content Corresponding to: [c, d]**	
	Maximum	Maximum	Maximum Ash	Maximum Sulfur
Primary				
Secondary				

a. As received basis. Proximate Analysis for Ash. (May use values in your fuel contract)
b. As received basis. Ultimate Analysis for Sulfur. (May use values in your fuel contract)
c. Higher Heating Value, BTU/Unit. (May use values in your fuel contract)
d. Suggested units are: Pounds for solid fuel, gallon for liquid fuels, and cu. Ft. for gaseous fuels. If other units are used, please specify.

6) **Maximum Annual Fuel Usage Rate (*please specify units)*: 8,760 tons = 1.0 tons/hr X 8,760 hr***

7) **Fuel Source or supplier:** Wood waste
____

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

DEP7007A
(Continued)

8) MAXIMUM OPERATING SCHEDULE FOR THIS UNIT*

_24_ hours/day **_7_ days/week** **_52_ weeks/year**

9) If this unit is multipurpose, describe percent in each use category:

Space Heat ______% Process Heat _100_ % Power ______ %

10) Control options for turbine/IC engine (*Check*)

__ (1) Water Injection **__ (2) Steam Injection**
__ (3) Selective Catalytic Reduction (SCR) **__ (3) Non-Selective Catalytic Reduction (NSCR)**
__ (5) Combustion Modification) **__ (5) Other (*Specify*) ______________**

IMPORTANT: Form DEP7007N must also be completed for this unit.

SECTION II COMPLETE ONLY FOR INDIRECT HEAT EXCHANGERS

11) Coal-Fired Units

______ Pulverized Coal Fired: **Fly Ash Rejection:**

__ Dry Bottom **__ Wall Fired** **☐ Yes** **☐ No**
__ Wet Bottom **__ Tangentially Fired**

______ Cyclone Furnace **______ Spreader Stoker**

______ Overfeed Stoker **______ Underfeed Stoker**

______ Fluidized Bed Combustor: **______ Hand-fed**
_____ Circulating Bed
_____ Bubbling Bed **______ Other (*specify*) ______________**

12) Oil-Fired Unit

_____ Tangentially (Corner) Fired **______ Horizontally Opposed (Normal) Fired**

13) Wood-Fired Unit

Fly-Ash Reinjection: ☒ Yes ☐ No

_____ Dutch Oven/Fuel Cell Oven **X_____ Stoker** **______ Suspension Firing**

_____ Fluidized Bed Combustion (FBC)

14) Natural Gas-Fired Units

__ Low NO$_x$ Burners: ☐ Yes ☐ No

__ Flue Gas Recirculation: ☐ Yes ☐ No

*Should be entered only if applicant requests operating restriction through federally enforceable limitations.

DEP7007A
(Continued)

15) **Combustion Air** **Draft:** ________ **Natural** ________ **Induced**

Forced Pressure __________ **lbs/sq. in.**

Percent excess air (air supplied in excess of theoretical air) __________ **%**

SECTION III

16) **Additional Stack Data**

A. **Are sampling ports provided?** ☒ **Yes** ☐ **No**
B. **If yes, are they located in accordance with 40 CFR 60*?** ☒ **Yes** ☐ **No**
C. **List other units vented to this stack** ____

____

17) **Attach manufacturer's specifications and guaranteed performance data for the indirect heat exchanger. Include information concerning fuel input, burners and combustion chamber dimensions.**

18) **Describe fuel transport, storage methods and related dust control measures, including ash disposal and control.**

____

____

____

____

____

*Applicant assumes responsibility for proper location of sampling ports if the Division for Air Quality requires a compliance demonstration stack test.

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
7	Veneer Clipping, sliced wood	B	24 x 7 x 50	Clipping Lines # 1 + # 2 + # 3 consisting of the following equipment (2) RFR side clippers (1) Capital end clipper (1) Cremona side clipper (2) Cremona end clippers (2) Infeed tables (1) under floor conveyor belt (1) Capital Hog/Chipper	7/30/79

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
7	Dried veneer	120,000 SF/HR		120,000 SF/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Veneer clippings generated at an average of 0.014 LB/SF or 1,680 LB/HR of veneer clipped transferred to Cyclone 4 via Clipping Line Chipper (EP07)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
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DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
08	Cyclone 4	B	24 x 7 x 50	Freeman installed cyclone (size 20) [mfg unknown]	9/15/06
44	Cyclone 1	B	24 x 7 x 50	Freeman installed cyclone (size 38) [mfg unknown].	1997
45	Cyclone 2	B	24 x 7 x 50	Associated Metal Works fan and cyclone (size 42)	11/22/08 4/15/06
46	Cyclone 3	B	24 x 7 x 50	Freeman installed cyclone (size 22) [mfg unknown]	9/15/06
48	Nicholson Chipper	B	24 x 7 x 50	Nicholson drum chipper (35" x 24")	4/15/04

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
08	Chipped wood waste from EP07	1,680 LB/HR	Chipped wood waste – boiler fuel	1,680 LB/HR	
44	Chipped wood waste from EP 21, EP 34	3,501 LB/HR	Chipped wood waste – boiler fuel	3,501 LB/HR	
45	Sawdust and wood chips from EP 14b, EP 18, EP 19, EP 20	1,745 LB/HR	Chipped wood waste – boiler fuel	1,745 LB/HR	
46	Chipped wood waste from EP47	3,248 LB/HR	Chipped wood waste – boiler fuel	3,247 LB/HR	
48	Log ends and sawdust from EP 19, EP 30	3,328 LB/HR	Chipped wood waste – boiler fuel	3,324 LB/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note: If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

08: Discharge of PM from Cyclone 4 at rate of 0.5 lbs PM per ton of throughput – 1,680 lbs/hr throughput yields 0.420 lbs PM/hr or 1.76 tons/yr

44: Discharge of PM from Cyclone 1 at rate of 0.5 lbs PM per ton of throughput – 3,501 lbs/hr throughput yields 0.875 lbs PM/hr or 3.68 tons/yr

45: Discharge of PM from Cyclone 2 at rate of 0.5 lbs PM per ton of throughput – 1,745 lbs/hr throughput yields 0.436 lbs PM/hr or 1.83 tons/yr

46: Discharge of PM from Cyclone 3 at rate of 0.5 lbs PM per ton of throughput – 3,248 lbs/hr throughput yields 0.812 lbs PM/hr or 3.41 tons/yr

48: Uncontrolled chipping process yields 2.0 lbs PM per ton of throughput - 3,328 LB/HR throughput yields 3.328 LB PM/HR or 13.98 tons/yr

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
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DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
10	Log yard	C	24 x 7 x 50	Non-paved log yard traveled over by loaders and log trucks	4/30/67

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
10	N/A	N/A	N/A	N/A	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

DEP7007B
(Continued)

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Road dust generated at 2.257 LB PM/MI

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with <u>complete</u> chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
11	Wastewood gasifier & boiler system	C	24 x 7 x 52	Boiler 1: Wickes #63755, 12 mm BTU/hr	2/28/91
12	Wastewood gasifier & boiler system	C	24 x 7 x 52	Boiler 2: Wickes #61004, 10 mm BTU/hr	5/29/91
15	Wastewood gasifier & boiler system	C	24 x 7 x 52	Boiler 3: Hurst #47130, 28.7 mm BTU/hr	8/31/95

=

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
					(1) rated input/heat content; avg 2018 heat content = 11.9 mmBTU/ton per Conti Labs (2) 1,000 LB STEAM = 1 mmBTU
11	Waste wood	1.0 tons/hr^{1}	Steam	12,000 lb/hr steam^{2}	
12	Waste wood	0.84 tons/hr^{1}	Steam	10,000 lb/hr steam^{2}	
15	Waste wood	2.4 tons/hr^{1}	Steam	28,700 lb/hr steam^{2}	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

DEP7007B
(Continued)

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)
05	See DEP7007A						
09							
11							
12							
15							
13							

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Generate ash at rate of .003667 tons of ash per ton of waste wood burned or 0.016 tons per hour at maximum output

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
14 A	Log debarking	B	24 x 7 x 50	TS Mfg butt end reducer & Nicholson debarker	2/26/06
14 B	Log flitching	B	24 x 7 x 50	Cremona SAT Model 5200 with Bandsaw head attachment, conveyors and banders	7/31/90
62	Log debarking	B	24 x 7 x 50	NEW TS Mfg butt end reducer and bark bin	Future

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units) Maximum Hourly Rated Capacity (Specify Units) (10a)	Quantity Output* (Specify Units) Maximum Annual (Specify Units) (10b)
14 A	Logs	4,000 DF/HR	Debarked logs (Sliced and Rotary combined)	3,520 DF/HR	
14 B	Debarked logs (Sliced only)	1,428 DF/HR	Flitches (log ¼'s, 1/3's, ½'s)	1,400 DF/HR	
62	Logs	4,000 DF/HR	Debarked logs	3,520 DF/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

14A, 62: Bark generated at an average of 1.86 LB/DF or 14,880 LB/HR combined and conveyed to truck for sale to mulch producer. Insignificant source of PM.

14B: Sawdust generated at an average of 0.116 LB/DF or 166 LB/HR to Cyclone 2 (EP 45).

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
16	Log cooking vats – Sliced	B	24 x 7 x 50	Slicer logs vat complete – Freeman built Consisting of: (1) mechanical conveyor (1) Prentice cherrypicker (12) concrete vats (12) units steam heating pipes & valves various pumps & water storage tanks	4/30/67 with improvements

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units) Maximum Hourly Rated Capacity (Specify Units) (10a)	Quantity Output* (Specify Units) Maximum Annual (Specify Units) (10b)
16	Flitches	2400 DF/hr	Cooked flitches	2400 DF/hr	
	Water	6000 gal/vat for 4 large vats (1/2 capacity)			
	Steam	5000 gal/vat for 8 small vats (1/2 capacity)			
		Each vat filled an average of 2 times per week			

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) **Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)**

Waste water transferred to rotary vats (EP 17)

Condensed steam is returned to the boiler system

17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**

18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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MANUFACTURING OR PROCESSING OPERATIONS

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
18	Skinning line	B	24 x 7 x 50	Air angle grinders with knotter heads Freeman built conveyor system	4/30/67 with improvements

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
18	Cooked flitches	2,400 DF/hr	Skinned flitches	2,328 DF/hr	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B (Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Wood chips generated at an average of 0.178 LB/DF or 427 LB/HR transferred to Cyclone 2 (EP45)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

*(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
19	Flitch cut-off saw	B	24 x 7 x 50	48” diameter Freeman built circular saw including mechanical conveyor and hold downs	3/31/91

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
19	Skinned flitches	2,400 DF/hr	Trimmed flitches	2,304 DF/hr	

***(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) **Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)**

Sawdust generated at an average of 0.025 LB/DF or 60 LB/HR to Cyclone 2 (EP 45).

Bulk wood waste generated at an average of 0.24 LB/DF or 576 LB/HR to Nicholson Chipper (EP 48).

17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**
18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
20	Flitch planing and grooving	B	24 x 7 x 50	Freeman manufactured flitch planer and groover including mechanical conveyor system	7/16/91

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
20	Trimmed flitches	2,304 DF/hr	Planed and grooved flitches	2,120 DF/hr	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	**Fuel Type for Process Heat (11)**	**Rated Burner Capacity (BTU/Hour) (12)**	**Fuel Composition**		**Fuel Usage Rates**		**Note:**
			% Sulfur (13a)	**% Ash (13b)**	**Maximum Hourly (14a)**	**Maximum Annual* (14b)**	**If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)**

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Planer shavings generated at an average of 0.474 LB/DF or 1,092 LB/HR to Cyclone 2 (EP 45).

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
21	Veneer Mill Hog	B	24 x 7 x 50	Lamb hog/chipper	4/15/08

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
21	Sliced veneer waste from slicers and sawdust from flitch rip saw (EP22, 23, 24, 25a, 25b, 26)	1,143 LB/HR	Wood chips and sawdust to Cyclone 1 (EP 44)	1,143 LB/HR	See Table 4a

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Wood chips and sawdust generated at an average of 1,143 LB/HR Cyclone 1 (EP 44)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

*(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.

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DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
22	Slicing Machine # 3	B	24 x 7 x 50	Capital Half Round 154" #3	6/30/86
23	Slicing Machine # 4	B	24 x 7 x 50	Capital Slicer 165" #4	4/30/67
24	Slicing Machine # 5	B	24 x 7 x 50	Capital Slicer 165" #5	7/30/79
25a	Slicing Machine # 1	B	24 x 7 x 50	Fezer Slicer 192" #1	4/1/04
25b	Slicing Machine # 2	B	24 x 7 x 50	Fezer Half Round FV54 #2	6/23/00
26	Flitch Rip Saw	B	24 x 7 x 50	Freeman built rip saw	

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
22	Flitches	600 DF/hr	sliced veneer	480 DF/hr	
			backing boards	120 DF/hr	
23	Whole & ripped flitches	600 DF/hr	sliced veneer	480 DF/hr	
			backing boards	120 DF/hr	
24	Whole & ripped flitches	600 DF/hr	sliced veneer	480DF/hr	
			backing boards	120 DF/hr	
25a	Whole & ripped flitches	600 DF/hr	sliced veneer	480 DF/hr	
			backing boards	120 DF/hr	
25b	Flitches – ¼, 1/3, & ½	600 DF/hr	sliced veneer	480 DF/hr	
			backing boards	120 BF/hr	
26	Flitches	600 DF/hr	Ripped flitches	600 DF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Waste veneer and sawdust from EP22, 23, 24, 25a, 25b, 26 are generated at an average of 0.381 LB/DF or 1,143 LB/HR and transferred to Veneer Mill Hog (EP 21) for chipping into boiler fuel.

Slicer backing boards from EP 23, 24, 25a are generated at an average of 0.560 LB/DF or 1,008 LB/HR and transferred to Fulghum Chipper (EP 47) for chipping into boiler fuel.

Half round backer boards from EP 22, 25b are generated at an average of 0.560 LB/DF or 672 LB/HR and transferred to Fulghum Chipper (EP 47) for chipping into boiler fuel.

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
27	Sliced veneer drying	B	24 x 7 x 50	Weber Dryer (#4)	3/31/90
28	Sliced veneer drying	B	24 x 7 x 50	Babcock dryer (#5)	7/25/95
29a	Sliced veneer drying	B	24 x 7 x 50	Omeco dryer (#1)	9/12/00
29b	Sliced veneer drying	B	24 x 7 x 50	Fezer dryer (#3)	4/15/04

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
27	Sliced veneer – green	30,000 SF/hr	Sliced veneer – dry	28,800SF/hr	
28	Sliced veneer - green	30,000 SF/hr	Sliced veneer – dry	28,800 SF/hr	
29a	Sliced veneer - green	30,000 SF/hr	Sliced veneer – dry	28,800 SF/hr	
29b	Sliced veneer - green	30,000 SF/hr	Sliced veneer – dry	28,800 SF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	**Fuel Type for Process Heat (11)**	**Rated Burner Capacity (BTU/Hour) (12)**	**Fuel Composition**		**Fuel Usage Rates**		**Note:**
			% Sulfur (13a)	**% Ash (13b)**	**Maximum Hourly (14a)**	**Maximum Annual* (14b)**	**If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)**

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

No waste generated from dryers other than shrinkage of ~ 4 to 7% from moisture loss in drying wood veneer.

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with <u>complete</u> chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
30	Rotary Cut-off Saw	B	24 x 7 x 50	Freeman built 72" cut-off saw	6/30/91
31	Rotary Debarker/ Williams Hog	B	24 x 7 x 50	Freeman built debarker, Williams Hog	12/31/00

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
30	Logs	4,000 DF/hr	Cut Blocks	3,080 DF/HR	See Table 4a
31	Cut Blocks	3,080 DF/hr	Debarked blocks	2,926 DF/HR	

***(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

DEP7007B (Continued)

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) **Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)**

30: Sawdust and cut-off ends collected and transferred to Nicholson Chipper (EP 48) at the rate of 1.166 LB/DF or 4,664 LB/HR

31: Bark and wood fiber reduced in Williams Hog then transferred to truck for sale to mulch producer at rate of 0.175 LB/DF or 539 LB/HR

17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**

18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
32	Peeling Blocks	B	24 x 7 x 50	Coe M249 66" Lathe	11/31/91
33	Rotary Clipping	B	24 x 7 x 50	Raute Rotary Clipper & Vacuum Stacker	8/27/07
34	Rotary Chipper	B	24 x 7 x 50	Black Clawson Chipper and Conveyor system (chips transferred to Cyclone 1 (EP 44))	2/28/95 relocated 8/27/07

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
32	Debarked Blocks	4,000 DF/HR	Rotary Veneer	3,440 DF/HR	See Table 4a
33	Rotary Veneer	3,440 DF/HR	Clipped Rotary Veneer	2,958 DF/HR	
34	Rotary veneer waste from EP32 and EP33 and EP55-60	2,358 LB/HR	Boiler Fuel	2,358 LB/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Rotary cores from EP32 are generated at an average of 0.392 LB/DF or 1,568 LB/HR and transferred to Fulghum Chipper (EP 47) for chipping into boiler fuel.

Rotary peeling and clipping (EP32 and EP33 combined) woodwaste is generated at an average of 0.538 LB/DF or 1,851 LB/HR and transferred to the Rotary Chipper (EP 34) for chipping into boiler fuel.

Chipped woodwaste from Rotary Chipper (EP34) is transferred to Cyclone 1 (EP 44)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
35	Rotary veneer drying	B	24 x 7 x 50	Cremona dryer	1/31/91
36	Rotary veneer drying	B	24 x 7 x 50	Raute dryer	fall 2002
37	Joiner/Gluer	B	24 x 7 x 50	Fisher Ruckle FL7 & crossfeed splicers Stand-alone Rees dust collector	11/30/01

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
35	Green veneer sheets	23,000 SF/hr	Dried veneer sheets	22,000 SF/hr	
36	Green veneer sheets	23,000 SF/hr	Dried veneer sheets	22,000 SF/hr	
37	Dried veneer sheets Powder resin glue	5,310 SF/hr	Spliced veneer sheets	5,100 SF/hr	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	**Fuel Type for Process Heat (11)**	**Rated Burner Capacity (BTU/Hour) (12)**	**Fuel Composition**		**Fuel Usage Rates**		**Note:**
			% Sulfur (13a)	**% Ash (13b)**	**Maximum Hourly (14a)**	**Maximum Annual* (14b)**	**If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)**

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

35 & 36: No waste generated. Shrinkage of ~4-7% due to moisture loss during drying process

37: Sawdust produced at an average rate of .00197 LB/SF or 10 LB/HR (transferred in drums to boilers for fuel)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
38	Watering logs	B	24 x 7 x 50	Freeman built spray system with pond and recirculating pump system	8/31/88
39	Crating trim saw	B	24 x 7 x 50	Freeman built crating trim saw	4/30/88
17	Rotary log cooking vats	B	24 x 7 x 50	Freeman built heat exchangers, conveyors, concrete vats, and 'cherry picker' (knuckle boom loader)	6/30/91

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
38	Rain water collected in pond	61,000 gal/hr pond water	N/A	60,000 gal/hr	
39	Kiln dried lumber	500 BF/hr	Cut to size lumber	80,000 SF veneer crated per hour	
17	Logs Water	4,000 DF/hr 5 vats @ 33,000 gal (1/2 capacity) 8 NEW vats @40,000 gal (½ cap) 1 vat for storing water @ 70,000 gal Each vat filled an average of 2 times per week	Cooked rotary veneer logs	4,000 DF/hr	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

38: Some evaporation loss

39: estimate 2 lbs of sawdust generated per million SF veneer processed or 0.16 lbs/hr – transferred to Fulghum chipper (EP 47)

17: Waste water discharged to the sanitary sewer system or reused

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
40	Sawdust unloading into fuel storage silo	B	24 x 7 x 50	Freeman built hopper	8/4/97
41	Sawdust loading from silo to boilers	B	24 x 7 x 52	Silo unloader and conveyors	8/8/97
42	Veneer chips and waste from storage containers to boilers	B	24 x 7 x 50	Freeman built storage containers and conveyors	8/4/97 3/15/06

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
40	Non-Freeman generated sawdust	4.24 tons/hr	Sawdust fed into silo	4.24 tons/hr	From maximum input to all wood waste boilers (see EP 11, 12, 15)
41	Wood waste from silo	4.24 tons/hr	Wood waste fed to boilers	4.24 tons/hr	
42	Wood waste from storage containers	4.24 tons/hr	Wood waste fed to boilers	4.24 tons/hr	Output from 40 = input to 41 or 42. EPs not additive. Either 41 or 42 operated, not both.

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

DEP7007B
(Continued)

Emission Point # (1)	**Fuel Type for Process Heat (11)**	**Rated Burner Capacity (BTU/Hour) (12)**	**Fuel Composition**		**Fuel Usage Rates**		**Note:**
			% Sulfur (13a)	**% Ash (13b)**	**Maximum Hourly (14a)**	**Maximum Annual* (14b)**	**If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)**

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

40: Non-contained sawdust produced at an average rate of 0.13 lbs/hr (0.56 tons/year)

41: Non-contained sawdust produced at an average rate of 0.32 lbs/hr (1.4 tons/year)

42: Non-contained sawdust produced at an average rate of 1.6 lbs/hr (6.9 tons/year)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
43	Veneer pressing	B	24 x 7 x 50	Wemhoner flat belt press	4/15/08

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
43	Veneer Steam	12,000 SF/hr Recirculated	Pressed veneer	12,000 SF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

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17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**

18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
47	Chipper	B	24 x 7 x 50	Fulghum chipper	9/15/06

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
47	Slicer backerboards from EP22 and EP25b; rotary cores from EP32	2,240 LB/HR	Chipped wood waste - boiler fuel	2,240 LB/HR	

***(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

100% of input backerboard wood waste chipped and transferred to Cyclone 3

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
48	Rotary cut-off ends chipper	B	24 x 7 x 50	Nicholson 24" drum chipper	1994

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
48	Bulk wood waste from Flitch Cutoff saw (EP19) and Rotary Cutoff saw (EP 30)	3,328 LB/HR	Waste wood chips - Boiler fuel	3,324 LB/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

48: Chips that fall off shaker screen and conveyor are collected and transferred to EP 40 for loading into the silo

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

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(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
55	Prentice Clipper	B	24 x 7 x 50	Prentice Clipper	11/01/09
56	Ompec Clipper	B	24 x 7 x 50	Ompec Clipper	08/06/02
57	Double Knife Guillotine	B	24 x 7 x 50	Double Knife Guillotine	Future
58	Lawson Clipper	B	24 x 7 x 50	Lawson Clipper	08/18/05
59	Seybold Clipper	B	24 x 7 x 50	Seybold Clipper	07/31/06
60	Elliott Bay Clipper	B	24 x 7 x 50	Elliott Bay Clipper	05/03/10

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
55	Veneer	9,750 SF/HR	clipped veneer	9,750 SF/HR	
56	Veneer	1,500 SF/HR	clipped veneer	1,500 SF/HR	
57	Veneer	2,500 SF/HR	clipped veneer	2,500 SF/HR	
58	Veneer	6,000 SF/HR	clipped veneer	6,000 SF/HR	
59	Veneer	4,500 SF/HR	clipped veneer	4,500 SF/HR	
60	Veneer	12,000 SF/HR	clipped veneer	12,000 SF/HR	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) **Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)**

Waste veneer EP 55, 56, 57, 58, 59, 60 are generated at an average of 0.014 LB/SF or 508 LB/HR combined and transferred to Rotary Veneer Chipper (EP 34) for chipping into boiler fuel.

17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**

18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
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DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
61	Wood grinding	B	24 x 7 x 50	Zeno Grinder	Future

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
61	Bulk Wood Waste	750 DF/HR	Boiler Fuel	750 DF/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B (Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

61: Reduced wood waste fed directly to boilers at average rate of 750 DF/HR or 2,100 LB/HR

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
63	Paul Saw_01	B	24 x 7 x 50	Paul Maschinenfabrik, K34G/1500, veneer trimmer	7/1/2017
64	Paul Saw_02	B	24 x 7 x 50	Paul Maschinenfabrik, K34G/1500, veneer trimmer	Future
65	Veneer Sizing Bandsaw	B	24 x 7 x 50	Freeman-made	Future

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
63	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	
64	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	
65	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Waste veneer from EP 63, 64, 65 generated at an average of 20 DF/HR or 56 LB/HR per unit and transferred to Veneer Mill Hog (EP 21) for chipping into boiler fuel.

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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DIVISION FOR AIR QUALITY

DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation　Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
011	Emission Unit Name: **Boiler No. 1 - Wood Fired** Date Constructed: 1991 HAPs present? ☐ Yes ☑ No Emission Point Name: **Boiler No. 1** Source ID: EP 11 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 11 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	12.0	8,760	12		8760

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
011											
	NOX	0.220	AP 42			2.64	2.64		11.56	11.56	
	CO	0.600	AP 42			7.20	7.20		31.54	31.54	
	SO2	0.025	AP 42			0.30	0.30		1.31	1.31	
	VOC	0.017	AP 42			0.20	0.20		0.89	0.89	
	PM 10	7.90	AP 42	Integral Multiclone		94.80	4.61		415.22	20.19	
	PM Tot	8.80	AP 42	KyEIS Control ID #: 11	0.9514	105.60	5.13		462.53	22.49	
	uncontrolled EF's - see Tables 3a, 3b										
	PM Tot	0.428	AP 42								
	Controlled Emission Factor (2018 Stack Test)										
				per 2018 FBT stack test compared to AP42							

Division Use Only: F___ Reviewer __________ Supervisor __________

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DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
012	Emission Unit Name: **Boiler No. 2 - Wood Fired** Date Constructed: 1991 HAPs present? ☐ Yes ☑ No Emission Point Name: **Wickes Boiler No. 2** Source ID: EP 12 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 12 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	10	8,760	10		8760

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DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
012											
	NOX	0.220	AP 42			2.20	2.20		9.64	9.64	
	CO	0.600	AP 42			6.00	6.00		26.28	26.28	
	SO2	0.025	AP 42			0.25	0.25		1.10	1.10	
	VOC	0.017	AP 42			0.17	0.17		0.74	0.74	
	PM 10	7.90	AP 42	Integral Multiclone		79.00	1.87		346.02	8.18	
	PM Tot	8.80	AP 42	KyEIS Control ID #: 12	0.9764	88.00	2.08		385.44	9.11	
	uncontrolled EF's - see Tables 3a, 3b										
	PM Tot	0.208	AP 42								
	Controlled Emission Factor (2018 Stack Test)										
				**per 2018 FBT stack test compared to AP42*							

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Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
015	Emission Unit Name: **Boiler No. 3 - Wood Fired** Date Constructed: 1996 HAPs present? ☐ Yes ☑ No Emission Point Name: **Wickes Boiler No. 2** Source ID: EP 15 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 15 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	28.7	8,760	28.7		8760

Division Use Only: F___ Reviewer __________ Supervisor __________

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
015											
	NOX	0.220	AP 42			6.31	6.31		27.66	27.66	
	CO	0.600	AP 42			17.22	17.22		75.42	75.42	
	SO2	0.025	AP 42			0.72	0.72		3.14	3.14	
	VOC	0.017	AP 42			0.49	0.49		2.14	2.14	
	PM 10	7.90	AP 42	Integral Multiclone		226.73	6.31		993.08	27.65	
	PM Tot	8.80	AP 42	KyEIS Control ID #: 15	0.9722	252.56	7.03		1106.21	30.80	
	uncontrolled EF's - see Tables 3a, 3b										
	PM Tot	0.245	AP 42								
	Controlled Emission Factor (2018 Stack Test)										
				**per 2018 FBT stack test compared to AP42*							

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Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
044	Emission Unit Name: **Cyclone 1** Date Constructed: Unknown HAPs present? ☐ Yes ☑ No Emission Point Name: **Cyclone 1** Source ID: EP 44 SCC Code: SCC Units: tons of thruput KyEIS Stack #: EP 44 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: Applicable Regulations: 401 KAR 59:010	1.83	8,400			8,400

Division Use Only: F___ Reviewer __________ Supervisor __________

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
044	PM 10	0.5	AQ-EF02	<u>1st control device</u> KyEIS Control ID #: NA Collection efficiency: NA <u>2nd control device</u> KyEIS Control ID #: NA Collection efficiency: NA		0.91	0.91	*11.56*	3.83	3.83	
	PM Tot	0.5				0.91	0.91	*11.56*	3.83	3.83	

DEP7007N
(continued)

SECTION III. Control Equipment Information for Cyclone

KyEIS Control ID #	Control Equipment Description	Manufacturer	Model Name and Number	Date Installed	Cost
44	*Cyclone 1 - Rotary Chipper & VM Hog*	*Unknown*	*Unknown*	*2008* *Maintenance replacement* Orignal installation 1991	

Inlet Gas Stream Data

Temperature: Ambient _____ ° F _____ ° C	Flowrate (scfm at 68°F): 27,000	Gas density (lb/ft^3):	Particle density (lb/ft^3) or Specific Gravity:	Average particle diameter (μm): *(or attach a particle size distribution table)* Chips of veneer

Equipment Physical Data

The control equipment manufacturer's equipment specifications and recommended operating procedures may be submitted in place of this information.

Type of cyclone:

Pick one:
- ☑ Single
- ☐ Multiple

Number of multiclone _________

Pick one:
- ☐ High-efficiency
- ☑ Conventional
- ☐ High-throughput

Dimensions of cyclone (specify units):

Inlet height	63'	Inlet width	2 @ 21.5" Dia
Body height	8'	Body diameter	12' 8"
Bottom cone height	13'	Dust outlet tube diameter	
Gas outlet tube diameter		Vortex finder height	

Equipment Operational Data

Pressure drop across unit (inches water gauge):	Pollutants collected/controlled: PM & PM 10 Emissions based on 0.5 lbs of PM / ton of thruput Efficiency based on % of thruput weight removed	Pollutant removal/destruction efficiency (%): 99.975%

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DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # _______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
045	Emission Unit Name: **Cyclone 2** Date Constructed: 2006 HAPs present? ☐ Yes ☑ No Emission Point Name: **Cyclone 2** Source ID: EP 45 SCC Code: SCC Units: tons of thruput KyEIS Stack #: EP 45 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: Applicable Regulations: 401 KAR 59:010	0.873	8,400			8,400

Division Use Only: F___ Reviewer __________ Supervisor __________

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DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
045											
				1st control device							
	PM 10	0.5	AQ-EF02	KyEIS Control ID #: NA		0.436	0.436	*17.21*	1.83	1.83	
	PM Tot	0.5		Collection efficiency: NA		0.436	0.436	*17.21*	1.83	1.83	
				2nd control device			.				
				KyEIS Control ID #: NA							
				Collection efficiency: NA							

DEP7007N
(continued)

SECTION III. Control Equipment Information for Cyclone

KyEIS Control ID #	Control Equipment Description	Manufacturer	Model Name and Number	Date Installed	Cost
45	*Cyclone 2 - Dust Collection System*	*Associated Metal Works*	*AMW 42*	*2006*	

Inlet Gas Stream Data

Temperature: Ambient	Flowrate (scfm at 68°F):	Gas density (lb/ft³):	Particle density (lb/ft³) or Specific Gravity:	Average particle diameter (μm): *(or attach a particle size distribution table)*
_____ ° F _____ ° C	34,200			Chips of veneer

Equipment Physical Data

The control equipment manufacturer's equipment specifications and recommended operating procedures may be submitted in place of this information.

Type of cyclone:

Pick one:

- ☑ Single
- ☐ Multiple

Number of multiclone _________

Pick one:

- ☐ High-efficiency
- ☑ Conventional
- ☐ High-throughput

Dimensions of cyclone (specify units):

Inlet height	60'	Inlet width	32" Dia
Body height	10'	Body diameter	14' 4"
Bottom cone height	13'	Dust outlet tube diameter	
Gas outlet tube diameter		Vortex finder height	

Equipment Operational Data

Pressure drop across unit (inches water gauge):	Pollutants collected/controlled:	Pollutant removal/destruction efficiency (%):
	PM & PM 10 Emissions based on 0.5 lbs of PM / ton of thruput Efficiency based on % of thruput weight removed	99.975%

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DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
046	Emission Unit Name: **Cyclone 3** Date Constructed: 2006 HAPs present? ☐ Yes ☑ No Emission Point Name: **Cyclone 3** Source ID: EP 46 SCC Code: SCC Units: tons of thruput KyEIS Stack #: EP 46 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: Applicable Regulations: 401 KAR 59:010	1.624	8,400			8,400

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
046											
				<u>1st control device</u>							
	PM 10	0.5	AQ-EF02	KyEIS Control ID #: NA		0.81	0.81	*17.63*	3.41	3.41	
	PM Tot	0.5	AQ-EF02	Collection efficiency: NA		0.81	0.81	*17.63*	3.41	3.41	
				<u>2nd control device</u>							
				KyEIS Control ID #: NA							
				Collection efficiency: NA							

DEP7007N
(continued)

SECTION III. Control Equipment Information for Cyclone

KyEIS Control ID #	Control Equipment Description	Manufacturer	Model Name and Number	Date Installed	Cost
46	*Cyclone - Rotary Core Chipper*	*Unknown*	*Unknown*	*2006*	

Inlet Gas Stream Data

Temperature: Ambient ______ °F ______ °C	Flowrate (scfm at 68°F): 9,000	Gas density (lb/ft^3):	Particle density (lb/ft^3) or Specific Gravity:	Average particle diameter (μm): *(or attach a particle size distribution table)* Chips of veneer

Equipment Physical Data

The control equipment manufacturer's equipment specifications and recommended operating procedures may be submitted in place of this information.

Type of cyclone:

Pick one:

☑ Single

☐ Multiple

Number of multiclone _________

Pick one:

☐ High-efficiency

☑ Conventional

☐ High-throughput

Dimensions of cyclone (specify units):

Inlet height	69'	Inlet width	13" Dia
Body height	4'	Body diameter	7' 4"
Bottom cone height	6'	Dust outlet tube diameter	
Gas outlet tube diameter		Vortex finder height	

Equipment Operational Data

Pressure drop across unit (inches water gauge):	Pollutants collected/controlled: PM & PM 10 Emissions based on 1.99 lbs of PM / ton of thruput Efficiency based on % of thruput weight removed	Pollutant removal/destruction efficiency (%): 99.9%

Freeman Corporation - Winchester, KY
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DEP7007N
(continued)

SECTION II. Stack Information

KyEIS Stack ID #	Stack Description	Stack Physical Data			Stack Geographic Data			Stack Gas Stream Data		
		Height (ft)	Diameter (ft)	Vent Height (ft)	Vertical Coordinate	Horizontal Coordinate	Coordinate Collection Method Code	Flowrate (acfm)	Temperature (°F)	Exit Velocity (ft/sec)
					UTM Zone 16 - USGS Conversion of Facility's Latitude & Longitude (center point of facility)					
8	Cyclone 4 Discharge	46	6' 8"	46	4210.29	747.298		7,400	Ambient	13.50
44	Cyclone 1 Discharge	63	12' 8"	63				27,000	Ambient	12.20
45	Cyclone 2 Discharge	60	14' 0"	60				34,200	Ambient	13.50
46	Cyclone 3 Discharge	69	7' 4"	69				9,000	Ambient	12.20
11	Boiler # 1	55.3	3	0				9,667	544.0	28.85
12	Boiler # 2	46	2.6	0				15,145	560.0	45.19
15	Boiler # 3	40.8	2.6	0				15,464	311.5	46.15

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DIVISION FOR AIR QUALITY

DEP7007V

Applicable Requirements & Compliance Activities

APPLICANT NAME: The Freeman Corporation

SECTION I. EMISSION AND OPERATING STANDARD(S) AND LIMITATION(S

KYEIS No.[(1)]	Emission Unit Description[(2)]	Contaminant[(3)]	Origin of Requirement or Standard[(4)]	Applicable Requirement, Standard, Restriction, Limitation, or Exemption[(5)]	Method of Determining Compliance with the Emission and Operating Requirement(s)[(6)]
11	Wickes Wood Boiler #1	PM & PM 10	401 KAR 59:015	Opacity <20%	Method 9 visual observation
			Existing Permit V-14-007	PM < 0.428 lb/mm Btu	Calculations based on steam generated and fuel consumed
12	Wickes Wood Boiler #2	PM & PM 10	401 KAR 59:015	Opacity <20%	Method 9 visual observation
			Existing Permit V-14-007	PM < 0.397 lb/mm Btu	Calculations based on steam generated and fuel consumed
15	Hurst Wood Boiler #3	PM & PM 10	401 KAR 59:015	Opacity <20%	Method 9 visual observation
			Existing Permit V-14-007	PM < 0.359 lb/mm Btu	Calculations based on steam generated and fuel consumed

DEP7007V
continued

APPLICANT NAME: The Freeman Corporation

SECTION II. MONITORING REQUIREMENTS

KYEIS No.[1]	Emission Unit Description[2]	Contaminant[3]	Origin of Requirement or Standard[4]	Parameter Monitored[7]	Description of Monitoring[8]
11	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation Calculation based on steam generated and fuel consumed
12	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation Calculation based on steam generated and fuel consumed
15	Hurst Wood Boiler #3	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation Calculation based on steam generated and fuel consumed

DEP7007V
continued

APPLICANT NAME: The Freeman Corporation

SECTION III. RECORDKEEPING REQUIREMENTS

KYEIS No.(1)	Emission Unit Description(2)	Contaminant(3)	Origin of Requirement or Standard(4)	Parameter Recorded(9)	Description of Recordkeeping(10)
11	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation - recorded weekly in log Daily boiler charts
12	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation - recorded weekly in log Daily boiler charts
15	Hurst Wood Boiler #3	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Method 9 visual observation - recorded weekly in log Daily boiler charts

DEP7007V
continued

APPLICANT NAME: The Freeman Corporation

SECTION IV. REPORTING REQUIREMENTS

KYEIS No.(1)	Emission Unit Description(2)	Contaminant(3)	Origin of Requirement or Standard(4)	Parameter Reported(11)	Description of Reporting(12)
11	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Reported semi-annually Reported semi-annually
12	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Reported semi-annually Reported semi-annually
15	Hurst Wood Boiler #3	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Opacity Particulate	Reported semi-annually Reported semi-annually

DEP7007V
continued

APPLICANT NAME: The Freeman Corporation

SECTION V. TESTING REQUIREMENTS

KYEIS No.(1)	Emission Unit Description(2)	Contaminant(3)	Origin of Requirement or Standard(4)	Parameter Tested(13)	Description of Testing(14)
11	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Particulate	Periodic stack testing as required
12	Wickes Wood Boiler	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Particulate	Periodic stack testing as required
15	Hurst Wood Boiler #3	PM & PM 10	401 KAR 59:015 Existing Permit V-14-007	Particulate	Periodic stack testing as required

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007DD

INSIGNIFICANT ACTIVITIES

INSIGNIFICANT ACTIVITY CRITERIA

1. **Emissions from insignificant activities shall be counted toward the source's potential to emit;**
2. **Emissions from the activity shall not be subject to a federally enforceable requirement other than generally applicable requirements that apply to all activities and affected facilities such as 401 KAR 59:010, 61:020, 63:010, and others deemed generally applicable by the Cabinet;**
3. **The potential to emit a regulated air pollutant from the activity or affected facility shall not exceed 5 tons/yr.**
4. **The potential to emit of a hazardous air pollutant from the activity or affected facility shall not exceed 1,000 pounds/yr., or the deminimis level established under Section 112(g) of the Act, whichever is less;**
5. **The activity shall be included in the permit application, identifying generally applicable and state origin requirements.**

Description of Activity Including Rated Capacity	Generally Applicable Regulations Or State Origin Requirements	Does the Activity meet the Insignificant Activity Criteria Listed Above?
EP 16 Log Cooking Vats - Sliced	401 KAR 59:010	All Insignificant Activities on the attached list meet the criteria described above.
EP 17 Log Cooking Vats - Rotary	401 KAR 59:010	
EP 27 Weber Dryer - # 4	401 KAR 59:010	
EP 28 Babcock Dryer - # 5	401 KAR 59:010	
EP 29a Omeco Dryer - # 1	401 KAR 59:010	
EP 29b Fezer Dryer - # 3	401 KAR 59:010	
EP 35 Cremona Dryer	401 KAR 59:010	
EP 36 Raute Dryer	401 KAR 59:010	
EP 37 Splicing/Jointing/Gluing Line	401 KAR 59:010	
EP 37 Splicing/Jointing/Gluing Line	401 KAR 59:010	
EP 39 Crating Trim Saw	401 KAR 59:010	
EP 38 Watering Logs with Pond Water	401 KAR 59:010	
EP 40 Sawdust unloading into silo	401 KAR 63:010	
EP 43 Wemhoner press line	401 KAR 63:010	
EP 41 sawdust unloading from silo to boilers	401 KAR 59:010	
EP 50 a-h Rotary & Veneer Mill Roof Vent Fans (8)	401 KAR 59:010	

SIGNATURE BLOCK

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

BY ____________________ Authorized Signature

___/___/___ Date

____________________ Typed or Printed Name of Signatory

____________________ Title of Signatory

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DEP7007CC
Compliance Certification

DIVISION FOR AIR QUALITY

Division Use Only
ID#
Permit #
Received Date

An application for a permit must contain a certification of compliance signed by a responsible official.
This form must be submitted with the original application as well as each annual report.
This form does not have to be completed for sources applying to construct with original application.

1) **Source Name**

The Freeman Corporation

2) **Source Street Address**

415 Magnolia Street

3) **City**	4) **Date Form Prepared**	5) **Source ID # (If known)**
Winchester	**06/28/19**	**21-049-00004**

6) **Permit Number(s) (If known)**

V-14-007

7) **Submittal Information**

Is this the first submittal of this form? ☐ **Yes** ☑ **No**

What is the reporting period? **01 / 01 / 18** (mm / dd / yy) **to** **12 / 31 / 18** (mm / dd / yy)

DEP7007CC Continued

ID #

8) IDENTIFICATION OF EMISSION UNITS

8a)(1) Emission Units in Compliance. The following emission units are in compliance with applicable requirements such as emission standards, emission control requirements, emission testing, court requirements, work practices, or enhanced monitoring, based on the compliance methods specified below and will continue to comply.
If additional space is needed, attach and label as exhibit DEP7007CC 8a)(1)

Emission Point ID#	Emission Unit ID#	Permit Condition or Applicable Regulation	Emission Unit Description	Permit Limit $	Actual Emissions	Method used for Determining Compliance & whether continuous or intermittent *(such as test methods, monitoring procedures, recordkeeping and reporting)*
	07 08	401 KAR 59:010	Cyclone 4 Clipping Chipper	PM<1.71 lbs/hr; VE<20% opacity	0.14 lbs/hr max	EF=(0.0067*(SQ of thin veneer input))/(2000*2). Weekly opacity observations. Monthly DF thruput recordkeeping. Weekly opacity
	10	401 KAR 63:010	Haul Roads and Log Yard	VE beyond property line prohibited	No known VE beyond property line	Weekly recordkeeping. Good operating procedures
	11	401 KAR 59:015; 401 KAR 60:005	Wickes wood-fired boiler #1	PM<0.428 lb/mmBtu; VE<20% opacity (6-min avg); SO_2<3.01 lb/mmBtu	PM=0.4279 lb/mmBtu per Feb 2018 stack test; SO_2<0.025 lb/mmBtu per AP-42	PM=0.4279lb/MMBtu (Feb 2018 test); SO2=3.01 lb/MMBtu; continuous flow weight monitoring of fuel; weekly moisture content measurement; daily opacity observations.
	12	401 KAR 59:015; 401 KAR 60:005	Wickes wood-fired boiler #2	PM<0.397 lb/mmBtu; VE<20% opacity (6-min avg); SO_2<1.91 lb/mmBtu	PM=0.208 lb/mmBtu per Feb 2018 stack test; SO_2<0.025 lb/mmBtu per AP-42	PM=0.208 lb/MMBtu (Feb 2018 test); SO2=1.91 lb/MMBtu; continuous flow weight monitoring of fuel; weekly moisture content measurement; daily opacity observations.

Emission Point ID#	Emission Unit ID#	Permit Condition or Applicable Regulation	Emission Unit Description	Permit Limit $	Actual Emissions	Method used for Determining Compliance & whether continuous or intermittent *(such as test methods, monitoring procedures, recordkeeping and reporting)*
	15	401 KAR 59:015; 401 KAR 60:005	Hurst wood-fired boiler #3	PM<0.359 lb/mmBtu; VE<20% opacity (6-min avg); SO_2<2.17 lb/mmBtu	PM=0.245 lb/mmBtu per Feb 2018 stack test; SO_2<0.025 lb/mmBtu per AP-42	PM=0.245 lb/MMBtu (Feb 2018 test); SO2=2.17 lb/MMBtu; continuous flow weight monitoring of fuel; weekly moisture content measurement; daily opacity observations.
	42	401 KAR 63:010	Chip Unloading from Storage to Boilers	VE beyond property line prohibited	No known VE beyond property line	Monthly recordkeeping. Good operating procedures
	44 34 21 22 23 24 25a 25b 26 63 64 65	401 KAR 59:010	Cyclone 1 Rotary Veneer Chipper Veneer Mill Hog Slicing Machine #1 Slicing Machine #2 Slicing Machine #3 Slicing Machine #4 Slicing Machine #5 Flitch Rip Saw Paul Saw_01 Paul Saw_02 Veneer Sizing Bandsaw	PM<11.56 lb/hr; VE<20% opacity (6-min avg)	0.08 lbs/hr max	EF=(0.381*(DF of wood))/(2000*0.5). Weekly opacity observations. Monthly DF thruput recordkeeping. Weekly opacity observations.
	45 14a 14b 18 19 20	401 KAR 59:010	Cyclone 2 Debarker Flitch Mill Skinning Line #1 Flitch Cut-Off Saw Flitch Planing and Grooving	PM<17.21 lb/hr; VE<20% opacity	0.04 lbs/hr max	EF=(0.20*(DF of wood))/(2000*0.5). Weekly opacity observations. Monthly DF thruput recordkeeping. Weekly opacity observations.
	46 32 47	401 KAR 59:010	Cyclone 3 Rotary Peeler Rotary Core Chipper	PM<17.63 lb/hr; VE<20% opacity	0.33 lbs/hr max	EF=(0.538*(DF of wood))/(2000*0.5). Weekly opacity observations. Monthly DF thruput recordkeeping. Weekly opacity observations.
	48	401 KAR 51:017	Nicholson Chipper	PM< 3.59P^0.62 lb/hr; VE<20% opacity	<19.1 lbs/hr	Monthly recordkeeping. Good operating procedures
	62	401 KAR 59:010	Butt End Reducer	PM< 3.59P^0.62 lb/hr; VE<20% opacity	<19.1 lbs/hr	Monthly recordkeeping. Good operating procedures

DEP7007CC Continued

ID #

8) IDENTIFICATION OF EMISSION UNITS (continued)

8a)(2) Emission Units in Compliance but Subject to Future Compliance Dates. The following emission units, which are currently in compliance with all applicable requirements, will

Emission Point ID#	Emission Unit ID#	Future Compliance Schedule	Emission Unit Description	Reason for Future Compliance Date		

ID #

8) IDENTIFICATION OF EMISSION UNITS (continued)

8b)(1) Emission Units Not in Compliance. The following emission units were not in compliance with applicable requirements such as emission standards, emission control

Emission Point ID#	Emission Unit ID#	Permit Condition or Applicable Regulation	Emission Unit Description	Permit Limit	Actual Emissions	Method used for Determining Compliance *(such as test methods, monitoring procedures, recordkeeping and reporting)*

ID #

8) IDENTIFICATION OF EMISSION UNITS (continued)

8b)(2) Emission Units Not in Compliance. For the above listed emission units that were not in continuous compliance since the last reporting period, state the reasons for

Emission Point ID#	Emission Unit ID#	Reason(s) for NonCompliance

DEP7007CC Continued

ID #

9) SIGNATURE BLOCK

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

BY: ______________________
AUTHORIZED SIGNATURE

6-28-19
DATE

Scott Hale
TYPED OR PRINTED NAME OF SIGNATORY

CFO
TITLE OF SIGNATORY

MATERIAL SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

DESCRIPTION: Perkins MS-406

1. Chemical Product and Company Identification

DESCRIPTION:	**Perkins MS-406**
PRODUCT CODE:	11-M406P-.
PRODUCT TYPE:	Powder MUF Resin
APPLICATION:	General Purpose MUF Powder Adhesive

Manufacturer/Supplier Information

MSDS Prepared by:
Borden Chemical, Inc.
155 West A Street, Bldg. A-1
Springfield, OR 97477

Emergency Phone Number
Poison Control Center
1-800-228-5635 ext 261

For additional health, safety or regulatory information, call 541-744-3256.

2. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

		% by weight
50-00-0	***Formaldehyde**	0.1-0.99
1332-58-7	***Kaolin**	10-30
7783-20-2	**Ammonium Sulfate**	1-5
	***Wood Flour**	5-10

3. Hazards Identification

3.1 Emergency Overview

Appearance	Off-White Dry Powder
Odor	Slight formaldehyde

CAUTION!
Combustible dust when finely divided or suspended in air.
May cause allergic skin and respiratory reactions.
May cause eye irritation

HMIS Rating

HEALTH = 1 (slight)
FLAMMABILITY = 1 (slight)
REACTIVITY = 0 (minimal)
CHRONIC = *

3.2 Potential Health Effects

Immediate Hazards

INGESTION:	Not expected to be harmful under normal conditions of use.
INHALATION:	Not expected to be harmful under normal conditions of use. However, if allowed to become airborne, may cause irritation of nose, throat and lungs.
SKIN:	May cause irritation on prolonged or repeated contact.
EYES:	May cause irritation on prolonged or repeated contact.

Delayed Hazards

Formaldehyde 50-00-0
POTENTIAL CANCER HAZARD.
Rats chronically exposed to 14 ppm formaldehyde contracted nasal cancers. Based on animal data and limited epidemiological evidence, NTP and IARC have listed formaldehyde as a probable human carcinogen. OSHA regulates formaldehyde as a potential human carcinogen. May cause allergic skin reaction. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that pre-existing respiratory and skin disorders may be aggravated by exposure.

OSHA has identified 0.5 ppm as the "Action Level", 29CFR 1910.1048. Please refer to the OSHA Standard for guidance applicable to your specific operations.

Kaolin 1332-58-7
Chronic inhalation has resulted in benign pneumoconiosis.
Pre-existing respiratory disorders may be aggravated by exposure.
-- See Footnote C.

Wood Flour
POTENTIAL CANCER HAZARD. Wood dust has been classified by IARC as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk of occurrence of adenocarcinomas in the nasal cavities and paranasal sinuses associated with exposure to wood dust. Wood dust is not listed by NTP nor regulated by OSHA as a carcinogen.

Delayed Hazards

Depending on species, may cause allergic skin and respiratory reactions.

Footnote C: As of the date of issuance of this document, this material has not been listed by NTP, classified by IARC nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. Immediately contact poison control center or hospital emergency room for any other additional treatment directions.

INHALATION: Remove to fresh air.

SKIN: In case of irritation, flush with water.

EYES: Immediately flush eyes with plenty of water. Call a physician if irritation persists.

5. Fire Fighting Measures

Flash point	Not applicable
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Autoignition temperature	Not applicable

Will burn.
Refer to NFPA Pamphlet No. 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids," if this material is to be reduced to or collected as a powder.
In case of fire, use water spray, dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool.

6. Accidental Release Measures

Sweep (scoop) up and remove to a chemical disposal area. Prevent entry into natural bodies of water.

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing.
Wash thoroughly after handling. Always use appropriate Personal Protective Equipment (PPE).
INHALATION: Avoid prolonged or repeated breathing of dust or

7.1 Handling

vapor.
SKIN: Avoid prolonged or repeated contact with skin and clothing.
EYES: Avoid prolonged or repeated contact with eyes.

7.2 Storage

Keep container closed.
Store in a cool, dry place.
Loosen closure cautiously before opening.
Use with adequate ventilation.

8. Exposure Controls/Personal Protection

8.1 Exposure Controls

If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.2 Personal Protection

Where air contaminants can exceed acceptable criteria, use NIOSH/MSHA approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminants in air in accordance with OSHA laws and regulations or other applicable standards or guidelines, including ANSI standards regarding respiratory protection. Use goggles if contact is likely. Wear impervious gloves as required to prevent skin contact.

8.3 Exposure Guidelines

Formaldehyde 50-00-0
ACGIH TLV: 0.3 ppm (0.37 mg/m^3) Ceiling, A2 - See Appendix A
OSHA PEL: 0.75 ppm(0.9 mg/m^3) TWA; 2 ppm(2.5mg/m^3)15min STEL

Kaolin 1332-58-7
ACGIH TLV: 2 mg/m^3 TWA, respirable fraction
OSHA PEL: 15 mg/m^3 TWA, total dust; 5 mg/m^3 TWA, respirable fraction
REMANDED PEL: 10 mg/^{3} TWA, total dust; 5 mg/m^3 TWA, respirable fraction
OSHA 1989 PEL remanded, but in effect in some states

Ammonium Sulfate 7783-20-2
ACGIH TLV: NONE ESTABLISHED
OSHA PEL: NONE ESTABLISHED

Wood Flour
ACGIH TLV: 5 mg/m^3 TWA; 10 mg/m^3 STEL (softwood)
OSHA PEL: 15 mg/m^{3}TWA (total dust); 5 mg/m^3(respirable)

8.3 Exposure Guidelines

REMANDED PEL: 5 mg/m³ TWA; 10 mg/m³ STEL (all soft and hard woods)
OSHA 1989 PEL remanded, but in effect in some states
OTHER: ACGIH TLV: 1 mg/m³ TWA (certain hardwoods)

9. Physical and Chemical Properties

Physical state	Solid
Appearance	Off-White Dry Powder
Odor	Slight formaldehyde
Odor threshold	Not available
Specific gravity	~0.5-0.7
pH	6.0-7.0 @ 25C
Viscosity, Brookfield	1000-2000 cps
Freezing point	Not available
Solubility in water	Dispersible
Octanol/water partition coefficient	Not available
Vapor pressure @ 25 C	Not applicable
Vapor density (air=1)	Not applicable
Evaporation rate (butyl acetate=1)	Not applicable
Boiling point, 760 mm Hg	Not applicable

10. Stability and Reactivity

Normally stable as defined in NFPA 704-12(4-3.1).
In common with most organic materials, this product should be treated as a combustible dust in the finely divided and suspended state.

Decomposition products may include:

CO, CO2, aldehydes (including formaldehyde), hydrogen cyanide, particulate matter and other organic compounds by thermal decomposition in air.

Hazardous polymerization:

Will not occur.

11. Toxicological Information

See Section 3 Hazards Identification information.
Formaldehyde 50-00-0
LC50: rat=203 mg/m³ (RTECS)
LD50: orl-rat=0.8 g/kg (Merck); skn-rbt=0.27 g/kg (Sax)

Kaolin 1332-58-7
LC50: Not available
LD50: Not available

Ammonium Sulfate 7783-20-2
LC50: Not available
LD50: Not available

11. Toxicological Information

Wood Flour
LC50: Not available
LD50: Not available

12. Ecological Information

No data for ecotoxicity has been found. Effects are expected to be minimal.

The material is a soil mobile liquid initially which will solidify on aging. Biodegradation is expected to be very slow; bioaccumulation negligible.

13. Disposal Considerations

Dispose of according to local, state/provincial, and federal requirements.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Non-Regulated

14.2 Canadian Transportation of Dangerous Goods (TDG)

Finished Goods - Non-regulated
Powdered Adhesive or Catalyst

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazard Communication Standard 29CFR1910.1200

This material presents possible health hazards as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Delayed health hazard

SARA Title III Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Formaldehyde	50-00-0	0.53%
Zinc Compounds	N982	2.50%

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

CLASS D, DIV 2A, 2B

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

Zinc (and Its Compounds)	7440-66-6	2.50%

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

CUR ISSUE 10-SEP-01
PREVIOUS ISSUE: 04-JUN-01

Material Safety Data Sheet

Weyerhaeuser

Wood and Wood Dust (Without Chemical Treatments or Resins/Adhesives)

Weyerhaeuser Company
PO Box 9777
Federal Way, WA 98063-9777
http://www.weyerhaeuser.com/Sustainability/MSDS

Emergency Phone: (253) 924-5000
Additional Information: (253) 924-3865
CHEMTREC: (800) 424-9300
Revised Date: November 5, 2010

1. Product Identification

Product	Manufacturing Location(s)
Wood and Wood Dust (Without Chemical Treatments or Resins/Additives))	**USA:** Various **Canada:** Various

Synonyms: Untreated wood, Sawdust, Sanderdust

2. Hazardous Ingredients/Identity Information

Name	CAS#	Percent	Agency	Exposure Limits	Comments
Wood (softwood and hardwood)	None	100	OSHA	PEL-TWA 15 mg/m^3 (see footnote [A] below)	Total dust (PNOR)
			OSHA	PEL-TWA 5 mg/m^3 (see footnote [A] below)	Respirable dust fraction (PNOR)
			ACGIH	TLV-TWA 1 mg/m^3	Inhalable fraction

[A] In AFL-CIO v OSHA, 965 F. 2d 962 (11th Cir. 1992), the Court overturned OSHA’s 1989 Air Contaminants Rule, including the specific PEL’s for wood dust that OSHA had established at that time. The 1989 vacated PEL’s were: 5 mg/m^3 PEL-TWA and 10 mg/m^3 STEL (15 min), all softwood and hardwood except Western Red Cedar. Wood dust is now regulated by OSHA as “Particulates Not Otherwise Regulated” (PNOR), which is also referred to as “nuisance dust”.

However, some states have incorporated the 1989 OSHA PEL’s in their state plans. Additionally, OSHA indicated that it may cite employers under the OSH Act general duty clause in appropriate circumstances for noncompliance with the 1989 PEL’s.

3. Hazard Identification

Primary Safety/Health Hazards:

Warning: Wood dust may pose a combustible dust explosion hazard if suspended in air in sufficient concentrations in a contained area in proximity to an ignition source. Users of wood products which may generate wood dust solids during handling and processing should evaluate combustibility hazards and controls. See additional comments in MSDS.

The primary health hazard posed by this product is thought to be due to exposure to airborne wood dust.

Appearance and Odor: Depending on wood species, light to dark colored, granular solid. Color and odor are dependent on the wood species and time since dust was generated. Particles may be generated by any manual or mechanical cutting or abrasion process performed on wood.

Primary Route(s) of Exposure:

☐ Ingestion:
☒ Skin:
☒ Inhalation:
☒ Eye:

Medical Conditions Generally Aggravated by Exposure: Wood dust may aggravate pre-existing respiratory conditions or allergies.

Signs and Symptoms of Exposure:

Acute Health Hazards: Wood dust can cause eye irritation. Certain species of wood dust can elicit allergic contact dermatitis in sensitized individuals. Inhalation of wood dust may cause respiratory irritation, nasal dryness, coughing, sneezing, and wheezing as a result of inhalation.

Chronic Health Hazards: Wood dust, depending on the species, may cause allergic contact dermatitis and respiratory sensitization with prolonged, repetitive contact or exposure to elevated dust levels. Exposure to wood dust has been reported by some organizations to cause nasal cancer.

Carcinogenicity Listing:

☒ NTP:	Wood dust, Known Human Carcinogen.
☒ IARC Monographs:	Wood dust, Group 1 - carcinogenic to humans.
☐ OSHA Regulated:	

Wood Dust - NTP: According to its Report on Carcinogens, Eleventh Edition, NTP states, “Wood dust is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans”. An association between wood dust exposure and cancer of the nasal cavity has been observed in many case reports, cohort studies, and case-control studies that specifically addressed nasal cancer. Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed both in studies of people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure. This classification is based primarily on increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. The evaluation did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust. There is inadequate evidence for the carcinogenicity of wood dust from studies in experimental animals according to NTP.

Wood Dust: IARC – Group 1: Carcinogenic to humans; sufficient evidence of carcinogenicity. This classification is primarily based on studies showing an association between occupational exposure to wood dust and adenocarcinoma to the nasal cavities and paranasal sinuses. IARC did not find sufficient evidence of an association between occupational exposure to wood dust and cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum.

4. Emergency and First-Aid Procedures

Ingestion: Not applicable under normal use.
Eye Contact: Wood dust may cause mechanical irritation. Treat dust in eye as foreign object. Flush with water to remove dust particles. Seek medical help if irritation persists.
Skin Contact: Wood dust of certain species can elicit allergic contact dermatitis in sensitized individuals, as well as mechanical irritation resulting in erythema and hives. Seek medical help if rash, irritation or dermatitis persists.
Skin Absorption: Not known to occur under normal use.
Inhalation: Wood dust may cause unpleasant obstruction in the nasal passages, resulting in dryness of nose, dry cough, and sneezing. Remove to fresh air. Seek medical help if persistent irritation, severe coughing, allergic-type responses or breathing difficulty occurs.

5. Fire and Explosion Data

Flash Point (Method Used):

Flammable Limits:	**LFL =**	See below under "Unusual Fire and Explosion Hazards"	**UFL =**	NAP

Extinguishing Media: Water, carbon dioxide, sand
Autoignition Temperature: Variable [typically 400°-500°F (204°-260°C)]
Special Firefighting Procedures: None
Unusual Fire and Explosion Hazards: Depending on moisture content, and more importantly, particle diameter and airborne concentration, wood dust in a contained area may explode in the presence of an ignition source. Wood dust may similarly deflagrate (combustion without detonation like an explosion) if ignited in an open or loosely contained area. An airborne concentration of 40 grams (40,000 mg) of dust per cubic meter of air is often used as the LEL for wood dusts. Reference NFPA Standards- 654 and 664 for guidance. Ventilation systems should be kept clean and precautions should be taken to prevent sparks or other ignition sources.

HMIS Rating (Scale 0-4):	**Health =**	2*	**Fire =**	1	**Physical Hazard =**	0
NFPA Rating (Scale 0-4):	**Health =**	1	**Fire =**	1	**Reactivity =**	0

6. Accidental Release Measures

Steps to be Taken In Case Material Is Released or Spilled: Sweep or vacuum up for recovery and disposal. Avoid creating dusty conditions whenever feasible. Maintain good housekeeping to avoid accumulation of dried wood dust on exposed surfaces. Dried wood dust may pose a combustible dust hazard. Place recovered wood dust in a container for proper disposal.

7. Handling and Storage

Precautions to be Taken In Handling and Storage: Wood dust may pose a combustible dust hazard. Keep away from ignition sources. Avoid eye contact. Avoid prolonged or repeated contact with skin. Avoid prolonged or repeated breathing of wood dust. Store in well-ventilated, dry place away from open flame.

8. Exposure Control Measures, Personal Protection

Personal Protective Equipment:
RESPIRATORY PROTECTION – Use NIOSH approved filtering face piece respirator ("dust mask") or higher levels of respiratory protection as indicated if there is a potential to exceed the exposure limits or for symptom relief or worker comfort. Use respiratory protection in accordance with regulatory requirements such as the OSHA respiratory protection standard 29 CFR 1910.134.

8. Exposure Control Measures, Personal Protection (cont'd.)

EYE PROTECTION – Goggles or safety glasses are recommended when excessive exposures to wood dust may occur (e.g. during clean up).

PROTECTIVE GLOVES – Not required. However, cloth, canvas, or leather gloves are recommended to minimize potential slivers or mechanical irritation from handling generated wood dust.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT – Outer garments which cover the arms may be desirable in extremely dusty areas.

WORK/HYGIENE PRACTICES – Follow good hygienic and housekeeping practices. Clean up areas where wood dust settles to avoid excessive accumulation of this combustible material. Minimize compressed air blowdown or other practices that generate high airborne-dust concentrations.

Ventilation:

LOCAL EXHAUST – Provide local exhaust as needed so that exposure limits are met. Ventilation to control dust should be considered where potential explosive concentrations and ignition sources are present. The design and operation of any exhaust system should consider the possibility of explosive concentrations of wood dust within the system. See "SPECIAL" section below. Use of tool mounted exhaust systems should also be considered, especially when working in enclosed areas.

MECHANICAL (GENERAL) – Provide general ventilation in processing and storage areas so that exposure limits are met.

SPECIAL – Ensure that exhaust ventilation and material transport systems involved in handling this product contain explosion relief vents or suppression systems designed and operated in accordance with applicable standards if the operating conditions justify their use.

OTHER – Cutting & Machining of product should preferably be done outdoors or with adequate ventilation & containment.

9. Physical/Chemical Properties

Physical Description: Light to dark colored, granular solid. Color and odor are dependent on the wood species and time since dust was generated.

Boiling Point (@ 760 mm Hg):	NAP
Evaporation Rate (Butyl Acetate = 1):	NAP
Freezing Point:	NAP
Melting Point:	NAP
Molecular Formula:	NAP
Molecular Weight:	NAP
Oil-water Distribution Coefficient:	NAP
Odor Threshold:	NAP
pH:	NAP
Solubility in Water (% by weight):	Insoluble
Specific Gravity (H_2O = 1):	Variable; depends on wood species and moisture
Vapor Density (air = 1; 1 atm):	NAP
Vapor Pressure (mm Hg):	NAP
Viscosity:	NAP
% Volatile by Volume [@ 70°F (21°C)]:	0

10. Stability and Reactivity

Stability: ☐ Unstable ☒ Stable

Conditions to Avoid: Avoid open flame. Product may ignite at temperatures in excess of 400°F (204°C).

Incompatibility (Materials to Avoid): Avoid contact with oxidizing agents.

10. Stability and Reactivity (cont'd.)

Hazardous Decomposition or By-Products: Thermal decomposition (i.e. smoldering, burning) products include carbon monoxide, carbon dioxide, oxides of nitrogen, aliphatic aldehydes, terpenes, and polycyclic aromatic hydrocarbons. Natural decomposition of organic materials such as wood may produce toxic gases and an oxygen deficient atmosphere in enclosed or poorly ventilated areas. Spontaneous and rapid hazardous decomposition will not occur.
Hazardous Polymerization: ☐ May occur ☒ Will not occur
Sensitivity to Mechanical Impact: NAP
Sensitivity to Static Discharge: NAP

11. Toxicological Information

Toxicity Data:
<u>Wood dust (softwood or hardwood)</u>
Wood dust – generated from sawing, sanding or machining wood products – may cause nasal dryness, irritation, coughing and sinusitis. NTP and IARC classify wood dust as a human carcinogen (IARC Group 1). See Section 3 above.
Components: NAP
Target Organs: Eyes, skin, respiratory system.

12. Ecological Information

Environmental Fate: Wood dust would be expected to be biodegradable.
Environmental Toxicity: NAP

13. Disposal Considerations

Waste Disposal Method: Incineration in accordance with local, state, and federal regulations is preferred because fugitive emissions can be effectively controlled. Landfill disposal in accordance with local, state, and federal regulations is acceptable if actions are taken to contain the material until it can be covered by other wastes or landfill cover materials.

14. Transport Information

Mode: (Air, Land, water) Not regulated as a hazardous material by the U.S. Department of Transportation. Not listed as a hazardous material in Canadian Transportation of Dangerous Goods (TDG).

Proper Shipping Name:	NAP
Hazard Class:	NAP
UN/NA ID Number:	NAP
Packing Group:	NAP
Information Reported for Product/Size:	NAP

15. Regulatory Information

TSCA: NAP

CERCLA: NAP

DSL: NAP

OSHA: Wood products per se are not hazardous under the criteria of the federal OSHA Hazard Communication Standard 29CFR 1910.1200. However, wood dust generated by sawing, sanding or machining wood products may be hazardous and hence included under 1910.1200.

STATE RIGHT-TO-KNOW:

California Prop 65:

Warning: Drilling, sawing, sanding or machining wood products generates wood dust, a substance known to the State of California to cause cancer.

Pennsylvania – When cut or otherwise machined, wood products may emit wood dust. Wood dust appears on Pennsylvania's Appendix A, Hazardous Substance List.

New Jersey – When cut or otherwise machined, wood products may emit wood dust. Wood dust appears on New Jersey's Environmental Hazardous Substance List.

SARA 313 Information: This product does not contain any chemical ingredient (s) with known CAS numbers that exceed the de minimis reporting levels established by SARA Title III, section 313 and 40 CFR section 372.

SARA 311/312 Hazard Category: This product has been reviewed according to the EPA "Hazard Categories" promulgated under SARA Title III Sections 311 and 312 and is considered, under applicable definitions, to meet the following categories:

An immediate (acute) health hazard	Yes
A delayed (chronic) health hazard	Yes
A corrosive hazard	No
A fire hazard	No
A reactivity hazard	No
A sudden release hazard	No

FDA: Not intended for use as a food additive or indirect food contact item.

WHMIS Classification: Controlled Product: D2A (wood dust: IARC Group 1)

16. Additional Information

Date Prepared: 02/01/2009

Date Revised: 11/05/2010

Prepared By: Weyerhaeuser Company Environment, Health, Safety and Sustainability

Weyerhaeuser MSDS available on: http://www.weyerhaeuser.com/Sustainability/MSDS

User's Responsibility: The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user's responsibility to determine if the product is suitable for its proposed application(s) and to follow necessary safety precautions. The user has the responsibility to make sure that this MSDS is the most up-to-date issue.

Definition of Common Terms:

ACGIH = American Conference of Governmental Industrial Hygienists
C = Ceiling Limit
CAS# = Chemical Abstracts System Number
DOT = U. S. Department of Transportation
DSL = Domestic Substance List
EC50 = Effective concentration that inhibits the endpoint to 50% of control population
EPA = U.S. Environmental Protection Agency

16. Additional Information (cont’d.)

HMIS = Hazardous Materials Identification System
IARC = International Agency for Research on Cancer
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods
LC50 = Concentration in air resulting in death to 50% of experimental animals
LCLo = Lowest concentration in air resulting in death
LD50 = Administered dose resulting in death to 50% of experimental animals
LDLo = Lowest dose resulting in death
LEL = Lower Explosive Limit
LFL = Lower Flammable Limit
MSHA = Mine Safety and Health Administration
NAP = Not Applicable
NAV = Not Available
NIOSH = National Institute for Occupational Safety and Health
NFPA = National Fire Protection Association
NPRI = Canadian National Pollution Release Inventory
NTP = National Toxicology Program
OSHA = Occupational Safety and Health Administration
PEL = Permissible Exposure Limit
RCRA = Resource Conservation and Recovery Act
STEL = Short-Term Exposure Limit (15 minutes)
STP = Standard Temperature and Pressure
TCLo = Lowest concentration in air resulting in a toxic effect
TDG = Canadian Transportation of Dangerous Goods
TDLo = Lowest dose resulting in a toxic effect
TLV = Threshold Limit Value
TSCA = Toxic Substance Control Act
TWA = Time-Weighted Average (8 hours)
UFL = Upper Flammable Limit
WHMIS = Workplace Hazardous Materials Information System

FINAL REPORT

PARTICULATE EMISSIONS EVALUATIONS
BOILERS 1, 2, & 3

at

THE FREEMAN CORPORATION
415 Magnolia Street
Winchester, KY 40392-0096

for

MOORE VENTURES LLC
220 Walton Avenue, Suite A
Lexington, KY 40502

by

FBT ENVIRONMENTAL SERVICES LLC
6860 Stonepoint Court
Paducah, KY 42003
(270)-331-8782

Prepared by:
Chris Gottschalk
Project Manager

Tests Performed:	**Report Issued:**
February 27-28, 2018	**March 24, 2018**

FINAL REPORT

PARTICULATE EMISSIONS EVALUATIONS
BOILERS 1, 2, & 3

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FINAL REPORT

PARTICULATE EMISSIONS EVALUATIONS
BOILERS 1, 2, & 3

EXECUTIVE SUMMARY

FBT Environmental Services LLC (FBT) was retained by Moore Ventures LLC, to perform particulate matter (PM) emissions evaluations on three wood-fired boilers controlled by multiclones at The Freeman Corporation in Winchester, Kentucky. The purpose of the tests was to demonstrate compliance with emissions limits imposed by the facility's Air Quality Permit V14-007 issued by the Kentucky Division for Air Quality.

Particulate matter emissions test results are presented in Table 1. These results show that the three boilers met their respective particulate matter emissions limits.

Table 1 Emissions Summary

	Avg. Steam Flow lbs/hr	Avg. PM Emissions lbs/million Btu	PM Emissions Limits lbs/million Btu
Boiler 1 (EU-11)	10,278	0.4279	0.428
Boiler 2 (EU-12)	9,007	0.208	0.359
Boiler 3 (EU-15)	23,007	0.245	0.397

Acronyms

acfm - actual cubic feet per minute

CFR - Code of Federal Regulations

CPM – condensable particulate matter

DAQ – Kentucky Division for Air Quality

DL – Detection Limit

dscf - dry standard cubic feet

dscfm - dry standard cubic feet per minute

EP - Emission Point

EU - Emission Unit

FBT - FBT Environmental Services, LLC

FPM – filterable particulate matter

fps - feet per second

in Hg – inches mercury gauge pressure

in H_2O – inches water gauge pressure

KAR - Kentucky Administration Regulations

KW - kilowatts

lbs/hr - pounds per hour

min – minute

MSOP – Minor Source Operating Permit

PM - Particulate Matter

PM10 - Particulate matter 10 microns and smaller

PM2.5 - Particulate matter 2.5 microns and smaller

ppm – parts per million volume, dry basis

PQL - Practical Quantification Limit

QA - Quality Assurance

QC - Quality Control

TFE - Tetrafluoroethylene (Teflon)

VE – Visual Emissions

VOC - Volatile Organic Compound(s)

USEPA - United States Environmental Protection Agency

FINAL REPORT

PARTICULATE EMISSIONS EVALUATIONS
BOILERS 1, 2, & 3

1.0 INTRODUCTION

FBT Environmental Services LLC (FBT) was retained by Moore Ventures LLC, to perform particulate matter (PM) emissions evaluations on three wood-fired boilers controlled by multiclones at The Freeman Corporation in Winchester, Kentucky. The purpose of the tests was to demonstrate compliance with emissions limits imposed by the facility's Air Quality Permit V14-007 issued by the Kentucky Division for Air Quality.

The tests were performed February 27-28, 2018. FBT's test team consisted of Bert Forsyth (Field Team Leader), Michael Meadows, and Matthew Huber. Jonathan Moore, Moore Ventures LLC, coordinated testing with plant operations. Trevor Hylton and Anthony Handley, KY DAQ, observed the tests.

The tests consisted of three 60-minute runs on each boiler stack for measurement of filterable PM emissions. United States Environmental Protection Agency Reference Methods were used.

2.0 TEST RESULTS

Test results for the three boilers are summarized in Tables 2.1, 2.2, and 2.3. Boiler steam flows and stack gas conditions are also presented in these Tables.

Sample calculations and calculated test results are presented in Appendix A. Analytical data including particulate matter and fuel analyses and stack gas oxygen and carbon dioxide compositions are contained in Appendix B. Field sampling data sheets and sampling site data are presented in Appendix C. Test equipment calibration data is contained in Appendix D. Process data is presented in Appendix E.

Table 2.1 -Boiler 1, EU-11
Particulate Matter Emissions Summary
2/28/2018

Emissions:

Time: **Run #:**	**0945-1104** **1**	**1140-1244** **2**	**1310-1412** **3**	**Averages**	**Permit Limit**
Particulate Matter:					
grains per dscf	0.0936	0.2055	0.1687	**0.1559**	**-**
pounds per million Btu	0.256	0.590	0.438	**0.4279**	**0.428**

Boiler Production:

Steam Flow:	**lbs/hr**	11,331	7,682	11,822	10,278

Stack Gas Conditions:

Velocity, Vs:	**fps**	28.38	24.01	34.15	28.85
Stack Gas	**acfm**	9,510	8,047	11,444	9,667
Flow Rate:	**dscfm**	4,193	3,737	4,891	4,273
Temp, Ts:	**^{o}F**	532	507	594	544
H_2O:	**%**	14.5	12.2	12.0	12.9
O_2:	**%**	9.94	10.66	9.65	10.08
CO_2:	**%**	10.72	10.03	11.03	10.59

Key:

fps = feet per second

acfm = actual cubic feet per minute

lbs/hr = pounds per hour

dscf = dry standard cubic feet

dscfm = dry standard cubic feet per minute

Table 2.2-Boiler 2, EU-12
Particulate Matter Emissions Summary
2/27/2018

Emissions:

Time: **Run #:**	**1405-1510** **1**	**1600-1703** **2**	**1745-1848** **3**	**Averages**	**Permit Limit**
Particulate Matter:					
grains per dscf	0.1309	0.0458	0.0611	**0.0793**	**-**
pounds per million Btu	0.311	0.161	0.153	**0.208**	**0.359**

Boiler Production:

Steam Flow:	**lbs/hr**	11,236	6,351	9,434	9,007

Stack Gas Conditions:

Velocity, Vs:	**fps**	45.19	43.73	46.67	45.19
Stack Gas	**acfm**	15,143	14,654	15,638	15,145
Flow Rate:	**dscfm**	6,604	6,481	6,833	6,640
Temp, Ts:	**^{o}F**	569	545	566	560
H_2O:	**%**	13.2	14.1	13.3	13.5
O_2:	**%**	8.37	12.37	8.86	9.87
CO_2:	**%**	12.38	8.54	11.29	10.74

Key:

fps = feet per second

acfm = actual cubic feet per minute

lbs/hr = pounds per hour

dscf = dry standard cubic feet

dscfm = dry standard cubic feet per minute

Table 2.3-Boiler 3, EU-15
Particulate Matter Emissions Summary
2/27/2018

Emissions:

Time: **Run #:**	**0833-0936** **1**	**1005-1108** **2**	**1130-1233** **3**	**Averages**	**Permit Limit**
Particulate Matter:					
grains per dscf	0.0851	0.0921	0.0720	**0.0830**	**-**
pounds per million Btu	0.248	0.273	0.215	**0.245**	**0.397**

Boiler Production:

Steam Flow:	**lbs/hr**	23,326	23,114	22,581	23,007

Stack Gas Conditions:

Velocity, Vs:	**fps**	47.35	44.69	46.40	46.15
Stack Gas	**acfm**	15,868	14,977	15,547	15,464
Flow Rate:	**dscfm**	8,765	9,241	9,403	9,136
Temp, Ts:	**^{o}F**	316.4	307.1	311.1	311.5
H_2O:	**%**	17.07	8.47	9.82	11.78
O_2:	**%**	10.71	10.97	10.95	10.88
CO_2:	**%**	9.91	9.85	10.05	9.94

Key:

fps = feet per second

acfm = actual cubic feet per minute

lbs/hr = pounds per hour

dscf = dry standard cubic feet

dscfm = dry standard cubic feet per minute

3.0 PROCESS DESCRIPTION

The Freeman Corporation operated a veneer manufacturing process at its facility in Winchester, Kentucky. The process consisted of receiving and storing hardwood logs, debarking the logs, soaking the logs in water, sawing the logs to length to fit in slicing machines, slicing the wood into thin veneer strips, drying the thin veneer strips, and trimming and joining them. Drying heat was provided by three wood-fired steam boilers designated boilers #s 1 (Emission Unit 11), 2 (Emission Unit 12) and 3 (Emission Unit 15). Particulate matter emissions from the three boilers were controlled by multiclones.

4.0 TEST PROCEDURES

Sampling and analytical procedures used for these tests were from the latest edition of United States Environmental Protection Agency (USEPA) Reference Methods described in the Code of Federal Regulations (CFR), 40 Part 60, Appendix A. Following are descriptions of these procedures:

4.1 Measurement Sites (Method 1)

Locations of measurement sites and the number of sample points were determined as specified in **USEPA Reference Method 1** Sample *and Velocity Traverses for Stationary Sources*.

4.2 Velocity and Volumetric Flow Rates (Method 2)

Stack gas velocities and volumetric flow rates were determined using **USEPA Reference Method 2**, *Determination of Stack Gas Velocity and Volumetric Flow Rate*. Velocity and static pressures were measured with S-type pitots and 10-inch inclined manometers. Stack gas temperatures were measured with calibrated Type K thermocouples.

4.3 Oxygen, Carbon Dioxide, Dry Molecular Weight (Method 3A)

Oxygen, carbon dioxide, and dry molecular weights of stack gases were determined using **USEPA Reference Method 3A**, *Determination of Oxygen and Carbon Dioxide Concentration from Stationary Sources.* Stack gas was withdrawn continuously through a glass fiber filter, stainless steel probe, TFE sample line, and refrigeration gas dryer with a vacuum pump and directed to Servomex 1400 paramagnetic O2 and NDIR CO2 analyzers. The analyzers were calibrated with USEPA protocol calibration gases. Instrument responses were recorded on a computer via an IO Tech data shuttle and Strata software.

4.4 Moisture (Method 4)

The moisture contents of stack gases were determined using **USEPA Reference Method 4**, *Determination of Moisture Content in Stack Gases*. Method 4 sampling was done in conjunction with Methods 5 particulate sampling.

4.5 Particulate Matter (Methods 5 and 19)

Particulate matter emissions were determined using **USEPA Reference Method 5,** *Determination of Particulate Emissions from Stationary Sources*. Emission rates in pounds per million Btu were calculated using **USEPA Reference Method 19**, *Determination of Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates.* Prior to testing, Method 5 filters were desiccated and weighed. During sampling an integrated gas sample was withdrawn from the stack with a vacuum pump through a stainless-steel nozzle, a heated borosilicate glass lined probe, a heated glass fiber filter, four pre-weighed glass impingers, and a dry gas meter. The fourth impinger contained silica gel.

After post run leak checks the filters were removed from filter holders and placed in sealed containers. The sample train components ahead of the Method 5 filter were rinsed and brushed with acetone into labeled sample containers. Impingers were weighed to determine moisture gain. The filters were desiccated and weighed to constant weight in the laboratory. Probe rinses were evaporated to dryness, desiccated, and weighed to constant weight.

APPENDIX A

EXAMPLE CALCULATIONS
AND
CALCULATED TEST RESULTS

CLIENT/PROJECT: THE FREEMAN CORPORATION/1288
SAMPLE LOCATION: BOILER 1, Emission Unit 11
DATE: 2/28/2018
TIME: 0945-1104
RUN #: 1

STACK GAS CONDITIONS

SAMPLE VOLUME (Dry Gas Meter):
Dry Gas Meter
Vmstd (dscf) = 17.647 x Vm x Γ x (Pbar+ΔH/13.6)/Tm(°R) =

MOISTURE:
Volume H2O Vapor Condensed Vwc std =
Stack Gas Moisture, % = 100 x (Vwc std (ml) +Vwsg std)/ (Vmstd + Vwc std + Vwsg std) = 14.5147
where:
Vol Water Vapor Condensed Vwc std (scf)= Vol Concenser Gain, ml x 0.04706 scf/ml
Vol Water Vapor in Silica Gel Vwsg std (scf)= Silica Gel Gain, g x 0.04715 scf/g

STACK STATIC PRESSURE:
Psa (inches Hg absolute) = Pb + Ps (inches H_2O)/ 13.6 = 28.99

MOLECULAR WEIGHT:
Md = 0.44 x %CO_2 + .28 x (100 - %O_2 - %CO_2) + 0.32 x %O_2 = 30.11

Ms = Md x (1 - %H_2O/100) + (18.0 x %H_2O/100) = 28.35

STACK GAS VELOCITY:
Vs(fps) = 85.49 x Cp x Avg ($\Delta P^{0.5}$) x $[Ts(°R)/(Ps("Hg) x Ms)]^{0.5}$ = 28.38

STACK GAS FLOW RATE:
Qa (acfm) = Vs x 60 x As(ft²) = 9510.46
Qstd (dscfm) = Qa x 17.647 x (1-%H_2O/100) x Ps/Ts(°R) = 4192.58

ISOKINETIC SAMPLING RATE:
%I = 0.0945 x Ts(°R) x Vm(std)/[Ps x Vs x An x Time x (1-Bws)] = 98.98

EMISSIONS CALCULATIONS:

Particulate Matter:
PM, (grains/dscf) = PM (mg) x 0.01543(grains/mg) / Vmstd (dscf) = 0.09356
PM, lb/dscf = PM (grains/dscf) x .0001429 lb/grain =

EMISSION RATE:
PM:
Er(lb /hr) = Cs(lb/dscf) x Qstd x 60 = 3.36
Er, lb PM /million Btu (pub Fd) = Cs (lb PM dry/dscf) x Fd (dscf/million Btu) x 20.9/(20.9 - %O_2) = 0.256

Fuel F-Factor Calc (Method 19, Eq 19-13), Run 1, Boiler 1 fuel sample:
Fd (dscf/Million Btu, dry O_2 basis) = 10^6 Btu/million Btu x (3.64 x %H + 1.53 x %C + .57 x %S +
.14 x %N - .46 x %O)/Dry Btu/lb = 10,049
where H, C, S, N, and O are dry basis fuel constituents: hydrogen, carbon, sulfur, nitrogen, and oxygen.

Particulate Matter Emissions Calculations

CLIENT/PROJECT #:	**THE FREEMAN CORPORATION/1288**		
SAMPLE LOCATION:	BOILER 1, Emission Unit 11		
DATE:	2/28/2018		
TIME	0945-1104	1140-1244	1310-1412
RUN #:	1	2	3
STATIC PRESSURE Ps("H2O):	-0.12	-0.10	-0.12
BAROMETRIC Pb ("Hg):	29.00	29.00	29.00
Cp PITOT:	0.84	0.84	0.84
METER BOX Γ:	0.9560	0.9560	0.9560
NOZZLE DIAMETER (inches):	0.375	0.375	0.375
LENGTH OF TEST (min):	60.0	60.0	60.0
VOLUME METERED Vm(CF):	36.490	32.140	42.691
AVG. SQUARE ROOT ΔP ("H2O):	0.3597	0.3094	0.4226
AVG ΔH (" H2O):	1.296	0.982	1.646
STACK TEMPERATURE Ts (F):	532.1	507.4	593.7
METER TEMPERATURE Tm (F)	63.6	63.9	68.0
STACK LENGTH L (Inches):	0.0	0.0	0.0
STACK WIDTH W (Inches):	0.0	0.0	0.0
STACK DIAMETER Ds (Inches):	32.0	32.0	32.0
STACK GAS O2 CONCENTRATION (%):	9.937	10.661	9.653
STACK GAS CO2 CONCENTRATION (%):	10.716	10.028	11.034
VOL Water Vapor Condensed Vwc, ml:	123.9	90.3	115.4
VOL Water Vapor in Silica Gel Vwsg , ml:	3.0	12.1	3.8
PARTICULATE MASS LOADING			
PARTICULATE MASS ON FILTER (mg):	140.25	136.75	258.05
PART. MASS IN ACETONE RINSE (mg):	67.19	264.03	176.35

************************************CALCULATED RESULTS***********************

				AVERAGES
VOL. METERED STD. CONDITIONS Vmstd (dscf):	**34.209**	30.087	39.723	
STACK GAS MOISTURE (%):	**14.5**	**12.2**	**12.0**	
STACK GAS MOLECULAR WEIGHT, DRY COND:	30.11	30.03	30.15	
STACK GAS MOLECULAR WEIGHT, STACK COND:	28.35	28.56	28.70	
STACK GAS STATIC PRESSURE Psa ("Hg)	28.99	28.99	28.99	
AREA OF STACK (ft^2)	5.59	5.59	5.59	
STACK GAS VELOCITY (fps):	28.38	24.01	34.15	**28.8**
STACK GAS AIR FLOW, STACK CONDITIONS (acfm):	9,510.5	8,047.0	11,444.4	**9667.3**
STACK GAS AIR FLOW, STD. COND (dscfm):	4,192.6	3,737.0	4,890.7	**4273.4**
STACK GAS AIR FLOW, STD. COND (scfm):	4,904.4	4,255.8	5,556.6	**4905.6**
STACK GAS TEMPERATURE (F):	532.1	507.4	593.7	**544.4**
STACK GAS MOISTURE (%):	14.5	12.2	12.0	**12.9**
STACK GAS O2 CONCENTRATION (%):	9.94	10.66	9.65	**10.08**
STACK GAS CO2 CONCENTRATION(%):	10.72	10.03	11.03	**10.59**
ISOKINETIC VARIATION (%):	99	98	99	**98.4**
Fd (dscf/million Btu, dry O2 basis):	**10,049**	**9,834**	**9,773**	
PARTICULATE RESULTS				
CONCENTRATION (gr/dscf):	**0.0936**	**0.2055**	**0.1687**	**0.156**
CONCENTRATION (lb/dscf):	**1.34E-05**	**2.94E-05**	**2.41E-05**	**2.229E-05**
EMISSION RATE (lb/million Btu):	**0.256**	**0.590**	**0.438**	**0.4279**
EMISSION RATE (lb/hr):	**3.36**	**6.59**	**7.08**	**5.67**

Particulate Matter Emissions Calculations

CLIENT/PROJECT #:	**THE FREEMAN CORPORATION/1288**		
SAMPLE LOCATION:	**BOILER 2, Emission Unit 12**		
DATE:	**2/27/2018**		
TIME	**1405-1510**	**1600-1703**	**1745-1848**
RUN #:	1	2	3
STATIC PRESSURE ("H2O):	-0.10	-0.10	-0.10
BAROMETRIC ("Hg):	29.31	29.31	29.31
Cp PITOT:	0.84	0.84	0.84
METER BOX Y:	0.9720	0.9720	0.9720
NOZZLE DIAMETER (inches):	0.340	0.321	0.321
LENGTH OF TEST (min):	60.0	60.0	60.0
VOLUME METERED (CF):	48.612	39.975	42.403
SQUARE ROOT DELTA P ("H2O):	0.5688	0.5522	0.5867
DELTA H (" H2O):	2.083	1.454	1.618
STACK TEMPERATURE (F):	569.0	544.7	565.9
METER TEMPERATURE (F)	79.9	76.8	74.9
STACK LENGTH (Inches):	0.0	0.0	0.0
STACK WIDTH (Inches):	0.0	0.0	0.0
STACK DIAMETER (Inches):	32.0	32.0	32.0
STACK GAS O2 CONCENTRATION (%):	8.365	12.374	8.856
STACK GAS CO2 CONCENTRATION (%):	12.382	8.535	11.291
VOL Water Vapor Condensed Vwc, ml:	149.7	134.4	132.2
VOL Water Vapor in Silica Gel Vwsg , ml:	17.2	23.8	11.9
PARTICULATE MASS LOADING			
PARTICULATE MASS ON FILTER (mg):	209.70	93.15	120.70
PART. MASS IN ACETONE RINSE (mg):	177.19	18.65	37.98

************************************CALCULATED RESULTS*******************

VOL. METERED STD. CONDITIONS (dscf):	45.500	37.577	40.018	**AVERAGES**
STACK GAS MOISTURE (%):	13.2	14.1	13.3	
STACK GAS MOLECULAR WEIGHT, DRY COND:	30.32	29.86	30.16	
TACK GAS MOLECULAR WEIGHT, STACK COND:	28.69	28.19	28.54	
STACK GAS STATIC PRESSURE ("H2O)	29.30	29.30	29.30	
AREA OF STACK	5.59	5.59	5.59	
STACK GAS VELOCITY (fps):	45.2	43.7	46.7	**45.2**
ACK GAS AIR FLOW, STACK CONDITIONS (acfm):	15143.0	14654.1	15637.7	**15144.9**
STACK GAS AIR FLOW, STD. COND (dscfm):	6604.2	6481.0	6833.3	**6639.5**
STACK GAS AIR FLOW, STD. COND (scfm):	7610.1	7542.5	7882.0	**7678.2**
STACK GAS TEMPERATURE (F):	569.0	544.7	565.9	**559.8**
STACK GAS MOISTURE (%):	13.2	14.1	13.3	**13.5**
STACK GAS O2 CONCENTRATION (%):	8.37	12.37	8.86	**9.87**
STACK GAS CO2 CONCENTRATION(%):	12.38	8.54	11.29	**10.74**
ISOKINETIC VARIATION (%):	102	96	97	**98.2**
Fd (dscf/million Btu, dry O2 basis):	9,953	10,031	10,123	
PARTICULATE RESULTS				
CONCENTRATION (gr/dscf):	**0.131**	**0.046**	**0.061**	**0.079**
CONCENTRATION (lb/dscf):	**1.87E-05**	**6.55E-06**	**8.73E-06**	**1.133E-05**
EMISSION RATE (lb/million Btu):	**0.311**	**0.161**	**0.153**	**0.208**
EMISSION RATE (lb/hr):	**7.41**	**2.55**	**3.58**	**4.51**

Particulate Matter Emissions Calculations

CLIENT/PROJECT #:	**THE FREEMAN CORPORATION/1288**			
SAMPLE LOCATION:	**BOILER 3, Emission Unit 15**			
DATE:		**2/27/2018**		
TIME	**0833-0936**	**1005-1108**	**1130-1233**	
RUN #:	**1**	**2**	**3**	
STATIC PRESSURE ("H2O):	-0.10	-0.10	-0.10	
BAROMETRIC ("Hg):	29.31	29.31	29.31	
Cp PITOT:	0.84	0.84	0.84	
METER BOX Y:	0.9720	0.9720	0.9720	
NOZZLE DIAMETER (inches):	0.276	0.276	0.276	
LENGTH OF TEST (min):	60.0	60.0	60.0	
VOLUME METERED (CF):	37.535	41.775	43.252	
SQUARE ROOT DELTA P ("H2O):	0.6774	0.6550	0.6766	
DELTA H (" H2O):	1.311	1.530	1.683	
STACK TEMPERATURE (F):	316.4	307.1	311.1	
METER TEMPERATURE (F)	71.8	81.2	73.3	
STACK LENGTH (Inches):	0.0	0.0	0.0	
STACK WIDTH (Inches):	0.0	0.0	0.0	
STACK DIAMETER (Inches):	32.0	32.0	32.0	
STACK GAS O2 CONCENTRATION (%):	10.706	10.974	10.947	
STACK GAS CO2 CONCENTRATION (%):	9.906	9.852	10.051	
VOL Water Vapor Condensed Vwc, ml:	156.4	77.9	95.2	
VOL Water Vapor in Silica Gel Vwsg , ml:	3.8	16.2	4.6	
PARTICULATE MASS LOADING				
PARTICULATE MASS ON FILTER (mg):	183.50	218.25	187.95	
PART. MASS IN ACETONE RINSE (mg):	13.14	14.59	3.39	
**********************************	**CALCULATED RESULTS**	*****************		
VOL. METERED STD. CONDITIONS (dscf):	35.601	38.954	40.950	**AVERAGES**
STACK GAS MOISTURE (%):	**17.1**	**8.5**	**9.8**	
STACK GAS MOLECULAR WEIGHT, DRY COND:	30.01	30.02	30.05	
STACK GAS MOLECULAR WEIGHT, STACK COND:	27.96	29.00	28.86	
STACK GAS STATIC PRESSURE ("H2O)	29.30	29.30	29.30	
AREA OF STACK	5.59	5.59	5.59	
STACK GAS VELOCITY (fps):	47.4	44.7	46.4	**46.1**
STACK GAS AIR FLOW, STACK CONDITIONS (acfm):	15868.3	14976.8	15547.3	**15464.1**
STACK GAS AIR FLOW, STD. COND (dscfm):	8765.4	9240.7	9402.5	**9136.2**
STACK GAS AIR FLOW, STD. COND (scfm):	10569.0	10095.6	10426.3	**10363.7**
STACK GAS TEMPERATURE (F):	316.4	307.1	311.1	**311.5**
STACK GAS MOISTURE (%):	17.1	8.5	9.8	**11.8**
STACK GAS O2 CONCENTRATION (%):	10.71	10.97	10.95	**10.88**
STACK GAS CO2 CONCENTRATION(%):	9.91	9.85	10.05	**9.94**
ISOKINETIC VARIATION (%):	91	94	98	**94.3**
Fd (dscf/million Btu, dry O2 basis):	9,941	9,867	9,960	
PARTICULATE RESULTS				
CONCENTRATION (gr/dscf):	**0.085**	**0.092**	**0.072**	**0.083**
CONCENTRATION (lb/dscf):	**1.22E-05**	**1.32E-05**	**1.03E-05**	**1.186E-05**
EMISSION RATE (lb/million Btu):	**0.248**	**0.273**	**0.215**	**0.245**
EMISSION RATE (lb/hr):	**6.39**	**7.29**	**5.80**	**6.50**

APPENDIX B

ANALYTICAL DATA

Particulate Matter

Fuel Analyses

Stack O_2, CO_2

ANALYTICAL DATA
PARTICULATE MATTER

PROJECT: The Freeman Corp — PROJECT DATE: 2/28/2018
PROJECT MANAGER: Chris Gottschalk — NUMBER OF SITES: 1
Site(s): Boilers: 1, 2, 3

ID NO.	RUN NO.	DESCRIPTION	Tare, mg	Final, mg	Net Gain mg	Volume Vaw, ml	Vol Loss* Y/N	ml	Blank Corr, Wa, mg	Wa max mg	NET, mg Blank corr
Boiler 1:											
01514	1	filter	371.50	511.75	140.25	na	na	-			
01521	2	filter	371.55	508.30	136.75	na	na	-			
01522	3	filter	372.70	630.75	258.05	na	na	-			
1456	1	pan	4,677.90	4,746.55	68.65	189.0	No	-	1.46	1.48	67.19
1457	2	pan	4,647.95	4,913.55	265.60	203.0	No	-	1.57	1.59	264.03
1458	3	pan	4,666.25	4,844.20	177.95	206.0	No	-	1.60	1.62	176.35
Boiler 2:											
01506	1	filter	373.95	583.65	209.70	na	na	-			
01511	2	filter	372.15	465.30	93.15	na	na	-			
01513	3	filter	373.60	494.30	120.70	na	na	-			
1459	1	pan	4,668.80	4,847.60	178.80	208.00	No	-	1.61	1.63	177.19
1460	2	pan	4,687.70	4,707.60	19.90	161	No	-	1.25	1.26	18.65
1461	3	pan	4,673.4	4,712.7	39.3	170	No	-	1.32	1.34	37.98
Boiler 3:											
01503	1	filter	372.3	555.8	183.50	na	na	-			
01504	2	filter	372.9	591.2	218.25	na	na	-			
01505	3	filter	372.1	560.0	187.95	na	na	-			
1462	1	pan	4,653.9	4,668.3	14.4	163	No	-	1.26	1.28	13.14
1463	2	pan	4,650.7	4,666.4	15.7	143	No	-	1.11	1.12	14.59
1464	3	pan	4,658.0	4,662.3	4.4	124	No	-	0.96	0.97	3.39
									Wt acetone		
					ma	Vaw, ml			blank, mg		
1455		acetone blank	4,660.95	4,662.50	1.55	200	No	-	157,140.0		

*Was significant liquid sample volume lost during transport to lab (Y = yes, N= no)? If yes, approximate ml lost.

Analyzed by: DBF

Wa max = .001% of weight of acetone used.

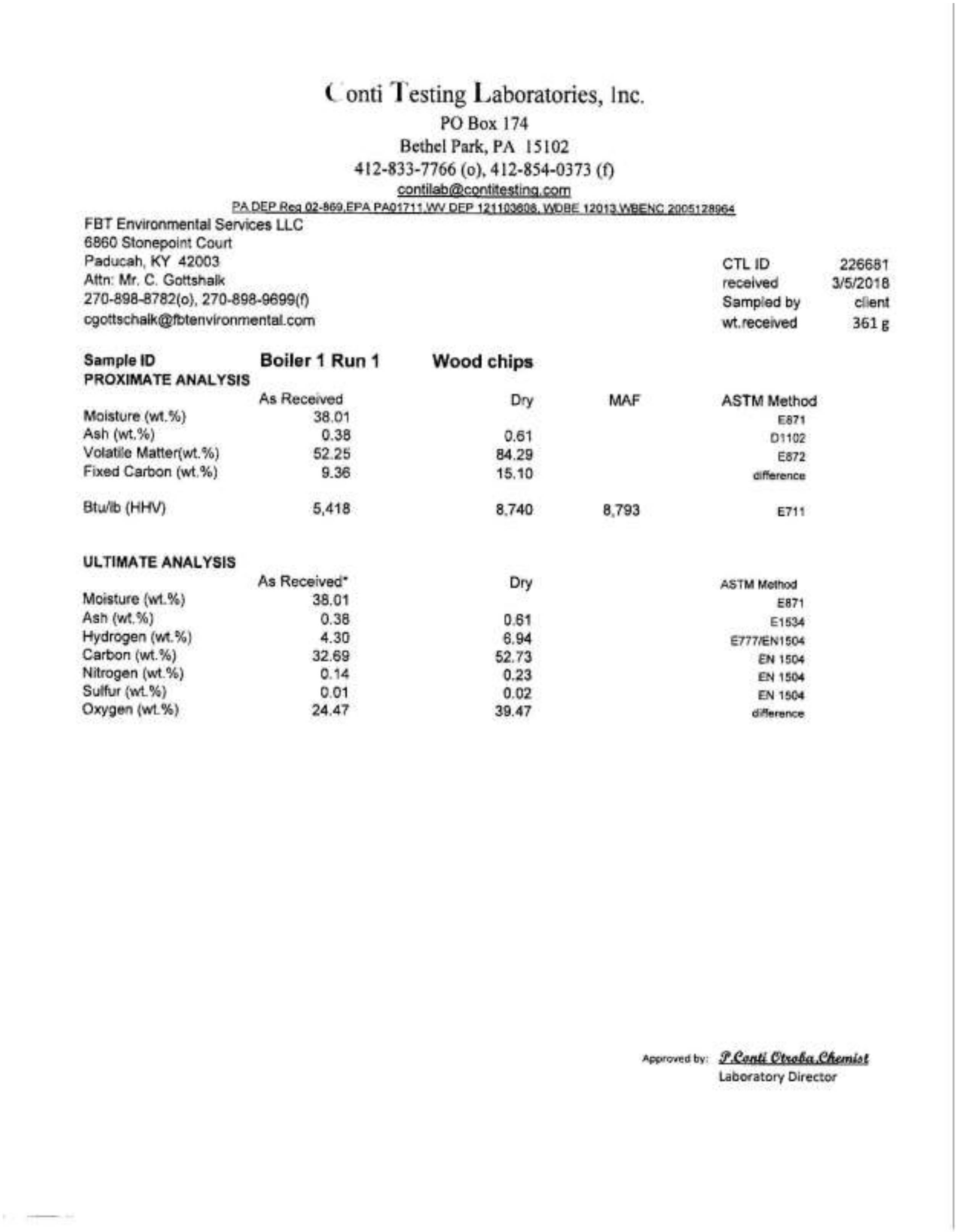
Wa = residue from acetone wash in sample = Ca x Vaw x ρa, Method 5 Eq 5-5

Page __1__ of __1__

Where: Ca = mg residue/mg acetone in blank = ma/(Va x ρa)= **9.86382E-06** , Method 5 Eq 5-4

Va = volume of acetone sample rinse, ml

ρa = density of acetone = **785.7** mg/ml



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cgottschalk@fbtenvironmental.com

CTL ID	226681
received	3/5/2018
Sampled by	client
wt.received	361 g

Sample ID **Boiler 1 Run 1** **Wood chips**

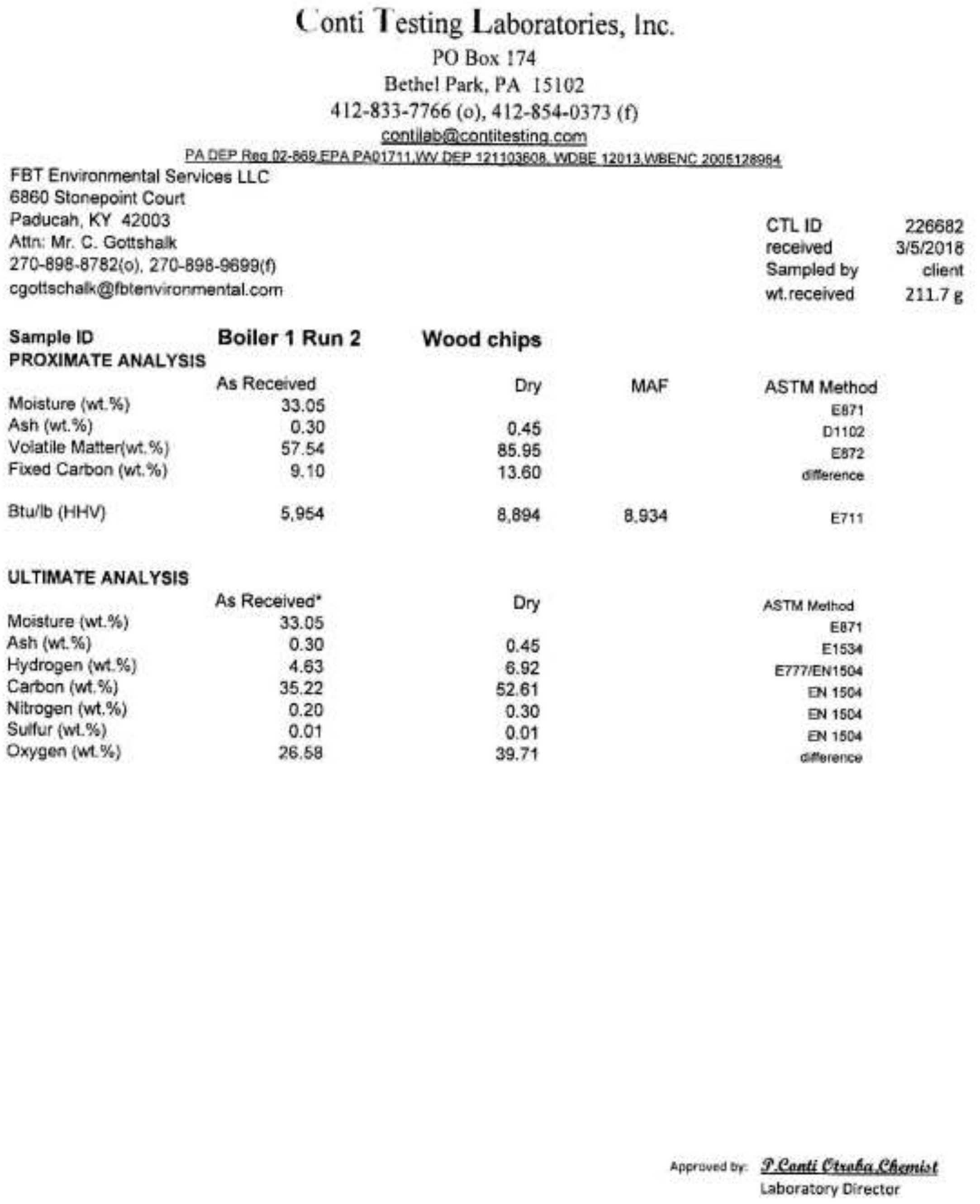
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	38.01			E871
Ash (wt.%)	0.38	0.61		D1102
Volatile Matter(wt.%)	52.25	84.29		E872
Fixed Carbon (wt.%)	9.36	15.10		difference
Btu/lb (HHV)	5,418	8,740	8,793	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	38.01		E871
Ash (wt.%)	0.38	0.61	E1534
Hydrogen (wt.%)	4.30	6.94	E777/EN1504
Carbon (wt.%)	32.69	52.73	EN 1504
Nitrogen (wt.%)	0.14	0.23	EN 1504
Sulfur (wt.%)	0.01	0.02	EN 1504
Oxygen (wt.%)	24.47	39.47	difference

Approved by: *P.Conti Otroba,Chemist*
Laboratory Director



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CTL ID	226682
received	3/5/2018
Sampled by	client
wt.received	211.7 g

Sample ID **Boiler 1 Run 2** **Wood chips**

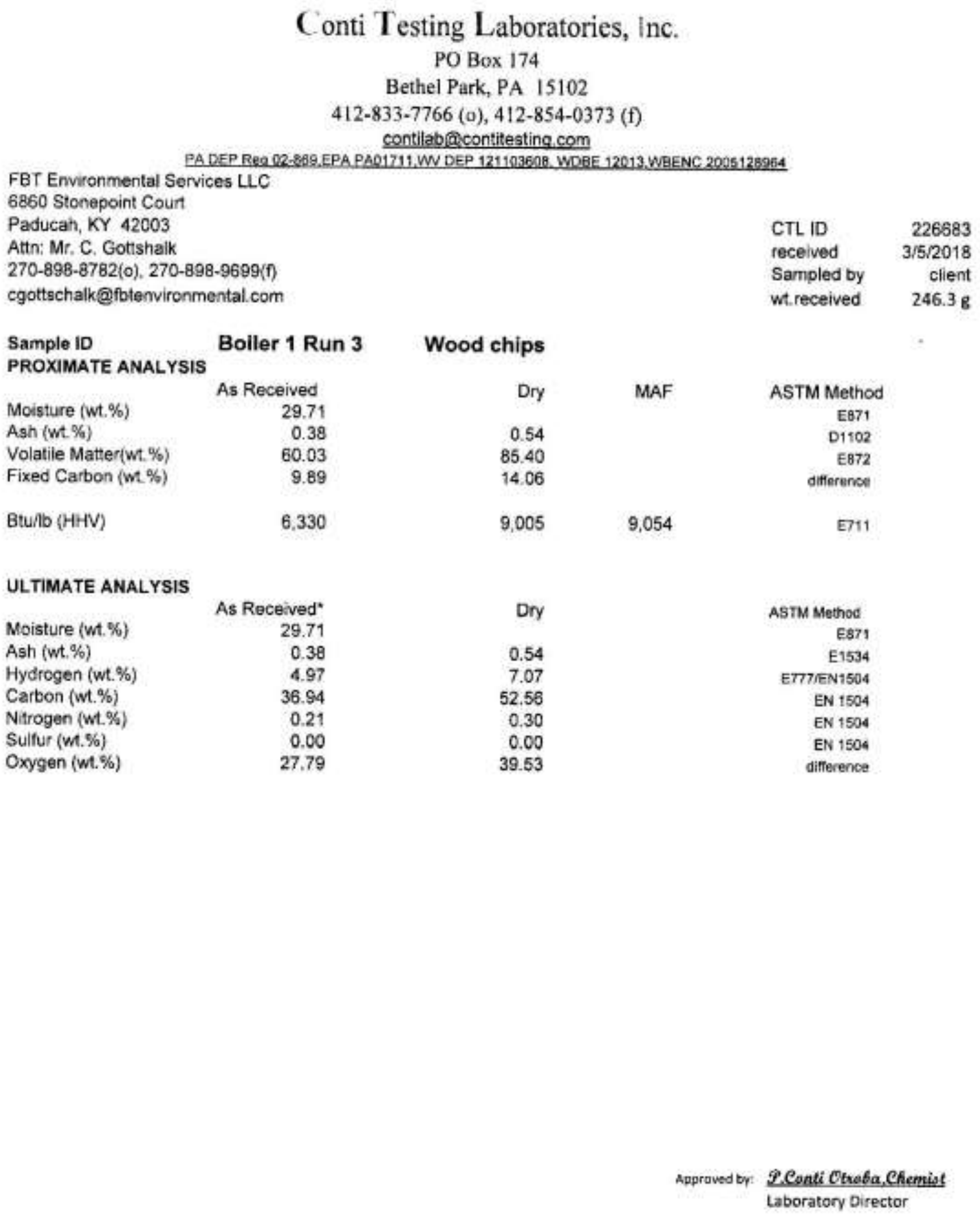
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	33.05			E871
Ash (wt.%)	0.30	0.45		D1102
Volatile Matter(wt.%)	57.54	85.95		E872
Fixed Carbon (wt.%)	9.10	13.60		difference
Btu/lb (HHV)	5,954	8,894	8,934	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	33.05		E871
Ash (wt.%)	0.30	0.45	E1534
Hydrogen (wt.%)	4.63	6.92	E777/EN1504
Carbon (wt.%)	35.22	52.61	EN 1504
Nitrogen (wt.%)	0.20	0.30	EN 1504
Sulfur (wt.%)	0.01	0.01	EN 1504
Oxygen (wt.%)	26.58	39.71	difference

Approved by: P.Conti Otroba,Chemist
Laboratory Director



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CTL ID	226683
received	3/5/2018
Sampled by	client
wt.received	246.3 g

Sample ID **Boiler 1 Run 3** **Wood chips**

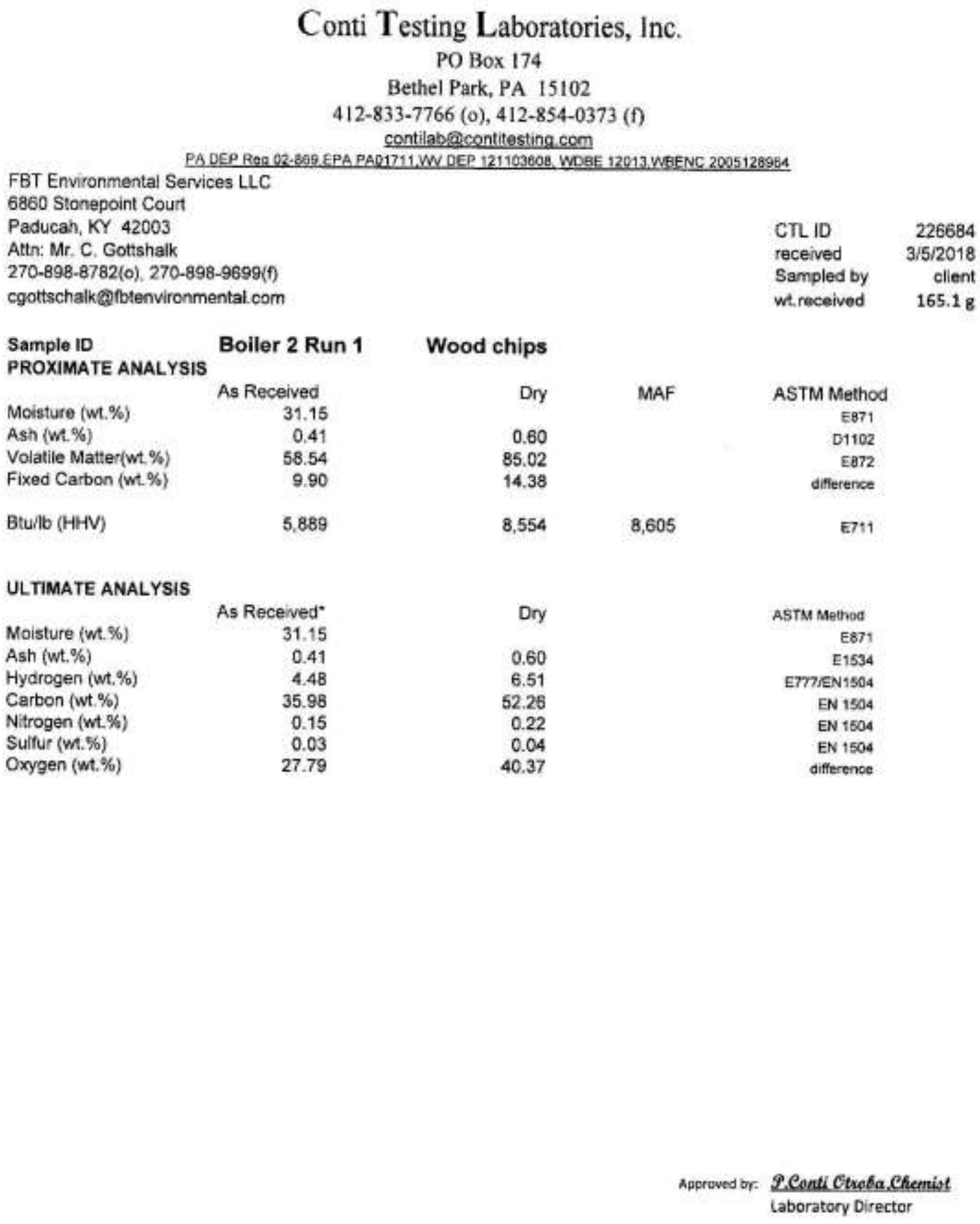
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	29.71			E871
Ash (wt.%)	0.38	0.54		D1102
Volatile Matter(wt.%)	60.03	85.40		E872
Fixed Carbon (wt.%)	9.89	14.06		difference
Btu/lb (HHV)	6,330	9,005	9,054	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	29.71		E871
Ash (wt.%)	0.38	0.54	E1534
Hydrogen (wt.%)	4.97	7.07	E777/EN1504
Carbon (wt.%)	36.94	52.56	EN 1504
Nitrogen (wt.%)	0.21	0.30	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	27.79	39.53	difference

Approved by: *P.Conti Otroba,Chemist*
Laboratory Director



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CTL ID	226684
received	3/5/2018
Sampled by	client
wt.received	165.1 g

Sample ID **Boiler 2 Run 1** **Wood chips**

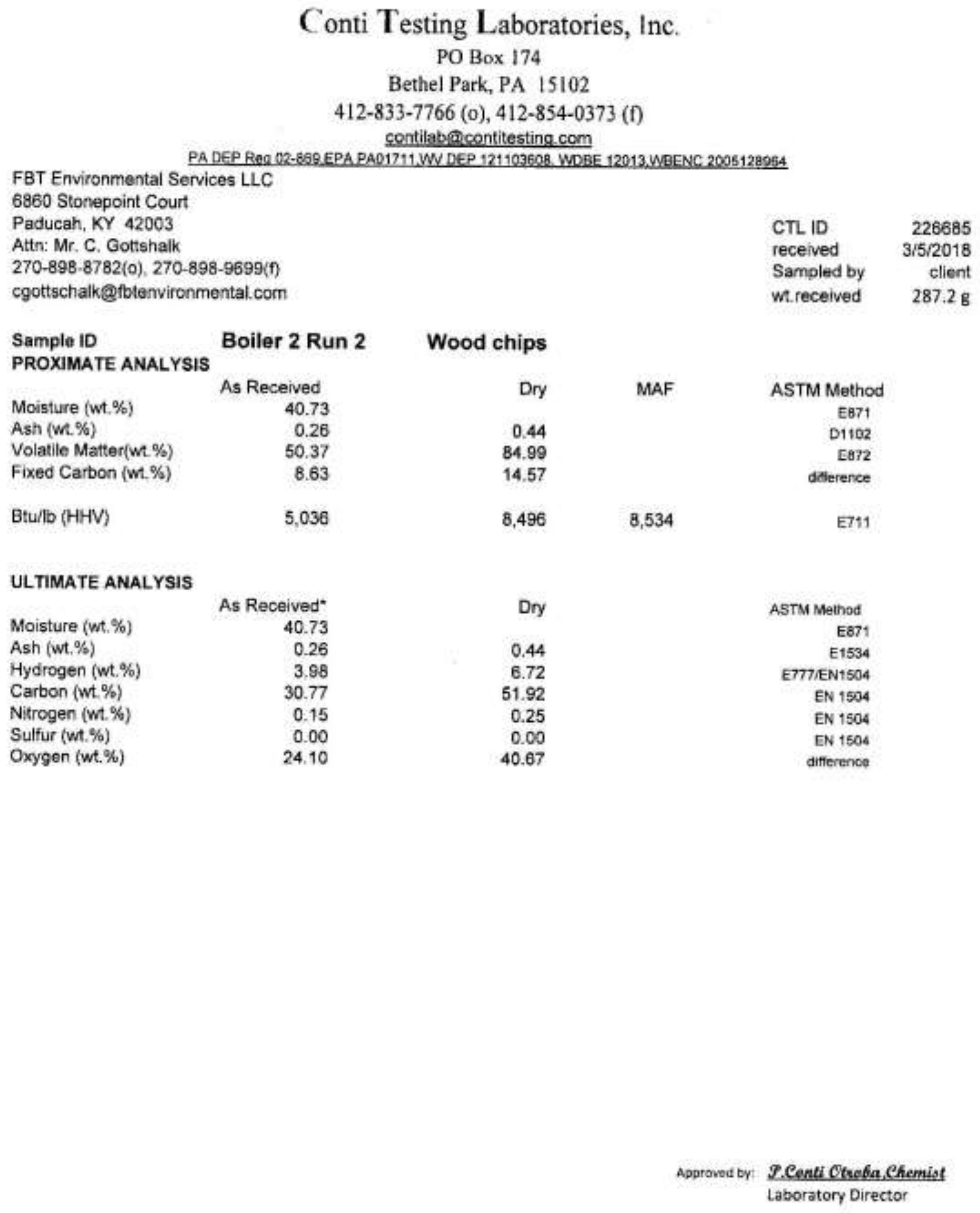
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	31.15			E871
Ash (wt.%)	0.41	0.60		D1102
Volatile Matter(wt.%)	58.54	85.02		E872
Fixed Carbon (wt.%)	9.90	14.38		difference
Btu/lb (HHV)	5,889	8,554	8,605	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	31.15		E871
Ash (wt.%)	0.41	0.60	E1534
Hydrogen (wt.%)	4.48	6.51	E777/EN1504
Carbon (wt.%)	35.98	52.26	EN 1504
Nitrogen (wt.%)	0.15	0.22	EN 1504
Sulfur (wt.%)	0.03	0.04	EN 1504
Oxygen (wt.%)	27.79	40.37	difference

Approved by: *P.Conti Otroba,Chemist*
Laboratory Director



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CTL ID	226685
received	3/5/2018
Sampled by	client
wt.received	287.2 g

Sample ID **Boiler 2 Run 2** **Wood chips**

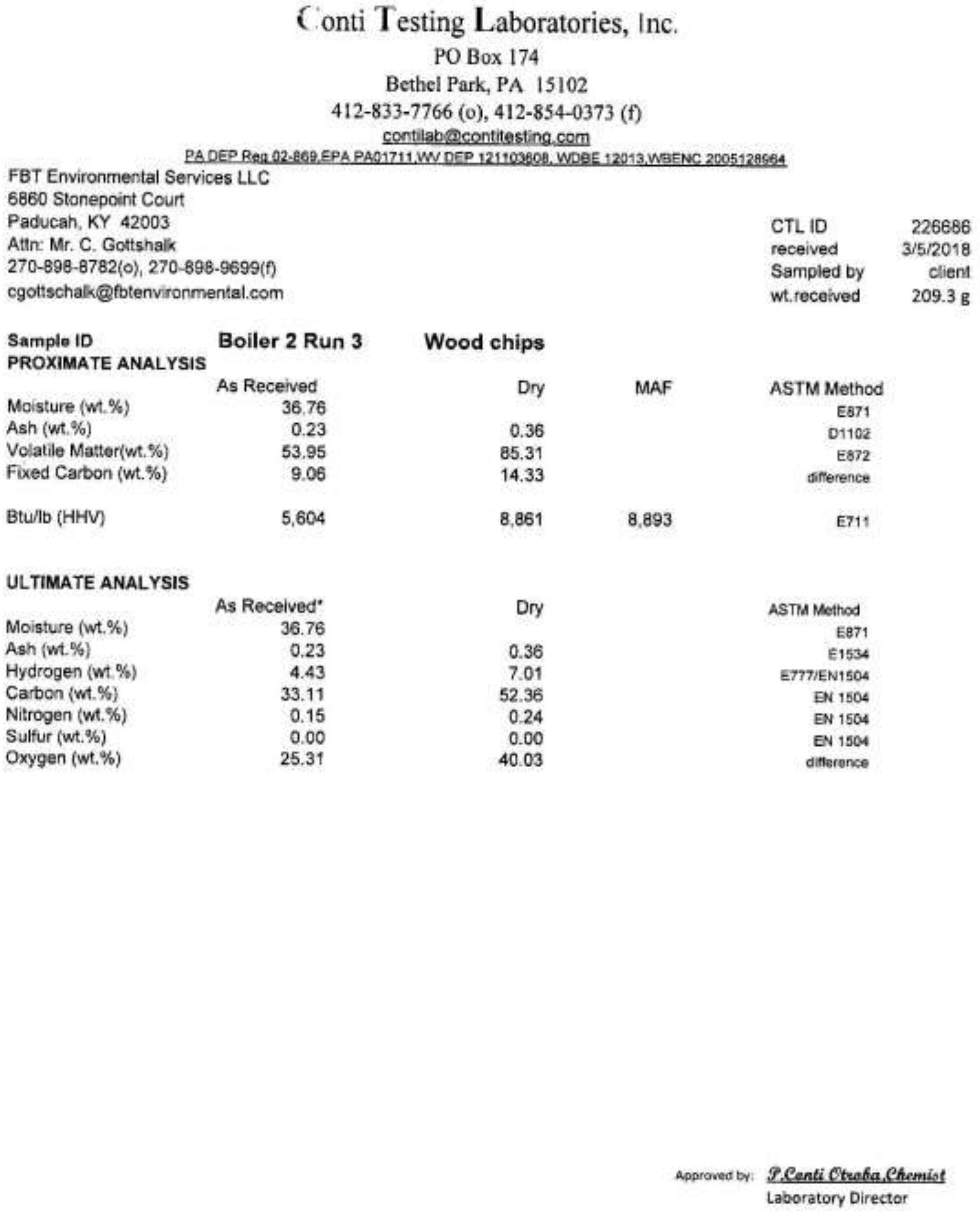
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	40.73			E871
Ash (wt.%)	0.26	0.44		D1102
Volatile Matter(wt.%)	50.37	84.99		E872
Fixed Carbon (wt.%)	8.63	14.57		difference
Btu/lb (HHV)	5,036	8,496	8,534	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	40.73		E871
Ash (wt.%)	0.26	0.44	E1534
Hydrogen (wt.%)	3.98	6.72	E777/EN1504
Carbon (wt.%)	30.77	51.92	EN 1504
Nitrogen (wt.%)	0.15	0.25	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	24.10	40.67	difference

Approved by: *P.Conti Otroba,Chemist*
Laboratory Director



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CTL ID	226686
received	3/5/2018
Sampled by	client
wt.received	209.3 g

Sample ID **Boiler 2 Run 3** **Wood chips**

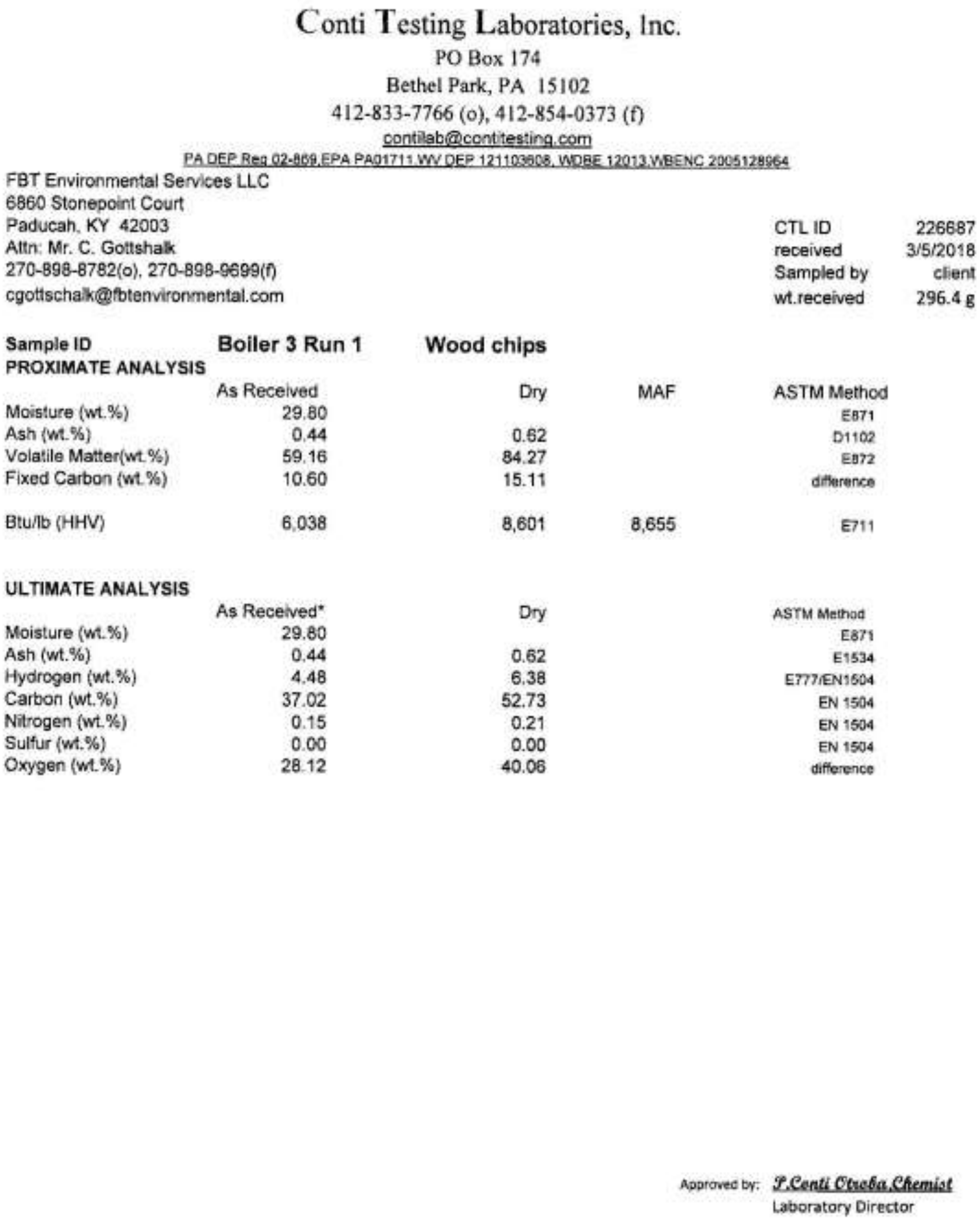
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	36.76			E871
Ash (wt.%)	0.23	0.36		D1102
Volatile Matter(wt.%)	53.95	85.31		E872
Fixed Carbon (wt.%)	9.06	14.33		difference
Btu/lb (HHV)	5,604	8,861	8,893	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	36.76		E871
Ash (wt.%)	0.23	0.36	E1534
Hydrogen (wt.%)	4.43	7.01	E777/EN1504
Carbon (wt.%)	33.11	52.36	EN 1504
Nitrogen (wt.%)	0.15	0.24	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	25.31	40.03	difference

Approved by: P.Conti Otroba,Chemist
Laboratory Director



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CTL ID	226687
received	3/5/2018
Sampled by	client
wt.received	296.4 g

Sample ID **Boiler 3 Run 1** **Wood chips**

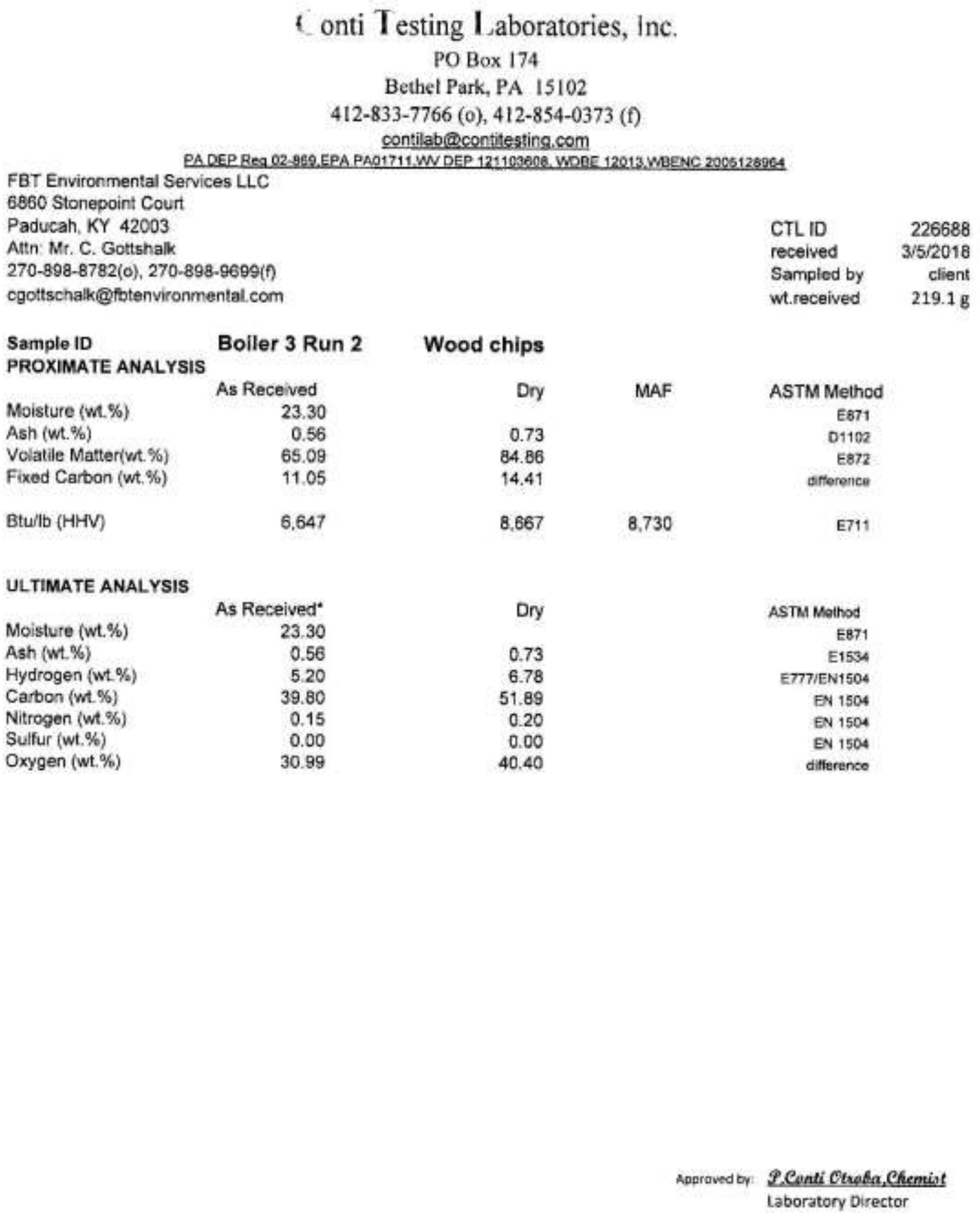
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	29.80			E871
Ash (wt.%)	0.44	0.62		D1102
Volatile Matter(wt.%)	59.16	84.27		E872
Fixed Carbon (wt.%)	10.60	15.11		difference
Btu/lb (HHV)	6,038	8,601	8,655	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	29.80		E871
Ash (wt.%)	0.44	0.62	E1534
Hydrogen (wt.%)	4.48	6.38	E777/EN1504
Carbon (wt.%)	37.02	52.73	EN 1504
Nitrogen (wt.%)	0.15	0.21	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	28.12	40.06	difference

Approved by: *P.Conti Otroba,Chemist*
Laboratory Director



Conti Testing Laboratories, Inc.

PO Box 174
Bethel Park, PA 15102
412-833-7766 (o), 412-854-0373 (f)
contilab@contitesting.com
PA DEP Reg 02-869,EPA PA01711,WV DEP 121103608, WDBE 12013,WBENC 2005128964

FBT Environmental Services LLC
6860 Stonepoint Court
Paducah, KY 42003
Attn: Mr. C. Gottshalk
270-898-8782(o), 270-898-9699(f)
cgottschalk@fbtenvironmental.com

CTL ID	226688
received	3/5/2018
Sampled by	client
wt.received	219.1 g

Sample ID **Boiler 3 Run 2** **Wood chips**

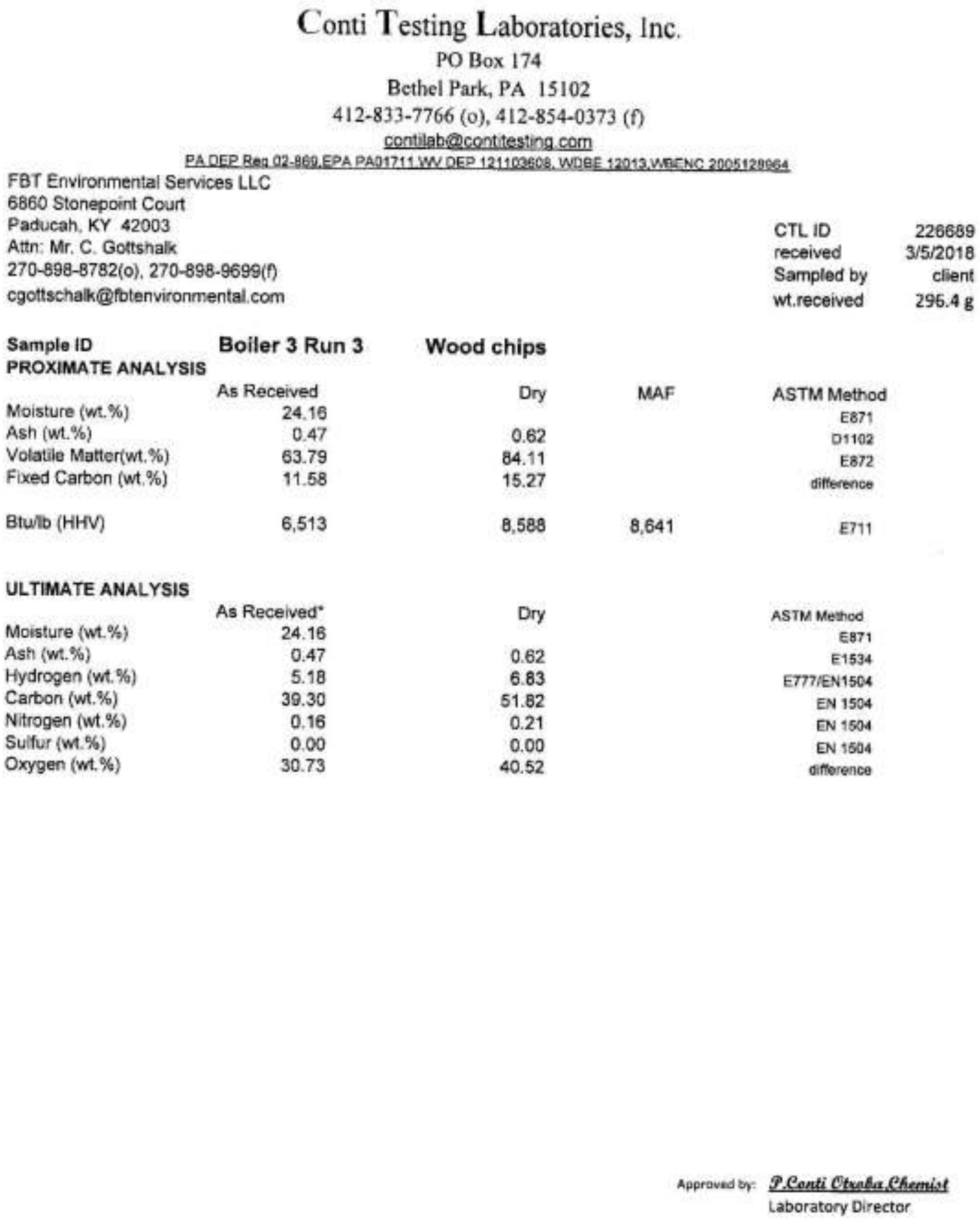
PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	23.30			E871
Ash (wt.%)	0.56	0.73		D1102
Volatile Matter(wt.%)	65.09	84.86		E872
Fixed Carbon (wt.%)	11.05	14.41		difference
Btu/lb (HHV)	6,647	8,667	8,730	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	23.30		E871
Ash (wt.%)	0.56	0.73	E1534
Hydrogen (wt.%)	5.20	6.78	E777/EN1504
Carbon (wt.%)	39.80	51.89	EN 1504
Nitrogen (wt.%)	0.15	0.20	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	30.99	40.40	difference

Approved by: P.Conti Otroba,Chemist
Laboratory Director



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FBT Environmental Services LLC
6860 Stonepoint Court
Paducah, KY 42003
Attn: Mr. C. Gottshalk
270-898-8782(o), 270-898-9699(f)
cgottschalk@fbtenvironmental.com

CTL ID	226689
received	3/5/2018
Sampled by	client
wt.received	296.4 g

Sample ID **Boiler 3 Run 3** **Wood chips**

PROXIMATE ANALYSIS

	As Received	Dry	MAF	ASTM Method
Moisture (wt.%)	24.16			E871
Ash (wt.%)	0.47	0.62		D1102
Volatile Matter(wt.%)	63.79	84.11		E872
Fixed Carbon (wt.%)	11.58	15.27		difference
Btu/lb (HHV)	6,513	8,588	8,641	E711

ULTIMATE ANALYSIS

	As Received*	Dry	ASTM Method
Moisture (wt.%)	24.16		E871
Ash (wt.%)	0.47	0.62	E1534
Hydrogen (wt.%)	5.18	6.83	E777/EN1504
Carbon (wt.%)	39.30	51.82	EN 1504
Nitrogen (wt.%)	0.16	0.21	EN 1504
Sulfur (wt.%)	0.00	0.00	EN 1504
Oxygen (wt.%)	30.73	40.52	difference

Approved by: P.Conti Otraba,Chemist
Laboratory Director

Calibration Error Test at Run 1 . STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILERS 2, 3

	Reference Cylinder Numbers			
	Zero	Low-range	Mid-range	High-range
O2	EB0051266		EB0082218	CC458736
CO2	EB0051266		EB0082218	CC458736

Date/Time	2/27/2018	7:10:45	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Avg	0.022	0.171	
Zero Error%	0.1	0.9	
Low Ref Cyl			
Low Avg			
Low Error%			
Mid Ref Cyl	10.02	9.99	
Mid Avg	10.023	10.168	
Mid Error%	0	0.9	
High Ref Cyl	20.02	19.99	
High Avg	19.878	19.933	
High Error%	0.7	0.3	

Initial System Bias Check for Run 1
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILERS 2, 3

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/27/2018	7:23:21	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Cal	0.022	0.171	
Zero Avg	0.274	0.376	
Zero Bias%	1.3	1	
Zero Drift%			
Span Ref Cyl	10.02	9.99	
Span Cal	10.023	10.168	
Span Avg	10.017	10.01	
Span Bias%	0	0.8	
Span Drift%			

Calibration Error Test at Run 1 . STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILER 1

	Reference Cylinder Numbers			
	Zero	Low-range	Mid-range	High-range
O2	EB0051266		EB0082218	CC458736
CO2	EB0051266		EB0082218	CC458736

Date/Time	2/28/2018	9:02:36	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Avg	0.094	0.189	
Zero Error%	0.5	0.9	
Low Ref Cyl			
Low Avg			
Low Error%			
Mid Ref Cyl	10.02	9.99	
Mid Avg	10.091	10.143	
Mid Error%	0.4	0.8	
High Ref Cyl	20.02	19.99	
High Avg	20.076	19.998	
High Error%	0.3	0	

Initial System Bias Check for Run 1
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILER 1

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/28/2018	9:11:48	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Cal	0.094	0.189	
Zero Avg	0.315	0.325	
Zero Bias%	1.1	0.7	
Zero Drift%			
Span Ref Cyl	10.02	9.99	
Span Cal	10.091	10.143	
Span Avg	10.225	9.912	
Span Bias%	0.7	1.2	
Span Drift%			

Final System Bias Check for Run 1
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 1**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/28/2018	11:09:45	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Cal	0.094	0.189	
Zero Avg	0.356	0.333	
Zero Bias%	1.3	0.7	
Zero Drift%	0.2	0	
Span Ref Cyl	10.02	9.99	
Span Cal	10.091	10.143	
Span Avg	10.031	9.925	
Span Bias%	0.3	1.1	
Span Drift%	-1	0.1	
Ini Zero Avg	0.315	0.325	
Ini Span Avg	10.225	9.912	
Run Avg	10.047	10.616	
Co	0.335	0.329	
Cm	10.128	9.919	
Correct Avg	9.937	10.716	

Test Run 1 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman Date: 2/28/2018
Location: **BOILER 1**

	O2	CO2
	%	%
Begin calculating run averages		
9:46:38	8.019	12.379
9:47:38	8.909	11.78
9:48:38	8.28	12.731
9:49:38	7.934	12.524
9:50:38	8.918	12.014
9:51:38	8.137	12.659
9:52:37	8.719	12.049
9:53:38	8.028	12.681
9:54:37	8.061	12.534
9:55:38	7.238	13.709
9:56:38	7.033	13.469
9:57:37	7.286	13.385
9:58:37	7.201	13.196
9:59:38	8.178	11.905
10:00:38	9.553	10.692
10:01:37	10.245	10.413
10:02:37	10.46	10.153
10:03:38	10.468	10.201
10:04:38	9.987	10.907
10:05:37	9.743	10.81
10:06:38	10.009	10.627
10:07:37	9.776	11.097
10:08:38	9.403	11.125
10:09:37	10.018	10.305
10:10:37	10.905	9.69
10:11:38	11.223	9.33
10:12:37	11.533	9.32
10:13:38	10.765	10.372
10:14:37	10.118	10.678
10:15:37	10.107	10.449
10:16:38	10.829	10.044
10:17:37	9.664	11.259
10:18:38	10.073	10.277
Pause		
10:19:37	11.201	8.832
10:20:37	13.434	6.774
10:21:38	14.372	6.762
10:22:37	13.863	6.787
10:23:38	14.012	8.022
10:24:37	9.44	11.32

	O2	CO2
	%	%
10:25:38	10.356	9.98
10:26:38	10.766	10.056
10:27:37	10.516	10.538
10:28:37	9.949	10.606
10:29:38	10.818	9.428
10:30:38	12.048	8.713
10:31:37	11.002	9.979
10:32:37	10.835	10.062
End Pause		
10:33:37	9.623	11.279
10:34:38	9.873	10.637
10:35:38	11.022	9.08
10:36:37	12.203	8.509
10:37:37	12.504	7.87
10:38:38	13.553	7.837
10:39:38	10.346	10.975
10:40:37	9.75	10.79
10:41:37	11.209	8.687
10:42:38	12.807	8.054
10:43:38	12.401	8.325
10:44:37	13.116	7.199
10:45:37	14.039	7.343
10:46:38	10.856	10.631
10:47:37	9.749	10.782
10:48:37	10.383	10.353
10:49:38	9.837	11.233
10:50:38	9.267	10.952
10:51:37	10.611	9.731
10:52:38	10.946	10.238
10:53:37	9.355	11.519
10:54:37	9.4	11.114
10:55:38	8.955	11.78
10:56:37	9.192	11.168
10:57:38	10.28	9.937
10:58:37	11.618	8.726
10:59:37	11.895	8.971
Average of Test Run		
	O2 %	CO2%
10:59:59	10.047	10.616
Test Run 1 End		

Final System Bias Check for Run 2
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 1**

	Reference Cylinder Numbers Zero	 Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time 2/28/2018 12:50:43 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.094	0.189
Zero Avg	0.604	0.455
Zero Bias%	2.6	1.3
Zero Drift%	1.2	0.6
Span Ref Cyl	10.02	9.99
Span Cal	10.091	10.143
Span Avg	9.992	9.856
Span Bias%	0.5	1.4
Span Drift%	-0.2	-0.3
Ini Zero Avg	0.356	0.333
Ini Span Avg	10.031	9.925
Run Avg	10.621	9.927
Co	0.48	0.394
Cm	10.012	9.891
Correct Avg	10.661	10.028

Test Run 2 Begin. STRATA Version 3.01
Operator:
Plant Name: Date: 2/28/2018
Location: **BOILER 1**

	O2 %	CO2 %
Begin calculating run averages		
11:41:14	11.593	8.779
11:42:15	11.292	9.342
11:43:14	11.288	9.127
11:44:14	12.268	8.192
11:45:14	9.791	12.306
11:46:14	8.826	11.396
11:47:15	9.036	11.272
11:48:14	9.733	10.683
11:49:14	10.068	10.608
11:50:14	9.567	11.039
11:51:14	9.908	10.854
11:52:15	10.062	9.824
11:53:14	10.905	9.935
11:54:15	9.783	11.431
11:55:14	8.42	11.83
11:56:14	10.397	9.509
11:57:15	11.418	8.931
11:58:14	11.346	9.56
11:59:14	10.552	9.806
12:00:15	11.483	8.722
12:01:14	12.134	8.911
12:02:15	11.051	9.448
12:03:14	10.565	10.466
12:04:14	9.933	10.388
12:05:15	10.208	10.952
12:06:14	8.258	12.368
12:07:14	8.481	11.828
12:08:14	9.303	10.961
12:09:14	9.111	11.505
12:10:14	9.477	10.852
12:11:14	10.18	10.206
12:12:14	9.993	10.743
12:13:14	9.327	11.077
12:14:14	10.46	9.628
12:15:14	10.892	10.081
12:16:14	9.226	11.467
12:17:14	9.925	10.074
12:18:14	10.555	9.929
12:19:14	10.412	10.443
12:20:14	9.448	11.068

	O2 %	CO2 %
12:21:14	9.918	10.298
12:22:15	10.462	10.003
12:23:15	10.48	9.785
12:24:15	11.279	8.659
12:25:15	13.188	6.585
12:26:15	15.012	5.271
12:27:15	15.376	5.553
12:28:15	14.095	6.941
12:29:15	12.579	8.639
12:30:15	11.237	9.292
12:31:15	11.705	8.515
12:32:15	12.347	8.203
12:33:15	12.152	8.671
12:34:15	10.469	10.736
12:35:15	9.816	10.437
12:36:15	10.75	9.584
12:37:15	11.454	9.08
12:38:15	10.998	9.737
12:39:14	9.811	11.242
12:40:14	8.738	12.092

Average of Test Run

	O2 %	CO2%
12:40:51	10.621	9.927

Test Run 2 End

Final System Bias Check for Run 3
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILER 1

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time 2/28/2018 14:22:44 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.094	0.189
Zero Avg	0.392	0.307
Zero Bias%	1.5	0.6
Zero Drift%	-1.1	-0.7
Span Ref Cyl	10.02	9.99
Span Cal	10.091	10.143
Span Avg	9.984	9.842
Span Bias%	0.5	1.5
Span Drift%	0	-0.1
Ini Zero Avg	0.604	0.455
Ini Span Avg	9.992	9.856
Run Avg	9.641	10.839
Co	0.498	0.381
Cm	9.988	9.849
Correct Avg	9.653	11.034

Test Run 3 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Nam Freeman
Location: BOILERS 1 Date: 2/28/2018

	O2	CO2
	%	%
Begin calculating run averages		
13:11:49	11.047	9.524
13:12:49	9.611	11.47
13:13:49	8.7	11.684
13:14:49	9.34	10.687
13:15:49	10.706	9.289
13:16:49	10.829	10.206
13:17:49	9.353	11.508
13:18:49	9.048	10.98
13:19:49	9.621	10.99
13:20:49	9.804	10.387
13:21:49	9.713	11.219
13:22:49	9.484	10.551
13:23:49	10.7	9.74
13:24:49	10.461	10.239
13:25:49	9.264	11.701
13:26:49	8.978	11.591
13:27:49	8.786	11.675
13:28:49	8.442	12.107
13:29:49	8.107	12.218
13:30:49	9.576	10.164
13:31:49	10.904	9.623
13:32:49	10.046	10.806
13:33:49	9.685	10.678
13:34:49	10.059	10.753
13:35:49	8.207	12.204
13:36:49	9.562	10.51
13:37:49	10.266	10.347
13:38:49	8.836	12.226
13:39:49	8.385	11.704
13:40:49	9.017	11.317
13:41:49	9.468	10.753
13:42:49	9.907	10.655
13:43:49	10.011	10.199
13:44:49	10.54	9.942
13:45:49	10.394	10.291
13:46:49	9.182	11.694
13:47:49	9.03	11.265
13:48:49	9.72	10.45
13:49:49	9.686	10.957
13:50:49	10.056	10.177
13:51:49	10.438	10.163

	O2	CO2
	%	%
13:51:49	10.438	10.163
13:52:49	9.982	10.622
13:53:49	9.76	10.63
13:54:49	10.32	10.399
13:55:49	8.766	12.011
13:56:49	8.806	11.474
13:57:49	9.79	10.283
13:58:49	9.558	11.601
13:59:49	8.59	11.704
14:00:49	8.847	11.187
14:01:48	9.943	10.523
14:02:48	9.502	10.895
14:03:48	10.307	9.981
14:04:48	10.319	10.124
14:05:48	10.253	10.437
14:06:48	9.78	10.763
14:07:48	9.445	10.802
14:08:48	10.296	10.156
14:09:48	10.241	10.268
14:10:49	9.531	11.333
Average of Test Run		
	O2 %	CO2%
14:11:23	9.641	10.839

Test Run 3 End

Final System Bias Check for Run 1
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 2**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time 2/27/2018 15:21:23 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.235	0.42
Zero Bias%	1.1	1.2
Zero Drift%	-1	-0.4
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	9.716	10.083
Span Bias%	1.5	0.4
Span Drift%	0.1	0.8
Ini Zero Avg	0.428	0.503
Ini Span Avg	9.703	9.919
Run Avg	8.16	12.285
Co	0.332	0.461
Cm	9.709	10.001
Correct Avg	8.365	12.382

Test Run 1 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Nam Freeman Date: 2/27/2018
Location: **BOILER 2**

Begin calculating run averages

	O2 %	CO2 %
14:06:28	7.886	12.39
14:07:28	8.496	11.625
14:08:28	8.314	12.368
14:09:28	7.815	12.331
14:10:28	8.231	12.176
14:11:28	7.849	12.552
14:12:28	8.037	12.056
14:13:28	8.631	11.538
14:14:28	8.838	11.431
14:15:28	9.034	11.128
14:16:28	9.41	10.848
14:17:28	9.391	10.998
14:18:27	9.455	10.736
14:19:27	9.586	10.855
14:20:27	9.257	11.141
14:21:27	9.116	11.336
14:22:27	8.44	12.073
14:23:27	8.068	12.291
14:24:27	7.88	12.527
14:25:27	7.976	12.35
14:26:28	8.034	12.409
14:27:28	8.347	11.881
14:28:28	8.558	12.116
14:29:28	8.077	12.48
14:30:28	7.369	13.33
14:31:28	6.895	13.603
14:32:28	6.971	13.195
14:33:28	7.48	13.031
14:34:28	7.261	13.141
14:35:28	7.621	12.644
14:36:28	8.153	12.241
14:37:27	8.121	12.525
14:38:27	7.807	12.688
14:39:27	8.034	12.364
14:40:27	8.13	12.403
14:41:28	7.993	12.499
14:42:28	8.552	11.651
14:43:28	9.035	11.421
14:44:28	9.027	11.398
14:45:28	9.342	11.078
14:46:28	9.364	11.297
14:47:28	8.611	12.264
14:48:28	8.07	12.554
14:49:28	7.843	12.832
14:50:28	7.713	12.761
14:51:28	7.77	12.787
14:52:28	7.746	12.789
14:53:27	7.931	12.619
14:54:27	7.739	12.92
14:55:27	7.768	12.813
14:56:27	7.578	13.002
14:57:27	7.816	12.47
14:58:27	8.162	12.305
14:59:28	8.219	12.379
15:00:28	7.813	12.848
15:01:28	7.628	12.883
15:02:28	7.454	13.145
15:03:28	7.332	13.22
15:04:28	7.301	13.102
15:05:28	7.485	13.011

Average of Test Run

	O2 %	CO2 %
15:05:45	8.16	12.285

Test Run 1 End

Final System Bias Check for Run 2
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: BOILER 2

	Reference Cylinder Numbers Zero	 Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/27/2018	17:24:08 PASSED
Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.371	0.276
Zero Bias%	1.7	0.5
Zero Drift%	0.7	-0.7
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	10.022	10.586
Span Bias%	0	2.1
Span Drift%	1.5	2.5
Ini Zero Avg	0.235	0.42
Ini Span Avg	9.716	10.083
Run Avg	12.116	8.881
Co	0.303	0.348
Cm	9.869	10.335
Correct Avg	12.374	8.535

1	2	3
8.365	12.374	8.856
12.382	8.535	11.291

Test Run 2 Begin. STRATA Version 3.01
Operator:
Plant Name: BOILER 2 Date: 2/27/2018
Location:

	O2 %	CO2 %
Begin calculating run averages		
16:01:41	8.983	11.849
16:02:40	8.849	11.703
16:03:40	8.94	11.886
16:04:40	8.617	11.898
16:05:40	9.208	11.309
16:06:40	9.336	11.322
16:07:40	9.746	10.56
16:08:40	10.398	10.18
16:09:40	10.409	10.2
16:10:40	10.639	9.829
16:11:40	10.771	9.913
16:12:40	10.474	10.305
16:13:40	10.071	10.879
16:14:40	9.577	11.389
16:15:40	9.138	11.834
16:16:40	8.569	12.459
16:17:40	8.129	12.837
16:18:40	7.852	13.037
16:19:40	7.487	13.426
16:20:41	7.271	13.513
16:21:40	7.902	12.965
16:22:40	8.969	11.802
16:23:40	9.882	10.897
16:24:40	10.942	9.574
16:25:40	12.116	8.689
16:26:40	11.997	9.297
16:27:40	11.513	9.568
16:28:40	11.553	9.493
16:29:40	11.737	9.148
16:30:40	12.428	8.464
16:31:40	12.923	8.118
16:32:41	13.24	7.682
16:33:40	13.725	7.395
16:34:40	13.777	7.21
16:35:40	14.108	6.992
16:36:40	14.232	6.653
16:37:40	14.594	6.403
16:38:40	14.83	5.97
16:39:41	15.489	5.352
16:40:40	15.949	4.882

	O2 %	CO2 %
16:41:40	16.178	4.809
16:42:40	16.249	4.696
16:43:40	16.268	4.812
16:44:40	15.929	5.211
16:45:40	15.796	5.336
16:46:41	15.641	5.403
16:47:40	15.706	5.298
16:48:40	15.843	5.171
16:49:40	15.831	5.261
16:50:40	15.571	5.733
16:51:40	15.124	6.023
16:52:40	15.029	6.135
16:53:40	14.772	6.57
16:54:40	14.312	7.035
16:55:40	13.921	7.478
16:56:40	13.756	7.758
16:57:40	13.25	8.381
16:58:40	12.613	9.137
16:59:40	11.561	10.073
17:00:40	11.167	10.506
17:01:40	10.494	11.327

Average of Test Run

	O2 %	CO2 %
17:02:36	12.116	8.881

Final System Bias Check for Run 3
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 2**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/27/2018	18:59:30 PASSED
Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.66	0.517
Zero Bias%	3.2	1.7
Zero Drift%	1.4	1.2
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	10.012	10.079
Span Bias%	0.1	0.4
Span Drift%	-0.1	-2.5
Ini Zero Avg	0.371	0.276
Ini Span Avg	10.022	10.586
Run Avg	8.913	11.627
Co	0.515	0.397
Cm	10.017	10.333
Correct Avg	8.856	11.291

Test Run 3 Begin. STRATA Version 3.01
Operator:
Plant Name: **BOILER 2** Date: 2/27/2018
Location:

	O2	CO2
	%	%
Begin calculating run averages		
17:46:12	9.291	12.552
17:47:12	8.518	13.408
17:48:12	8.523	12.203
17:49:12	8.741	12.023
17:50:12	9.153	11.399
17:51:13	9.555	11.445
17:52:12	8.885	11.87
17:53:12	9.055	11.574
17:54:12	9.441	11.098
17:55:12	9.22	11.705
17:56:12	8.505	12.251
17:57:13	8.25	12.327
17:58:12	8.302	12.345
17:59:12	7.936	12.736
18:00:12	7.897	12.65
18:01:12	7.927	12.599
18:02:12	8.027	12.322
18:03:12	7.928	12.754
18:04:13	7.548	12.919
18:05:12	7.742	12.717
18:06:12	7.641	12.745
18:07:12	7.674	12.572
18:08:12	7.728	12.593
18:09:12	7.768	12.551
18:10:12	7.754	12.63
18:11:12	7.707	12.674
18:12:12	7.67	12.726
18:13:12	7.738	12.607
18:14:12	7.66	12.636
18:15:13	8.057	12.283
18:16:13	7.855	12.714
18:17:13	7.795	12.574
18:18:12	7.875	12.323
18:19:12	9.255	10.531
18:20:12	10.704	9.552
18:21:12	10.985	9.754
18:22:12	10.224	10.586
18:23:12	9.817	10.835
18:24:12	9.362	11.124
18:25:12	9.778	10.557
18:26:12	9.921	10.704
18:27:12	9.933	10.431
18:28:13	10.387	10.019
18:29:13	10.556	10.134
18:30:13	9.767	11.072
18:31:12	8.684	12.236
18:32:12	7.65	13.003
18:33:12	7.384	13.018
18:34:12	7.452	13.032
18:35:12	7.748	12.368
18:36:12	8.53	11.587
18:37:12	9.126	11.012
18:38:12	9.997	10.108
18:39:12	10.808	9.386
18:40:12	11.306	8.952
18:41:13	11.214	9.588
18:42:13	10.608	9.921
18:43:12	10.569	9.999
18:44:12	10.532	10.006
18:45:12	10.229	10.619

Average of Test Run

	O2	CO2
	%	%
18:46:11	8.913	11.627

Test Run 3 End

Final System Bias Check for Run 1
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 3**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time 2/27/2018 9:48:52 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.325	0.453
Zero Bias%	1.5	1.4
Zero Drift%	0.3	0.4
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	9.923	9.944
Span Bias%	0.5	1.1
Span Drift%	-0.5	-0.3
Ini Zero Avg	0.274	0.376
Ini Span Avg	10.017	10.01
Run Avg	10.631	9.896
Co	0.3	0.414
Cm	9.97	9.977
Correct Avg	10.706	9.906

Test Run 1 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILERS 3** Date: 2/27/2018

Begin calculating run averages

	O2	CO2
	%	%
8:34:11	10.318	10.12
8:35:11	10.481	9.956
8:36:10	10.504	9.917
8:37:11	10.55	9.872
8:38:11	10.638	9.83
8:39:11	10.474	10.059
8:40:11	10.495	9.817
8:41:10	10.787	9.528
8:42:11	10.936	9.547
8:43:11	10.59	9.974
8:44:11	10.528	9.836
8:45:11	10.6	9.854
8:46:10	10.585	9.973
8:47:11	10.398	10.115
8:48:11	10.493	9.944
8:49:11	10.558	10.007
8:50:11	10.494	9.946
8:51:10	10.811	9.628
8:52:11	10.868	9.756
8:53:10	10.501	10.147
8:54:11	10.462	10.097
8:55:11	10.615	9.923
8:56:10	10.631	10.024
8:57:11	10.427	10.147
8:58:11	10.655	9.806
8:59:11	10.716	9.923
9:00:11	10.662	9.861
9:01:11	10.78	9.764
9:02:11	10.694	9.97
9:03:11	10.477	10.072
9:04:11	10.627	9.815
9:05:11	10.717	9.894
9:06:11	10.6	9.977
9:07:11	10.609	9.93
9:08:11	10.661	9.832
9:09:11	10.679	9.878
9:10:11	10.819	9.658
9:11:11	11.049	9.495
9:12:11	10.877	9.859
9:13:11	10.499	10.135
9:14:11	10.268	10.384
9:15:11	10.137	10.328
9:16:11	10.466	9.962
9:17:11	10.597	9.968
9:18:11	10.442	10.15
9:19:11	10.294	10.245
9:20:11	10.334	10.17
9:21:11	10.382	10.215
9:22:10	10.221	10.26
9:23:10	10.584	9.699
9:24:10	11.117	9.271
9:25:10	11.155	9.547
9:26:10	10.66	10.005
9:27:10	10.618	9.87
9:28:10	10.992	9.546
9:29:10	10.945	9.658
9:30:10	10.852	9.698
9:31:10	10.962	9.504
9:32:10	11.077	9.479
9:33:10	11.081	9.55
9:34:10	10.736	9.964
9:35:11	10.4	10.233
9:36:11	10.554	9.862

Average of Test Run

	O2	CO2
	%	%
9:36:31	10.631	9.896

Test Run 1 End

Final System Bias Check for Run 2
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 3**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time 2/27/2018 11:19:48 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.5	0.552
Zero Bias%	2.4	1.9
Zero Drift%	0.9	0.5
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	9.831	9.887
Span Bias%	1	1.4
Span Drift%	-0.5	-0.3
Ini Zero Avg	0.325	0.453
Ini Span Avg	9.923	9.944
Run Avg	10.778	9.786
Co	0.413	0.502
Cm	9.877	9.916
Correct Avg	10.974	9.852

1	2	3
10.706	10.974	10.947
9.906	9.852	10.051

Test Run 2 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Date: 2/27/2018
Location: **BOILER 3**

	O2	CO2
	%	%
Begin calculating run averages		
10:06:23	10.084	10.365
10:07:23	10.491	9.87
10:08:23	10.726	9.72
10:09:23	10.942	9.651
10:10:23	10.561	10.082
10:11:23	10.534	9.954
10:12:23	10.621	9.939
10:13:23	10.644	9.843
10:14:23	10.767	9.749
10:15:23	11.043	9.428
10:16:23	11.012	9.544
10:17:23	11.02	9.605
10:18:22	10.572	10.077
10:19:22	10.758	9.658
10:20:22	11.045	9.47
10:21:22	11.159	9.459
10:22:22	10.984	9.578
10:23:22	11.111	9.381
10:24:23	10.94	9.841
10:25:23	10.726	9.71
10:26:23	11.253	9.149
10:27:23	11.401	9.233
10:28:23	11.101	9.706
10:29:23	10.784	9.788
10:30:23	10.86	9.819
10:31:22	10.336	10.535
10:32:22	9.91	10.72
10:33:22	10.28	9.987
10:34:22	10.934	9.604
10:35:22	10.748	10.03
10:36:22	10.517	10.046
10:37:22	10.764	9.771
10:38:22	10.932	9.651
10:39:22	10.725	10.012
10:40:22	10.564	10.076
10:41:22	10.702	9.774
10:42:22	11.023	9.585
10:43:22	10.801	9.974
10:44:22	10.611	9.936
10:45:22	10.79	9.82
10:46:22	10.712	10.023
10:47:22	10.275	10.472
10:48:22	10.236	10.138
10:49:23	10.91	9.525
10:50:23	11.043	9.631
10:51:23	10.48	10.359
10:52:23	10.205	10.316
10:53:23	10.188	10.434
10:54:23	10.214	10.175
10:55:23	10.861	9.355
10:56:23	11.374	9.075
10:57:23	11.379	9.203
10:58:23	11.04	9.663
10:59:23	10.675	9.931
11:00:23	10.663	9.799
11:01:23	11.015	9.398
11:02:23	10.966	9.71
11:03:23	10.783	9.648
11:04:23	11.254	9.075
11:05:23	11.4	9.126

Average of Test Run

	O2	CO2
	%	%
11:06:13	10.778	9.786

Test Run 2 End

Final System Bias Check for Run 3
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 3**

	Reference Cylinder Numbers	
	Zero	Span
O2	EB0051266	EB0082218
CO2	EB0051266	EB0082218

Date/Time	2/27/2018	12:45:01 PASSED
Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0	0
Zero Cal	0.022	0.171
Zero Avg	0.428	0.503
Zero Bias%	2	1.7
Zero Drift%	-0.4	-0.2
Span Ref Cyl	10.02	9.99
Span Cal	10.023	10.168
Span Avg	9.703	9.919
Span Bias%	1.6	1.2
Span Drift%	-0.6	0.2
Ini Zero Avg	0.5	0.552
Ini Span Avg	9.831	9.887
Run Avg	10.627	9.96
Co	0.464	0.527
Cm	9.767	9.903
Correct Avg	10.947	10.051

Test Run 3 Begin. STRATA Version 3.01
Operator: Bert Forsyth / FBT
Plant Name: Freeman
Location: **BOILER 3**

Begin calculating run averages

	O2	CO2
	%	%
11:31:12	10.823	9.433
11:32:12	11.183	9.143
11:33:13	11.496	8.952
11:34:12	11.249	9.499
11:35:12	10.628	10.096
11:36:12	10.401	10.259
11:37:13	10.277	10.166
11:38:13	10.874	9.466
11:39:13	11.034	9.562
11:40:13	10.955	9.625
11:41:13	10.886	9.661
11:42:13	11.102	9.413
11:43:13	11.169	9.405
11:44:13	10.921	9.828
11:45:13	10.668	9.983
11:46:13	10.657	9.87
11:47:13	10.882	9.749
11:48:13	10.585	10.187
11:49:13	10.366	10.14
11:50:13	10.565	9.963
11:51:13	10.5	10.271
11:52:13	10.199	10.264
11:53:13	10.553	9.91
11:54:13	10.669	9.978
11:55:13	10.178	10.587
11:56:13	10.104	10.357
11:57:13	10.377	10.114
11:58:13	10.369	10.326
11:59:13	10.191	10.266
12:00:13	10.353	10.208
12:01:13	10.401	10.136
12:02:13	10.267	10.415
12:03:13	10.168	10.264
12:04:13	10.521	9.905
12:05:13	10.733	9.793
12:06:13	10.646	9.96
12:07:13	10.425	10.257
12:08:13	10.286	10.309
12:09:13	10.294	10.234
12:10:13	10.663	9.845

	O2	CO2
	%	%
12:11:13	11.008	9.462
12:12:13	11.11	9.518
12:13:13	11.059	9.602
12:14:13	10.889	9.776
12:15:13	10.772	9.843
12:16:12	10.791	9.803
12:17:12	10.837	9.93
12:18:12	10.511	10.177
12:19:12	10.544	10.077
12:20:12	10.506	10.245
12:21:12	10.162	10.612
12:22:12	9.944	10.637
12:23:12	10.136	10.353
12:24:12	10.627	9.848
12:25:13	10.777	9.892
12:26:13	10.442	10.311
12:27:13	10.425	10.049
12:28:13	10.753	9.846
12:29:13	10.886	9.714
12:30:13	10.916	9.841

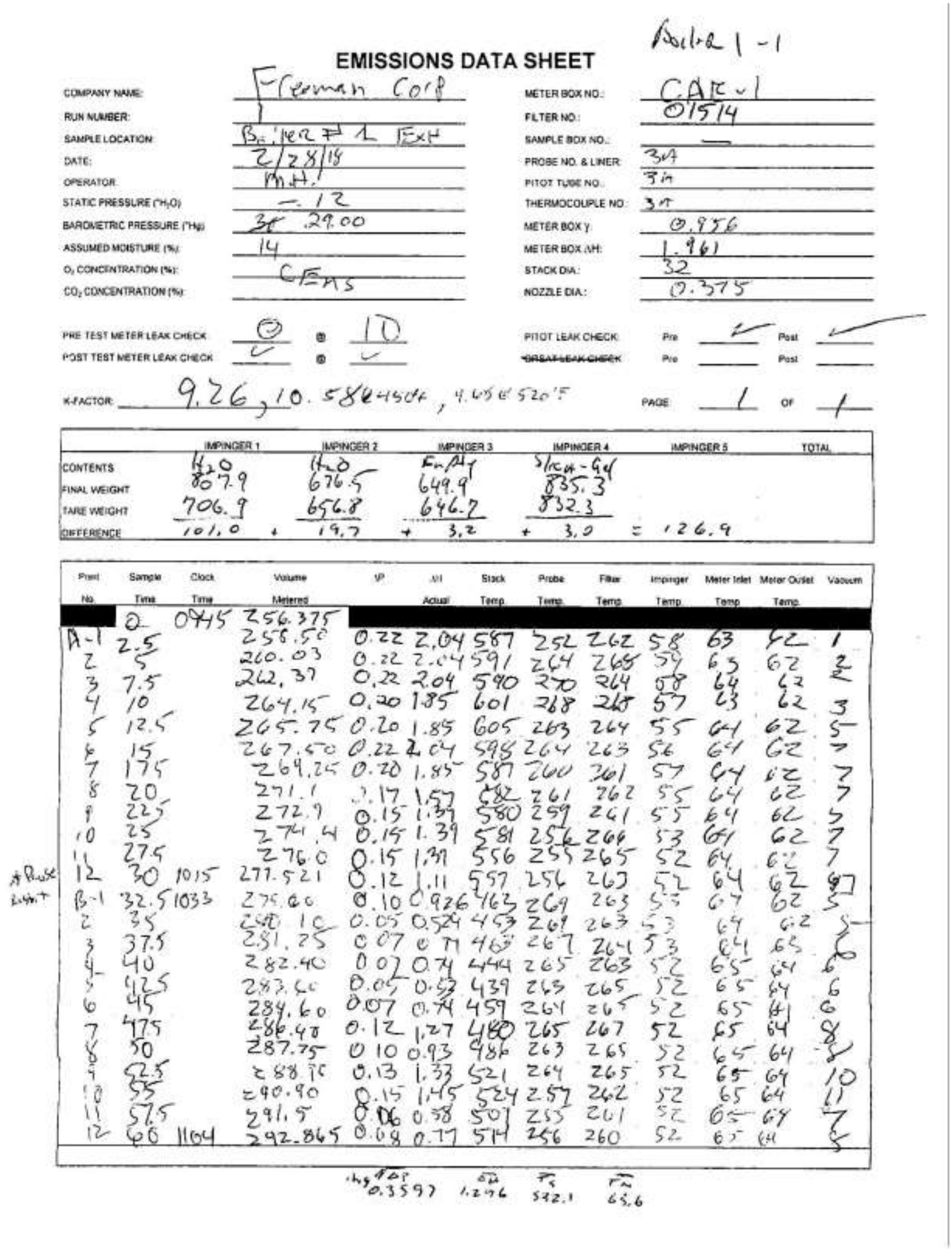
Average of Test Run

	O2	CO2
	%	%
12:30:54	10.627	9.96

Test Run 3 End

APPENDIX C

FIELD SAMPLING AND SAMPLING SITE DATA



Boiler 1-1

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp
RUN NUMBER: 1
SAMPLE LOCATION: Boiler #1 Exh
DATE: 2/28/18
OPERATOR: M.H.
STATIC PRESSURE ("H_2O): -.12
BAROMETRIC PRESSURE ("Hg): ~~30~~ 29.00
ASSUMED MOISTURE (%): 14
O_2 CONCENTRATION (%): CEMS
CO_2 CONCENTRATION (%):

METER BOX NO.: CAE-1
FILTER NO.: 01514
SAMPLE BOX NO.: —
PROBE NO. & LINER: 3ft
PITOT TUBE NO.: 3ft
THERMOCOUPLE NO.: 3ft
METER BOX γ: 0.956
METER BOX ΔH: 1.961
STACK DIA.: 32
NOZZLE DIA.: 0.375

PRE TEST METER LEAK CHECK: 0 @ 10
POST TEST METER LEAK CHECK: ✓ @ ✓
PITOT LEAK CHECK: Pre ✓ Post ✓
~~ORSAT LEAK CHECK~~: Pre Post

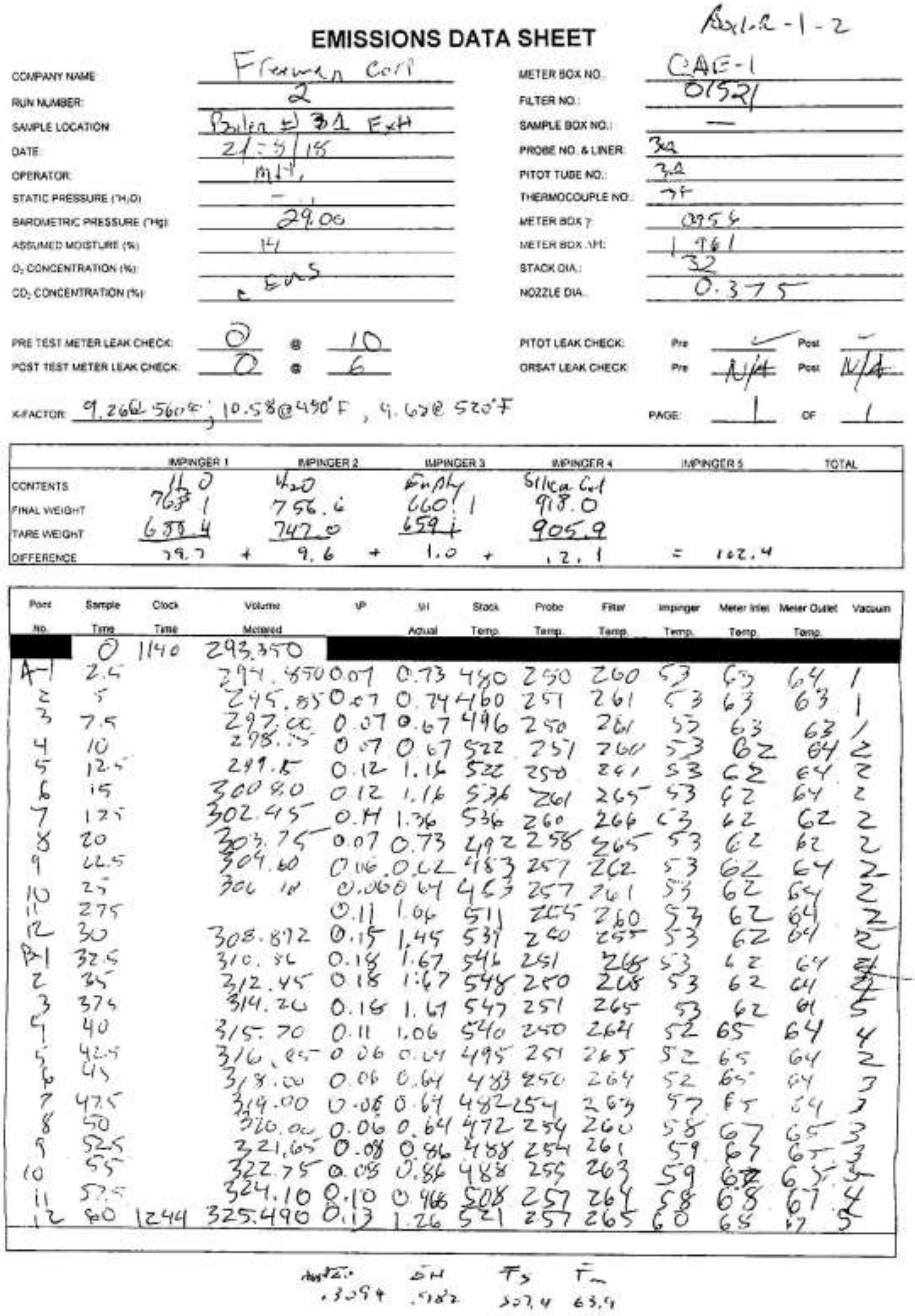
K-FACTOR: 9.26, 10.58@450°F, 4.65@520°F

PAGE 1 OF 1

	IMPINGER 1		IMPINGER 2		IMPINGER 3		IMPINGER 4		IMPINGER 5	TOTAL
CONTENTS	H_2O		H_2O		Empty		Silica-Gel			
FINAL WEIGHT	807.9		676.5		649.9		835.3			
TARE WEIGHT	706.9		656.8		646.7		832.3			
DIFFERENCE	101.0	+	19.7	+	3.2	+	3.0	=	126.9	

	Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
		0	0745	256.375									
	A-1	2.5		258.50	0.22	2.04	587	252	262	58	63	62	1
	2	5		260.03	0.22	2.04	591	264	268	59	65	62	2
	3	7.5		262.37	0.22	2.04	590	270	264	58	64	62	2
	4	10		264.15	0.20	1.85	601	268	265	57	63	62	3
	5	12.5		265.75	0.20	1.85	605	263	264	55	64	62	5
	6	15		267.50	0.22	2.04	598	264	263	56	64	62	7
	7	17.5		269.25	0.20	1.85	587	260	261	57	64	62	7
	8	20		271.1	0.17	1.57	582	261	262	55	64	62	7
	9	22.5		272.9	0.15	1.39	580	259	261	55	64	62	5
	10	25		274.4	0.15	1.39	581	256	264	53	64	62	7
	11	27.5		276.0	0.15	1.39	556	255	265	52	64	62	7
* Pulse	12	30	1015	277.521	0.12	1.11	557	256	263	52	64	62	9
Light	B-1	32.5	1033	279.60	0.10	0.926	463	269	263	53	64	62	5
	2	35		280.10	0.05	0.524	453	269	263	53	64	62	5
	3	37.5		281.25	0.07	0.74	463	267	264	53	64	63	6
	4	40		282.40	0.07	0.74	444	265	263	52	65	64	6
	5	42.5		283.60	0.05	0.53	439	263	265	52	65	64	6
	6	45		284.60	0.07	0.74	459	264	265	52	65	64	6
	7	47.5		286.40	0.12	1.27	480	265	267	52	65	64	8
	8	50		287.75	0.10	0.93	486	263	265	52	65	64	8
	9	52.5		288.75	0.13	1.33	521	264	265	52	65	64	10
	10	55		290.90	0.15	1.45	524	257	262	52	65	64	11
	11	57.5		291.5	0.06	0.58	501	255	261	52	65	64	7
	12	60	1104	292.865	0.08	0.77	514	256	260	52	65	64	5

avg $\overline{\sqrt{\Delta P}}$ 0.3597 $\overline{\Delta H}$ 1.296 $\overline{T_s}$ 532.1 $\overline{T_m}$ 63.6



Boil-R-1-2

EMISSIONS DATA SHEET

COMPANY NAME:	Freeman Corp	METER BOX NO.:	CAE-1
RUN NUMBER:	2	FILTER NO.:	01521
SAMPLE LOCATION:	Boiler #31 Exh	SAMPLE BOX NO.:	—
DATE:	2/28/18	PROBE NO. & LINER:	3A
OPERATOR:	MH,	PITOT TUBE NO.:	3A
STATIC PRESSURE ("H₂O):	-	THERMOCOUPLE NO.:	3F
BAROMETRIC PRESSURE ("Hg):	29.00	METER BOX γ:	0.954
ASSUMED MOISTURE (%):	14	METER BOX ΔH@:	1.961
O₂ CONCENTRATION (%):	CEMS	STACK DIA.:	32
CO₂ CONCENTRATION (%):		NOZZLE DIA.:	0.375

PRE TEST METER LEAK CHECK: 0 @ 10

POST TEST METER LEAK CHECK: 0 @ 6

PITOT LEAK CHECK: Pre ✓ Post ✓

ORSAT LEAK CHECK: Pre N/A Post N/A

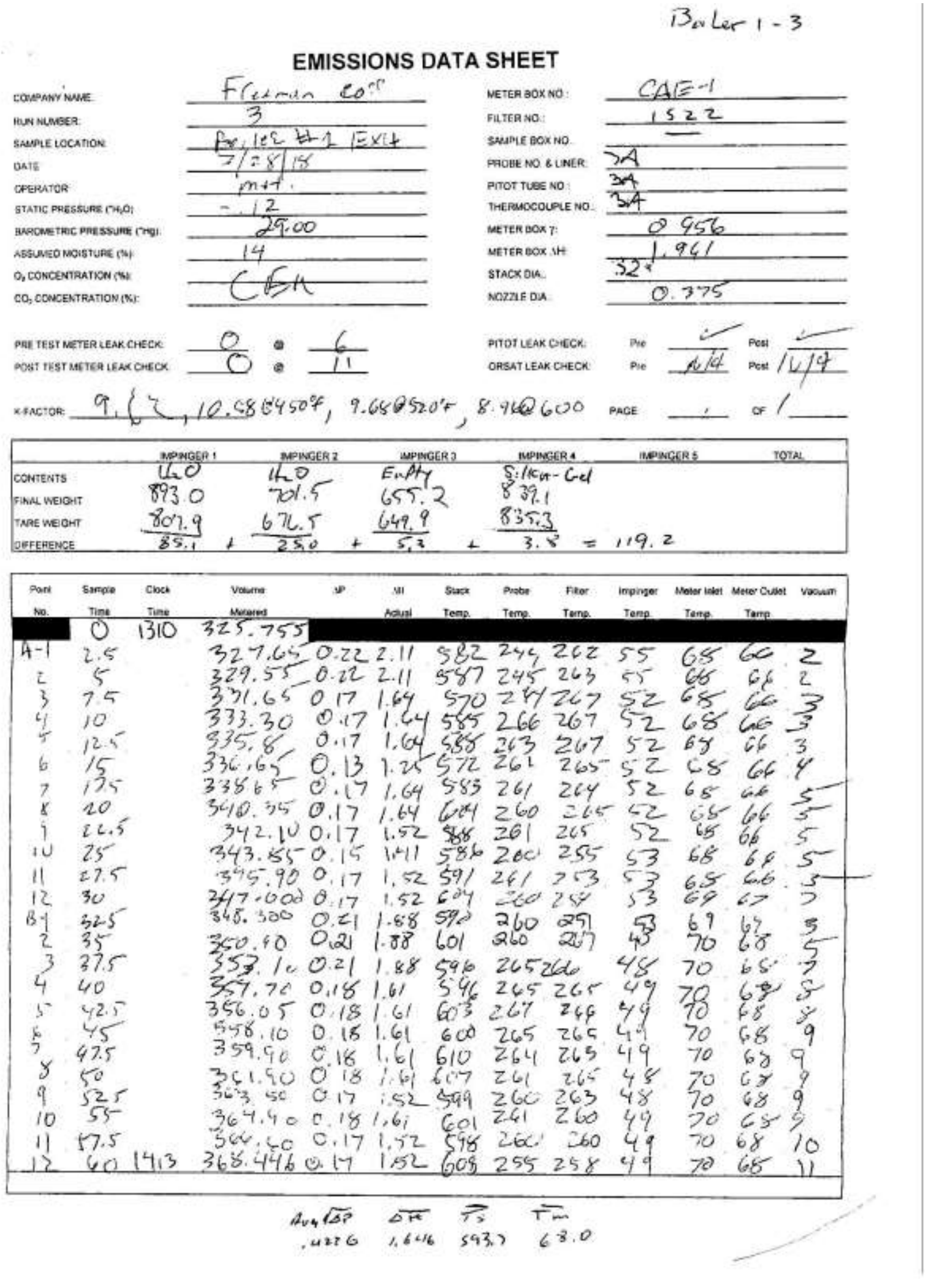
K-FACTOR: 9.26@560°F; 10.58@450°F, 9.69@520°F

PAGE: 1 OF 1

	IMPINGER 1		IMPINGER 2		IMPINGER 3		IMPINGER 4		IMPINGER 5	TOTAL
CONTENTS	H₂O		H₂O		Empty		Silica Gel			
FINAL WEIGHT	763.1		756.6		660.1		918.0			
TARE WEIGHT	683.4		747.0		659.1		905.9			
DIFFERENCE	79.7	+	9.6	+	1.0	+	12.1		=	102.4

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1140	293.350									
A-1	2.5		294.850	0.07	0.73	480	250	260	53	63	64	1
2	5		295.850	0.07	0.74	460	251	261	53	63	63	1
3	7.5		297.00	0.07	0.67	496	250	261	53	63	63	1
4	10		298.55	0.07	0.67	522	251	260	53	62	64	2
5	12.5		299.5	0.12	1.16	522	250	261	53	62	64	2
6	15		300.80	0.12	1.16	536	261	265	53	62	64	2
7	17.5		302.45	0.14	1.36	536	260	266	53	62	62	2
8	20		303.75	0.07	0.73	492	258	265	53	62	62	2
9	22.5		304.60	0.06	0.62	483	257	262	53	62	64	2
10	25		306.18	0.06	0.64	463	257	261	53	62	64	2
11	27.5			0.11	1.06	511	255	260	53	62	64	2
12	30		308.872	0.15	1.45	531	250	255	53	62	64	2
B-1	32.5		310.86	0.18	1.67	546	251	268	53	62	64	4
2	35		312.45	0.18	1.67	548	250	268	53	62	64	4
3	37.5		314.20	0.16	1.61	547	251	265	53	62	61	5
4	40		315.70	0.11	1.06	540	250	264	52	65	64	4
5	42.5		316.85	0.06	0.64	495	251	265	52	65	64	2
6	45		318.00	0.06	0.64	483	250	264	52	65	64	3
7	47.5		319.00	0.06	0.64	482	254	263	57	65	64	3
8	50		320.00	0.06	0.64	472	254	260	58	67	65	3
9	52.5		321.65	0.08	0.86	488	254	261	59	67	65	3
10	55		322.75	0.08	0.86	488	255	263	59	67	65	3
11	57.5		324.10	0.10	0.966	508	257	264	58	68	67	4
12	60	1244	325.490	0.13	1.26	521	257	265	60	65	67	5

avg √ΔP	ΔH	Ts	Tm
.3094	.9182	527.4	63.9



Boiler 1 - 3

EMISSIONS DATA SHEET

COMPANY NAME: Freeman corp
RUN NUMBER: 3
SAMPLE LOCATION: Boiler #1 Exit
DATE: 2/28/18
OPERATOR: matt.
STATIC PRESSURE ("H_2O): -.12
BAROMETRIC PRESSURE ("Hg): 29.00
ASSUMED MOISTURE (%): 14
O_2 CONCENTRATION (%): CEM
CO_2 CONCENTRATION (%): CEM

METER BOX NO.: CAE-1
FILTER NO.: 1522
SAMPLE BOX NO.: —
PROBE NO. & LINER: 3A
PITOT TUBE NO.: 3A
THERMOCOUPLE NO.: 3A
METER BOX γ: 0.956
METER BOX ΔH: 1.961
STACK DIA.: 32"
NOZZLE DIA.: 0.375

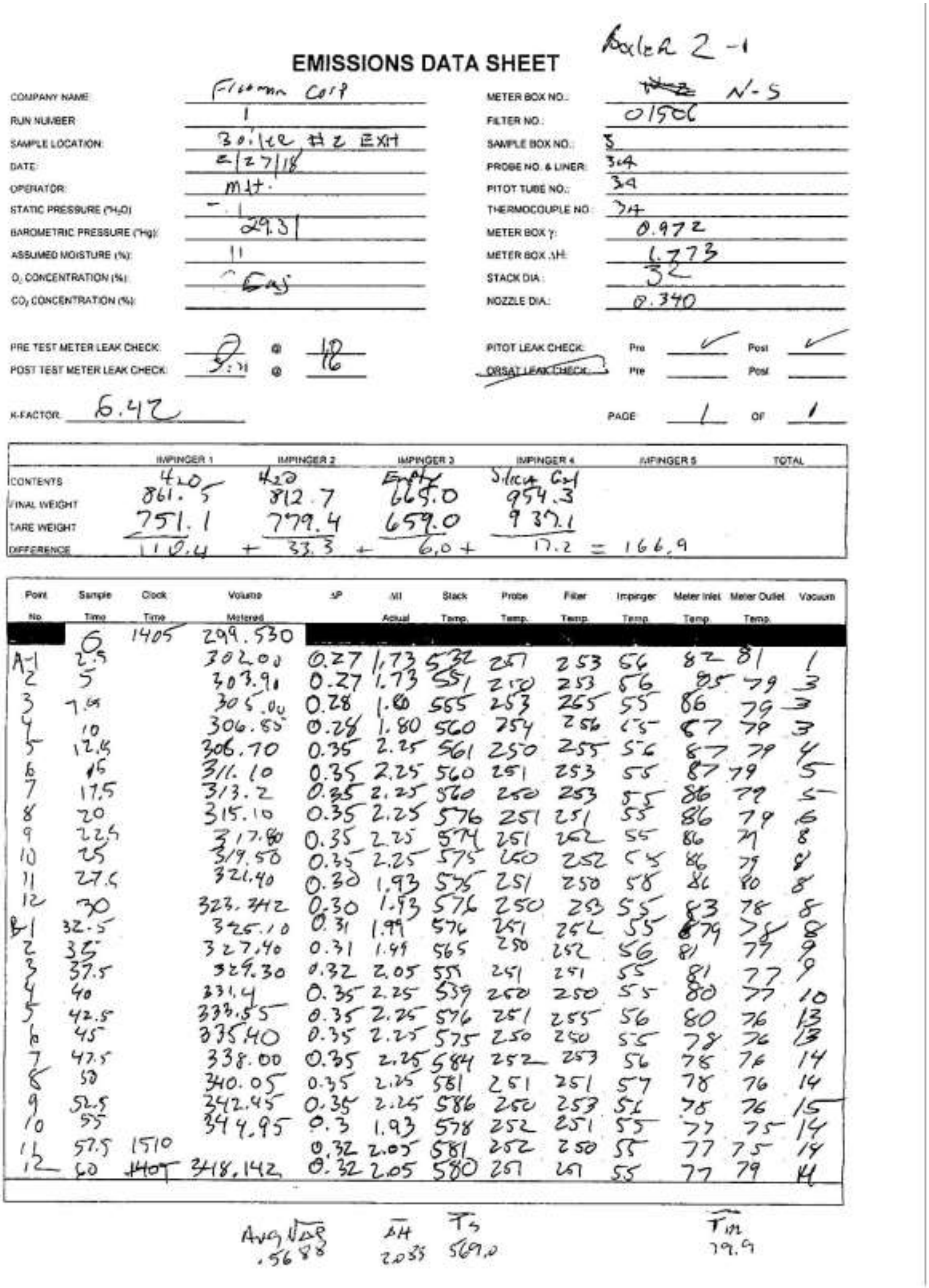
PRE TEST METER LEAK CHECK: 0 @ 6
POST TEST METER LEAK CHECK: 0 @ 11
PITOT LEAK CHECK: Pre ✓ Post ✓
ORSAT LEAK CHECK: Pre N/A Post N/A

K-FACTOR: 9.62, 10.5884504, 9.6805204, 8.9606600
PAGE 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H_2O	H_2O	Empty	Silica-Gel		
FINAL WEIGHT	893.0	701.5	655.2	839.1		
TARE WEIGHT	807.9	676.5	649.9	835.3		
DIFFERENCE	85.1 +	25.0 +	5.3 +	3.8 =	119.2	

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1310	325.755									
A-1	2.5		327.65	0.22	2.11	582	244	262	55	68	66	2
2	5		329.55	0.22	2.11	587	245	263	55	66	66	2
3	7.5		331.65	0.17	1.64	570	244	267	52	68	66	3
4	10		333.30	0.17	1.64	585	266	267	52	68	66	3
5	12.5		335.8	0.17	1.64	588	263	267	52	68	66	3
6	15		336.65	0.13	1.25	572	261	265	52	68	66	4
7	17.5		338.65	0.17	1.64	583	261	264	52	68	66	5
8	20		340.35	0.17	1.64	604	260	265	52	68	66	5
9	22.5		342.10	0.17	1.52	588	261	265	52	68	66	5
10	25		343.85	0.15	1.41	586	260	255	53	68	66	5
11	27.5		345.90	0.17	1.52	591	261	253	53	68	66	5
12	30		347.000	0.17	1.52	604	260	254	53	69	67	7
B-1	32.5		348.300	0.21	1.88	592	260	251	53	69	67	5
2	35		350.40	0.21	1.88	601	260	257	43	70	68	5
3	37.5		353.10	0.21	1.88	596	265	266	48	70	68	7
4	40		357.70	0.18	1.61	596	265	265	49	70	68	8
5	42.5		356.05	0.18	1.61	603	267	266	49	70	68	8
6	45		358.10	0.18	1.61	600	265	265	49	70	68	9
7	47.5		359.90	0.18	1.61	610	264	265	49	70	68	9
8	50		361.90	0.18	1.61	607	261	265	48	70	68	9
9	52.5		363.50	0.17	1.52	599	260	263	48	70	68	9
10	55		364.40	0.18	1.61	601	261	260	49	70	68	9
11	57.5		366.60	0.17	1.52	598	260	260	49	70	68	10
12	60	1413	368.446	0.17	1.52	608	255	258	49	70	68	11

Avg $\sqrt{\Delta P}$	$\overline{\Delta H}$	$\overline{T_s}$	$\overline{T_m}$
.4226	1.646	593.7	68.0



Boiler 2-1

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp
RUN NUMBER: 1
SAMPLE LOCATION: Boiler #2 EXH
DATE: 2/27/18
OPERATOR: mht.
STATIC PRESSURE ("H₂O): -.1
BAROMETRIC PRESSURE ("Hg): 29.31
ASSUMED MOISTURE (%): 11
O₂ CONCENTRATION (%): Gas
CO₂ CONCENTRATION (%):

METER BOX NO.: N-5
FILTER NO.: 01506
SAMPLE BOX NO.: 5
PROBE NO. & LINER: 3-4
PITOT TUBE NO.: 34
THERMOCOUPLE NO.: 34
METER BOX γ: 0.972
METER BOX ΔH: 1.773
STACK DIA.: 32
NOZZLE DIA.: 0.340

PRE TEST METER LEAK CHECK: 0 @ 18
POST TEST METER LEAK CHECK: .011 @ 16

PITOT LEAK CHECK: Pre ✓ Post ✓
~~ORSAT LEAK CHECK:~~ Pre Post

K-FACTOR: 6.42

PAGE 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H₂O	H₂O	Empty	Silica Gel		
FINAL WEIGHT	861.5	812.7	665.0	954.3		
TARE WEIGHT	751.1	779.4	659.0	937.1		
DIFFERENCE	110.4 +	33.3 +	6.0 +	17.2 =	166.9	

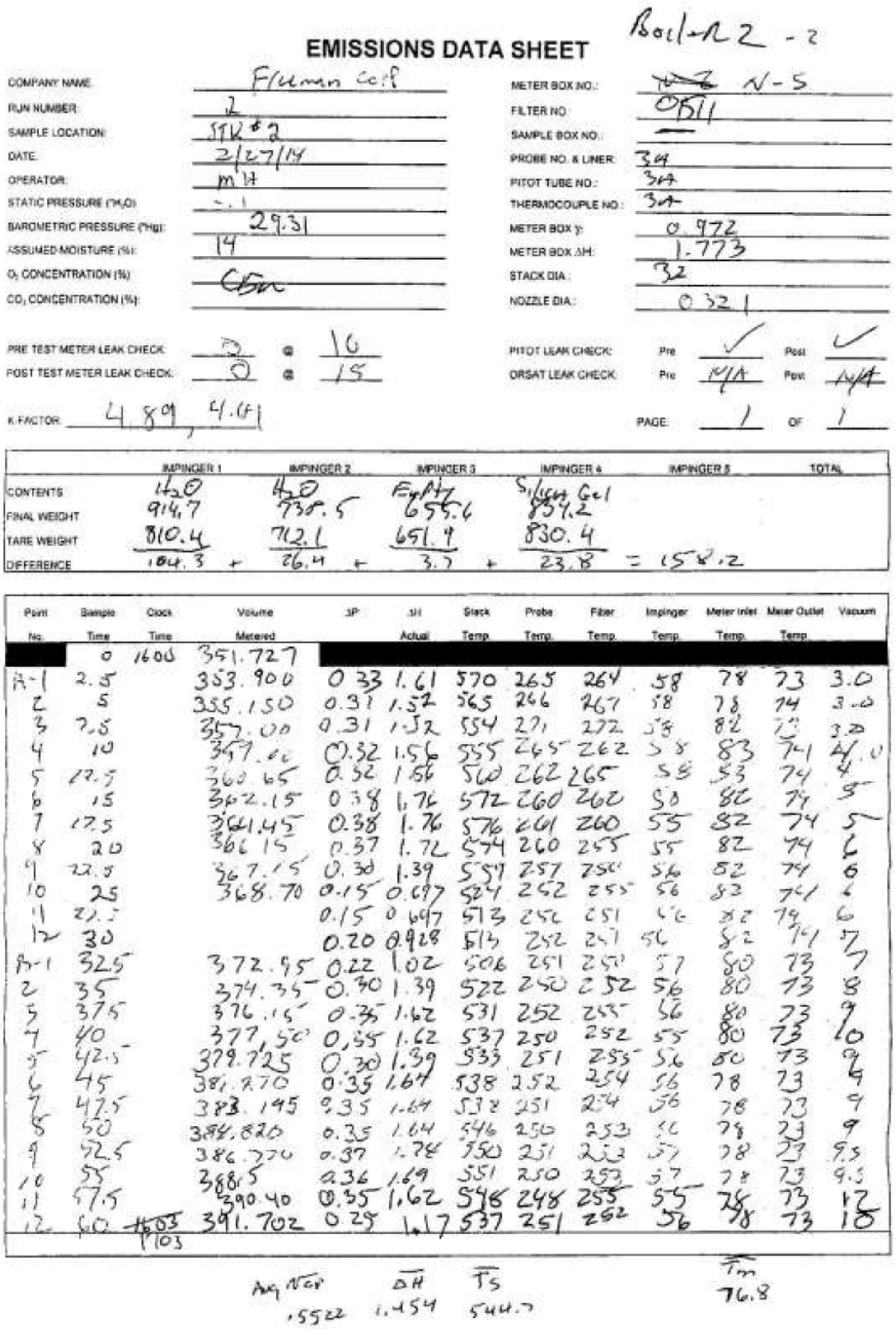
Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1405	299.530									
A-1	2.5		302.00	0.27	1.73	532	251	253	56	82	81	1
2	5		303.90	0.27	1.73	551	250	253	56	85	79	3
3	7.5		305.00	0.28	1.80	555	253	255	55	86	79	3
4	10		306.85	0.28	1.80	560	254	256	55	87	79	3
5	12.5		306.70	0.35	2.25	561	250	255	56	87	79	4
6	15		311.10	0.35	2.25	560	251	253	55	87	79	5
7	17.5		313.2	0.35	2.25	560	250	253	55	86	79	5
8	20		315.10	0.35	2.25	576	251	251	55	86	79	6
9	22.5		317.80	0.35	2.25	574	251	252	55	86	79	8
10	25		319.50	0.35	2.25	575	250	252	55	86	79	8
11	27.5		321.40	0.30	1.93	575	251	250	58	86	80	8
12	30		323.342	0.30	1.93	576	250	253	55	83	78	8
B-1	32.5		325.10	0.31	1.99	576	251	252	55	79	78	8
2	35		327.40	0.31	1.99	565	250	252	56	81	77	9
3	37.5		329.30	0.32	2.05	551	251	251	55	81	77	9
4	40		331.4	0.35	2.25	539	250	250	55	80	77	10
5	42.5		333.55	0.35	2.25	576	251	255	56	80	76	13
6	45		335.40	0.35	2.25	575	250	250	55	78	76	13
7	47.5		338.00	0.35	2.25	584	252	253	56	78	76	14
8	50		340.05	0.35	2.25	581	251	251	57	78	76	14
9	52.5		342.45	0.35	2.25	586	250	253	56	78	76	15
10	55		344.95	0.3	1.93	578	252	251	55	77	75	14
11	57.5	1510		0.32	2.05	581	252	250	55	77	75	14
12	60	~~1407~~	348.142	0.32	2.05	580	251	251	55	77	79	14

Avg √ΔP .5688

$\overline{\Delta H}$ 2.035

$\overline{T_s}$ 569.0

$\overline{T_m}$ 79.9



Boiler 2 - 2

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp
RUN NUMBER: 2
SAMPLE LOCATION: STK #2
DATE: 2/27/18
OPERATOR: MH
STATIC PRESSURE ("H₂O): -.1
BAROMETRIC PRESSURE ("Hg): 29.31
ASSUMED MOISTURE (%): 14
O₂ CONCENTRATION (%): ~~CEM~~
CO₂ CONCENTRATION (%):

METER BOX NO.: ~~N-2~~ N-5
FILTER NO.: OBII
SAMPLE BOX NO.: —
PROBE NO. & LINER: 34
PITOT TUBE NO.: 34
THERMOCOUPLE NO.: 34
METER BOX γ: 0.972
METER BOX ΔH: 1.773
STACK DIA.: 32
NOZZLE DIA.: 0.321

PRE TEST METER LEAK CHECK: 0 @ 16
POST TEST METER LEAK CHECK: 0 @ 15
PITOT LEAK CHECK: Pre ✓ Post ✓
ORSAT LEAK CHECK: Pre N/A Post N/A
K-FACTOR: 4.89, 4.61
PAGE: 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H₂O	H₂O	Empty	Silica Gel		
FINAL WEIGHT	914.7	738.5	655.6	854.2		
TARE WEIGHT	810.4	712.1	651.9	830.4		
DIFFERENCE	104.3 +	26.4 +	3.7 +	23.8	= 158.2	

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1600	351.727									
A-1	2.5		353.900	0.33	1.61	570	265	264	58	78	73	3.0
2	5		355.150	0.31	1.52	565	266	267	58	78	74	3.0
3	7.5		357.00	0.31	1.52	554	271	272	58	82	73	3.0
4	10		357.60	0.32	1.56	555	265	262	58	83	74	4.0
5	12.5		360.65	0.32	1.56	560	262	265	55	53	74	4
6	15		362.15	0.38	1.76	572	260	262	58	82	74	5
7	17.5		364.45	0.38	1.76	576	261	260	55	82	74	5
8	20		366.15	0.37	1.72	574	260	255	55	82	74	6
9	22.5		367.15	0.30	1.39	557	257	250	56	82	74	6
10	25		368.70	0.15	0.697	524	252	255	56	82	74	6
11	27.5			0.15	0.697	513	252	251	56	82	74	6
12	30			0.20	0.928	513	252	251	56	82	74	7
B-1	325		372.95	0.22	1.02	506	251	250	57	80	73	7
2	35		374.35	0.30	1.39	522	250	252	56	80	73	8
3	375		376.15	0.35	1.62	531	252	255	56	80	73	9
4	40		377.50	0.35	1.62	537	250	252	55	80	73	10
5	42.5		379.725	0.30	1.39	533	251	255	56	80	73	9
6	45		381.270	0.35	1.64	538	252	254	56	78	73	9
7	47.5		383.145	0.35	1.64	538	251	254	56	78	73	9
8	50		384.820	0.35	1.64	546	250	253	56	78	73	9
9	52.5		386.770	0.37	1.78	550	251	253	57	78	73	9.5
10	55		388.5	0.36	1.69	551	250	253	57	78	73	9.5
11	57.5		390.40	0.35	1.62	548	248	255	55	78	73	12
12	60	~~1603~~ 1703	391.702	0.29	1.17	537	251	262	56	78	73	10

Avg √ΔP .5522
$\overline{\Delta H}$ 1.454
$\overline{T_s}$ 544.7
$\overline{T_m}$ 76.8

Boiler 2-3

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp
RUN NUMBER: 3
SAMPLE LOCATION: Boiler #2 Exit
DATE: 2/27/18
OPERATOR: MH
STATIC PRESSURE ("H_2O): -.1
BAROMETRIC PRESSURE ("Hg): 29.31
ASSUMED MOISTURE (%): 14
O_2 CONCENTRATION (%): CEM
CO_2 CONCENTRATION (%):

METER BOX NO.: N-5
FILTER NO.: 1513
SAMPLE BOX NO.: —
PROBE NO. & LINER: 34
PITOT TUBE NO.: 34
THERMOCOUPLE NO.: 34
METER BOX γ: 0.972
METER BOX ΔH: 1.773
STACK DIA.: ~~0.321~~
NOZZLE DIA.: 0.321

PRE TEST METER LEAK CHECK: 0 @ 10
POST TEST METER LEAK CHECK: 0 @ 8

PITOT LEAK CHECK: Pre ✓ Post ✓
ORSAT LEAK CHECK: Pre N/A Post N/A

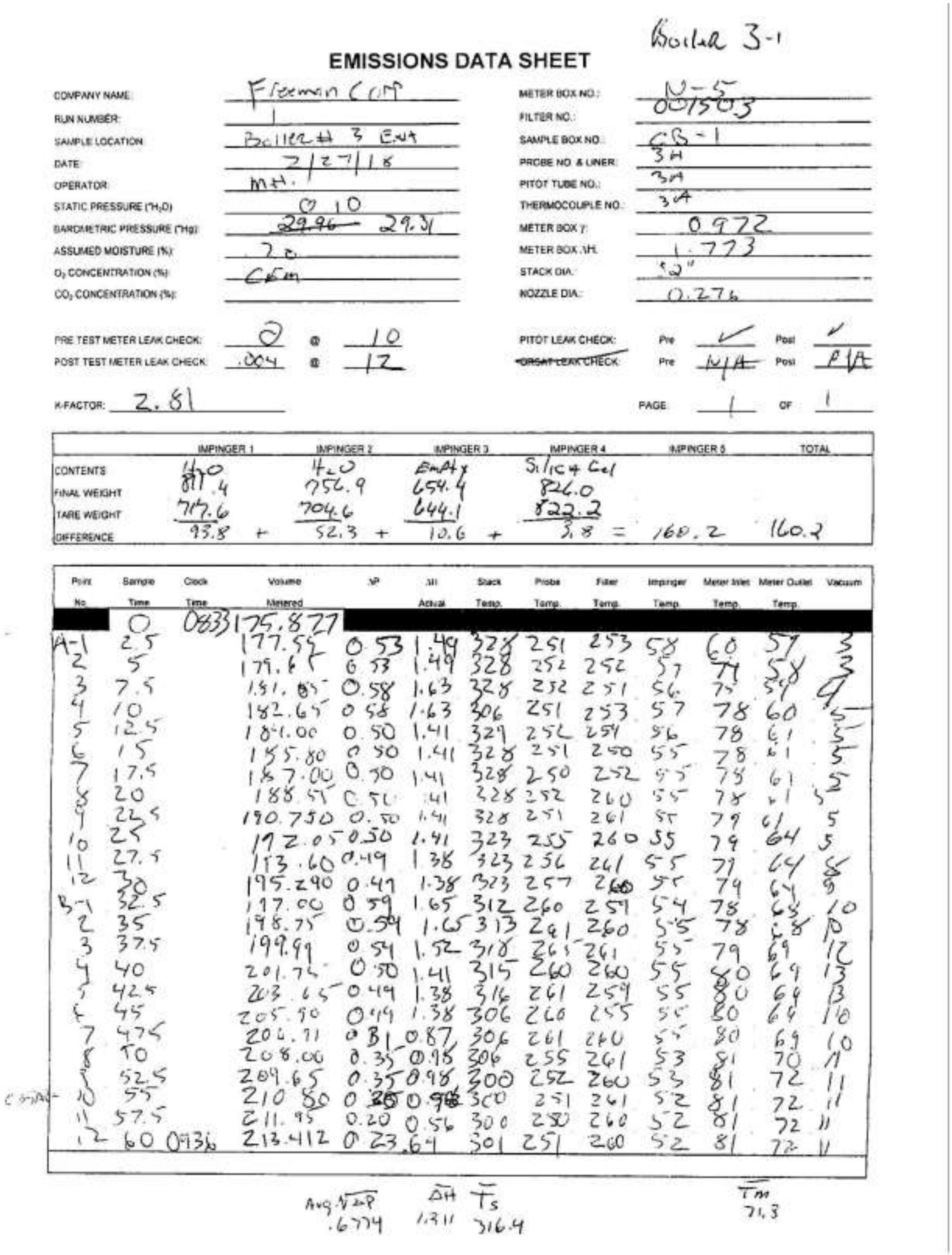
K-FACTOR: 4.69

PAGE 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H_2O	H_2O	Empty	Silica Gel		
FINAL WEIGHT	795.2	769.1	659.2	964.5		
TARE WEIGHT	690.7	745.7	655.0	952.6		
DIFFERENCE	104.5 +	23.5 +	4.2 +	11.9 =		144.1

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1745	392.152									
A-1	2.5		393.8	0.26	1.22	538	238	247	56	76	71	2
2	5		395.75	0.3	1.41	549	248	252	55	78	71	2
3	7.5		397.30	0.3	1.41	555	250	255	52	79	71	2
4	10		399.26	0.35	1.64	556	252	251	51	79	71	2
5	12.5			0.35	1.64	564	251	255	51	80	70	3
6	15			0.35	1.64	560	250	252	52	79	71	4
7	17.5		404.05	0.35	1.64	574	253	255	52	79	71	4
8	20		406.00	0.36	1.69	572	252	263	52	81	71	4
9	22.5		408.15	0.35	1.64	574	250	252	50	81	71	4
10	25		410.25	0.35	1.64	580	252	252	51	81	71	4
11	27.5		411.85	0.38	1.78	580	253	253	52	81	71	5
12	30		413.30	0.38	1.78	581	251	250	51	81	71	5
B-1	32.5		415.2	0.35	1.64	582	~~250~~	255	52	81	71	5
2	35		417.45	0.35	1.64	581	245	251	51	80	71	5
3	37.5		419.15	0.35	1.64	565	247	252	57	79	71	6
4	40		420.00	0.35	1.64	552	252	252	51	78	70	6
5	42.5		422.25	0.4	1.87	563	259	255	52	78	70	6
6	45		424.16	0.4	1.87	575	260	257	52	78	70	6
7	47.5		426.00	0.4	1.87	580	261	258	52	78	70	7
8	50		428.11	0.4	1.87	577	260	259	52	78	70	7
9	52.5		430.70	0.35	1.64	567	261	260	51	78	70	7
10	55		431.40	0.28	1.31	569	258	255	52	78	71	8
11	57.5		432.80	0.28	1.31	543	259	255	51	78	71	8
12	60	1848	434.555	0.30	1.41	545	255	255	50	78	71	8

Avg√ΔP .5867
$\overline{\Delta H}$ 1.618
$\overline{Ts}$ 565.9
$\overline{Tm}$ 74.9



Boiler 3-1

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp

RUN NUMBER: 1

SAMPLE LOCATION: Boiler # 3 Exit

DATE: 2/27/18

OPERATOR: MH.

STATIC PRESSURE ("H₂O): 0.10

BAROMETRIC PRESSURE ("Hg): ~~29.96~~ 29.31

ASSUMED MOISTURE (%): 7.0

O₂ CONCENTRATION (%): CEM

CO₂ CONCENTRATION (%):

METER BOX NO.: N-5

FILTER NO.: 001503

SAMPLE BOX NO.: CB-1

PROBE NO. & LINER: 3H

PITOT TUBE NO.: 3H

THERMOCOUPLE NO.: 34

METER BOX γ: 0.972

METER BOX ΔH: 1.773

STACK DIA.: 52"

NOZZLE DIA.: 0.276

PRE TEST METER LEAK CHECK: 0 @ 10

POST TEST METER LEAK CHECK: .004 @ 12

PITOT LEAK CHECK: Pre ✓ Post ✓

~~ORSAT LEAK CHECK~~: Pre N/A Post N/A

K-FACTOR: 2.81

PAGE 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H₂O	H₂O	Empty	Silica Gel		
FINAL WEIGHT	811.4	756.9	654.4	826.0		
TARE WEIGHT	717.6	704.6	644.1	822.2		
DIFFERENCE	93.8 +	52.3 +	10.6 +	3.8 =	160.2	160.2

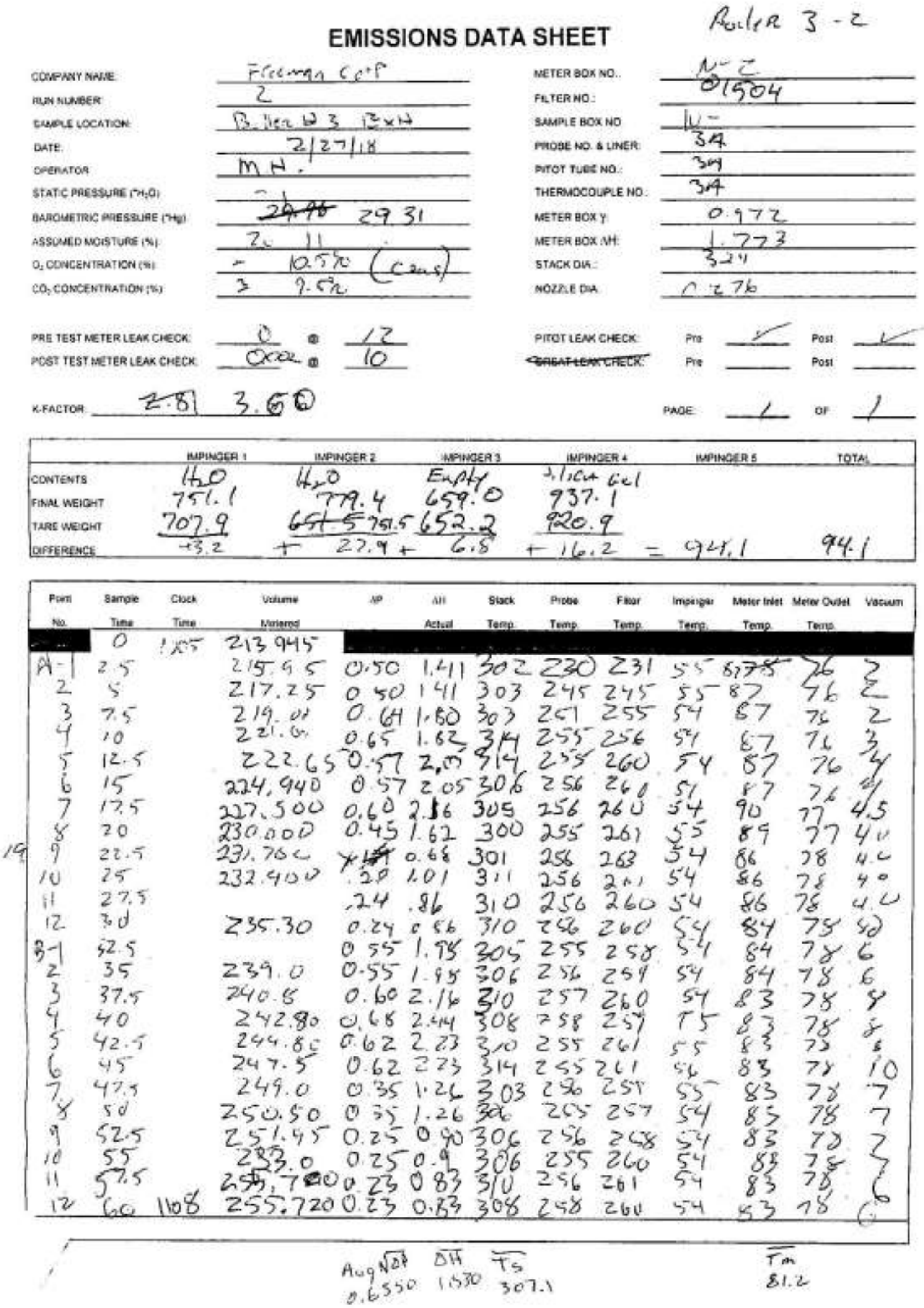
Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	0833	175.877									
A-1	2.5		177.55	0.53	1.49	328	251	253	58	60	57	3
2	5		179.65	0.53	1.49	328	252	252	57	71	58	3
3	7.5		181.85	0.58	1.63	328	252	251	56	75	59	4
4	10		182.65	0.58	1.63	306	251	253	57	78	60	5
5	12.5		184.00	0.50	1.41	329	252	254	56	78	61	5
6	15		185.80	0.50	1.41	328	251	250	55	78	61	5
7	17.5		187.00	0.50	1.41	328	250	252	55	78	61	5
8	20		188.55	0.50	1.41	328	252	260	55	78	61	5
9	22.5		190.750	0.50	1.41	328	251	261	55	79	61	5
10	25		192.05	0.50	1.41	323	255	260	55	79	64	5
11	27.5		193.60	0.49	1.38	323	256	261	55	71	64	8
12	30		195.290	0.49	1.38	323	257	260	55	79	64	9
B-1	32.5		197.00	0.59	1.65	312	260	259	54	78	68	10
2	35		198.75	0.59	1.65	313	261	260	55	78	68	10
3	37.5		199.99	0.54	1.52	318	261	261	55	79	69	12
4	40		201.75	0.50	1.41	315	260	260	55	80	69	13
5	42.5		203.65	0.49	1.38	316	261	259	55	80	69	13
6	45		205.50	0.49	1.38	306	260	255	55	80	69	10
7	47.5		206.71	0.31	0.87	306	261	260	55	80	69	10
8	50		208.00	0.35	0.98	306	255	261	53	81	70	11
9	52.5		209.65	0.35	0.98	300	252	260	53	81	72	11
10	55		210.80	0.35	0.98	300	251	261	52	81	72	11
11	57.5		211.95	0.20	0.56	300	250	260	52	81	72	11
12	60	0936	213.412	0.23	.64	301	251	260	52	81	72	11

Avg $\sqrt{\Delta P}$ .6774

$\overline{\Delta H}$ 1.311

$\overline{T_s}$ 316.4

$\overline{T_m}$ 71.3



Boiler 3 - 2

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp
RUN NUMBER: 2
SAMPLE LOCATION: Boiler # 3 Exh
DATE: 2/27/18
OPERATOR: MH.
STATIC PRESSURE ("H₂O): -1
BAROMETRIC PRESSURE ("Hg): ~~29.46~~ 29.31
ASSUMED MOISTURE (%): 20 11
O₂ CONCENTRATION (%): - 10.5% (Cems)
CO₂ CONCENTRATION (%): 3 9.5%

METER BOX NO.: N-2
FILTER NO.: 01504
SAMPLE BOX NO: 10-
PROBE NO. & LINER: 34
PITOT TUBE NO.: 34
THERMOCOUPLE NO.: 34
METER BOX Y: 0.972
METER BOX ΔH: 1.773
STACK DIA.: 32"
NOZZLE DIA: 0.276

PRE TEST METER LEAK CHECK: 0 @ 12
POST TEST METER LEAK CHECK: 0.002 @ 10

PITOT LEAK CHECK: Pre ✓ Post ✓
~~GREAT LEAK CHECK~~: Pre ____ Post ____

K-FACTOR: ~~2.81~~ 3.60

PAGE: 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H₂O	H₂O	Empty	Silica Gel		
FINAL WEIGHT	751.1	779.4	659.0	937.1		
TARE WEIGHT	707.9	~~651.5~~ 751.5	652.2	920.9		
DIFFERENCE	43.2	+ 27.9 +	6.8	+ 16.2	= 94.1	94.1

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
	0	1105	213 945									
A-1	2.5		215.95	0.50	1.41	302	230	231	55	~~87~~ 85	76	2
2	5		217.25	0.50	1.41	303	245	245	55	87	76	2
3	7.5		219.01	0.64	1.80	303	251	255	54	87	76	2
4	10		221.6	0.65	1.62	314	255	256	54	87	76	3
5	12.5		222.65	0.57	2.0	314	255	260	54	87	76	4
6	15		224.940	0.57	2.05	306	256	261	51	87	76	4
7	17.5		227.500	0.60	2.16	305	256	260	54	90	77	4.5
8	20		230.000	0.45	1.62	300	255	261	55	89	77	4.0
.19 9	22.5		231.700	~~.19~~	0.68	301	256	263	54	86	78	4.0
10	25		232.400	.20	1.01	311	256	261	54	86	78	4.0
11	27.5			.24	.86	310	256	260	54	86	78	4.0
12	30		235.30	0.24	0.86	310	256	260	54	84	78	5.0
B-1	32.5			0.55	1.98	305	255	258	54	84	78	6
2	35		239.0	0.55	1.98	306	256	259	54	84	78	6
3	37.5		240.8	0.60	2.16	310	257	260	54	83	78	8
4	40		242.80	0.68	2.44	308	258	259	55	83	78	8
5	42.5		244.85	0.62	2.23	310	255	261	55	83	78	8
6	45		247.5	0.62	2.23	314	255	261	56	83	78	10
7	47.5		249.0	0.35	1.26	303	256	258	55	83	78	7
8	50		250.50	0.35	1.26	306	255	257	54	83	78	7
9	52.5		251.45	0.25	0.90	306	256	258	54	83	78	7
10	55		253.0	0.25	0.9	306	255	260	54	83	78	7
11	57.5		254.700	0.23	0.83	310	256	261	54	83	78	6
12	60	1108	255.720	0.23	0.83	308	258	260	54	83	78	6

Avg √ΔP 0.6550 ΔH 1.530 Ts 307.1 Tm 81.2

Boiler 3 - 3

EMISSIONS DATA SHEET

COMPANY NAME: Freeman Corp

RUN NUMBER: 3

SAMPLE LOCATION: Boiler # 3 Exh

DATE: 2/27/18

OPERATOR: MH.

STATIC PRESSURE ("H₂O): -.1

BAROMETRIC PRESSURE ("Hg): 29.31

ASSUMED MOISTURE (%): 11

O_2 CONCENTRATION (%): CEMS

CO_2 CONCENTRATION (%):

METER BOX NO.: N-5

FILTER NO.: 01505

SAMPLE BOX NO.: ~~34~~

PROBE NO. & LINER: 34

PITOT TUBE NO.: 3.4

THERMOCOUPLE NO.: J.4

METER BOX Y: 0.972

METER BOX ΔH: 1.773

STACK DIA.: 32

NOZZLE DIA.: .276

PRE TEST METER LEAK CHECK: 0 @ 10

POST TEST METER LEAK CHECK: 0.00 @ 18

PITOT LEAK CHECK: Pre ✓ Post ✓

~~ORSAT LEAK CHECK~~: Pre Post

K-FACTOR: 3.6

PAGE 1 OF 1

	IMPINGER 1	IMPINGER 2	IMPINGER 3	IMPINGER 4	IMPINGER 5	TOTAL
CONTENTS	H_2O	H_2O	Empty	Silica Gel		
FINAL WEIGHT	810.4	712.1	651.9	830.4		
TARE WEIGHT	737.2	693.7	648.3	825.8		
DIFFERENCE	73.2 +	18.4 +	3.6 +	4.6 =	99.8	99.8

Point No.	Sample Time	Clock Time	Volume Metered	ΔP	ΔH Actual	Stack Temp.	Probe Temp.	Filter Temp.	Impinger Temp.	Meter Inlet Temp.	Meter Outlet Temp.	Vacuum
[redacted]	0	1130	255.938	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
A-1	2.5		257.85	0.45	1.62	306	251	255	54	80	71	4
2	5		259.95	0.45	1.62	305	250	253	54	77	71	4
3	7.5		261.20	0.50	1.8	301	252	255	54	76	71	4
4	10		263.30	0.55	1.98	301	251	254	54	76	71	4
5	12.5		265.000	0.68	2.44	305	251	241	54	77	70	5
6	15		266.640	0.73	2.63	311	250	246	54	77	[illegible]	[illegible]
7			269.020	0.34	1.22	312	250	244	54	74	70	3
8	20		270.850	0.34	1.22	311	250	247	55	74	71	3
9	22.5		272.50	0.34	1.22	315	251	278	54	75	71	7
10	25		274.10	0.35	1.26	316	252	251	55	75	71	7
11	27.5		275.5	0.40	1.44	320	255	260	56	75	71	7
12	30		277	0.40	1.44	320	256	261	55	75	71	7
B-1	32.5		278.5	0.35	1.26	315	251	260	57	75	70	8
2	35		280.55	0.35	1.26	317	253	259	57	75	70	9
3	37.5		281.57	0.35	1.26	310	254	260	57	75	70	9
4	40		383.3	0.31	1.11	305	255	258	57	75	70	9
5	42.5		285.00	0.3	1.11	309	256	259	58	75	70	9
6	45		286.5	0.3	1.11	304	257	258	58	74	70	9
7	47.5		288.65	0.50	1.8	303	255	257	55	76	71	12
8	50		290.00	0.50	1.8	306	256	258	55	76	71	12
9	52.5		292.0	0.81	2.86	308	257	254	55	76	71	17
10	55		294.10	0.69	2.44	311	260	259	55	77	71	18
11	57.5		296.75	0.69	2.44	328	[illegible]	260	54	77	71	18
12	60	1233	299.190	0.58	2.05	327	259	241	54	77	71	18

Avg $\sqrt{\Delta P}$ .6766

$\overline{\Delta H}$ 1.683

$\overline{T_s}$ 311.1

$\overline{T_m}$ 73.3

Traverse Point Locator Data

Client The Freeman Corp

Site Boiler #1

Calculator Jonathan Moore Date 2/20/18 no de

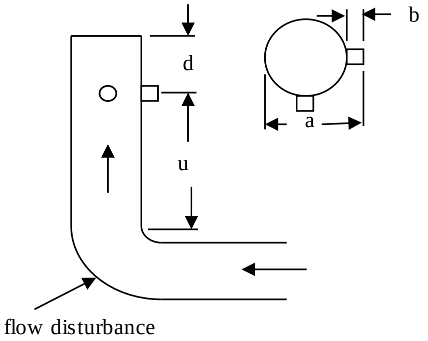
Distance from upstream disturbance (u), in 144 4.50

Distance from downstream disturbance (d), in 270 8.44

Outside of port to far side of stack (a), in. 36.0

Outside of port to near side of stack (b), in. 4.0

Inside Stack Diameter (a - b), in. 32.0



Point #	% from wall to point	" from wall to point (c)	Port length (b)	" from probe tip to point (b + c)
1	2.1	0.67	4.00	5.00
2	6.7	2.14	4.00	6.14
3	11.8	3.78	4.00	7.78
4	17.7	5.66	4.00	9.66
5	25	8.00	4.00	12.00
6	35.6	11.39	4.00	15.39
7	64.4	20.61	4.00	24.61
8	75	24.00	4.00	28.00
9	82.3	26.34	4.00	30.34
10	88.2	28.22	4.00	32.22
11	93.3	29.86	4.00	33.86
12	97.9	31.33	4.00	35.00

Note: If stack > 24" diameter points no closer than 1" from wall.
If stack equal to or < 24" diameter points no closer than 1/2" from wall.

Traverse Point Locator Data

Client The Freeman Corp

Site Boiler #2

Calculator Jonathan Moore Date 2/20/18 no de

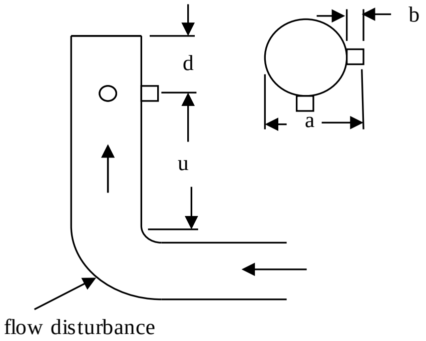
Distance from upstream disturbance (u), in 84 2.63

Distance from downstream disturbance (d), in 156 4.88

Outside of port to far side of stack (a), in. 36.0

Outside of port to near side of stack (b), in. 4.0

Inside Stack Diameter (a - b), in. 32.0



Point #	% from wall to point	" from wall to point (c)	Port length (b)	" from probe tip to point (b + c)
1	2.1	0.67	4.00	5.00
2	6.7	2.14	4.00	6.14
3	11.8	3.78	4.00	7.78
4	17.7	5.66	4.00	9.66
5	25	8.00	4.00	12.00
6	35.6	11.39	4.00	15.39
7	64.4	20.61	4.00	24.61
8	75	24.00	4.00	28.00
9	82.3	26.34	4.00	30.34
10	88.2	28.22	4.00	32.22
11	93.3	29.86	4.00	33.86
12	97.9	31.33	4.00	35.00

Note: If stack > 24" diameter points no closer than 1" from wall.
If stack equal to or < 24" diameter points no closer than 1/2" from wall.

Traverse Point Locator Data

Client The Freeman Corp

Site Boiler #3

Calculator Jonathan Moore Date 2/20/18 no de

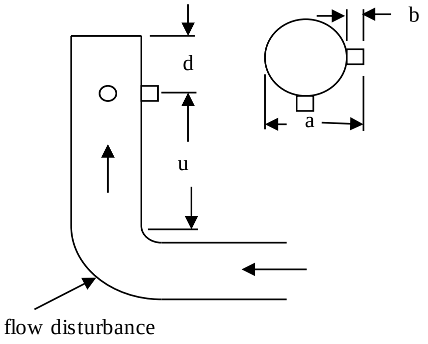
Distance from upstream disturbance (u), in 73 2.28

Distance from downstream disturbance (d), in 120 3.75

Outside of port to far side of stack (a), in. 36.0

Outside of port to near side of stack (b), in. 4.0

Inside Stack Diameter (a - b), in. 32.0



Point #	% from wall to point	" from wall to point (c)	Port length (b)	" from probe tip to point (b + c)
1	2.1	0.67	4.00	5.00
2	6.7	2.14	4.00	6.14
3	11.8	3.78	4.00	7.78
4	17.7	5.66	4.00	9.66
5	25	8.00	4.00	12.00
6	35.6	11.39	4.00	15.39
7	64.4	20.61	4.00	24.61
8	75	24.00	4.00	28.00
9	82.3	26.34	4.00	30.34
10	88.2	28.22	4.00	32.22
11	93.3	29.86	4.00	33.86
12	97.9	31.33	4.00	35.00

Note: If stack > 24" diameter points no closer than 1" from wall.
If stack equal to or < 24" diameter points no closer than 1/2" from wall.

APPENDIX D

CALIBRATION DATA

APPENDIX D

CALIBRATION DATA AND VISUAL EMISSIONS CERTIFICATIONS

This appendix contains calibration documentation, including visual emissions certifications and describes the specific QA/QC procedures employed by FBT in performing this test. The goal of the QA/QC activities for this project is to ensure, to the highest degree possible, the accuracy of the data collected. The procedures contained in the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume I. Principles, EPA-600/9-76-005, and Volume III Stationary Sources Specific Methods, EPA-600/77-027b* are the bases for performance for all testing and related work activities.

CALIBRATION OF APPARATUS

The preparation and calibration of source sampling equipment is essential in maintaining data quality. Brief descriptions of the calibration procedures used by FBT follow:

Barometers

FBT uses aneroid barometers that are calibrated against a National Weather Service-Type mercurial barometer.

Temperature Sensors

Type K thermocouples are calibrated using the procedure described in Section 3.4.2 of the Quality Assurance Handbook. Each temperature sensor is calibrated over the expected range of use against an ASTM 3C or 3F thermometer.

Pitots

FBT uses Type S pitots on sources having significant particulate loadings and on larger ducts. These pitots are constructed according to USEPA Reference Method 2 specifications. Pitots meeting these criteria are assigned a baseline coefficient of 0.84 and need not be calibrated.

FBT uses standard pitots on smaller sources having insignificant particulate loadings. These pitots are constructed according to USEPA Reference Method 2 specifications. Pitots meeting these criteria are assigned a baseline coefficient of 0.99 and need not be calibrated.

Differential Pressure Gauges

FBT uses Dwyer inclined/vertical manometers to measure differential pressures. These include velocity pressures, static pressures, and orifice pressure differentials. Manometers are selected with sufficient sensitivity to accurately measure pressures over the entire range of expected values. Manometers are leveled and zeroed prior to each run and checked periodically during the run. Manometers are primary standards and require no calibration.

Dry Gas Meters and Orifices

Dry gas meters and orifices are calibrated using critical orifices as described in USEPA Reference Method 5. Before initial use in the field, a metering system is calibrated over the entire range of operation. After each field use, the metering system is calibrated at a single intermediate setting based on the previous field test. Acceptable difference for pre-test and post-test dry gas meter coefficient values is ± 5%. Metering systems are also calibrated using a reference dry gas meter. Reference dry gas meters are calibrated using critical orifices.

ON-SITE MEASUREMENTS

On-site QA/QC activities included:

Measurement Sites

Prior to sampling, all stack/duct dimensions are measured to determine measurement site locations, location of test ports, and stack inside dimensions. Inside dimensions are checked through all available test ports to ensure uniformity of the stack cross-sectional area.

Verification of Absence of Cyclonic Flow

Some flow disturbances such as cyclones, inertial demisters, and venturi scrubbers tend to induce cyclonic flow. In situations such as these, the presence or absence of cyclonic flow must be determined. Prior to testing, FBT conducts an evaluation to identify duct configurations that may induce swirl. If these conditions exist the presence or absence of cyclonic flow must be determined. A sampling site is acceptable if the average angle of rotation from the duct axis required to achieve a null pitot reading is less than 20^o.

Velocity Measurements

All velocity measurement apparatus is assembled, leveled, zeroed, and leak checked prior to each test run. Static pressure is determined at a single point near the center of the stack.

Stack Gas Component Sampling

During test runs gas samples are withdrawn from a single point near the center of each test site and analyzed with a Fyrite combustion gas analyzer to determine percent concentrations of carbon dioxide and oxygen. The sample train is assembled and leak checked before sampling.

Gas analyzers are calibrated with USEPA protocol calibration gases. Linearity, system bias, zero and calibration drift, and response time checks are also done with these gases.

Moisture

Stack gas moisture may be determined simultaneously with particulate matter. During sampling, the gas exiting the condenser is maintained below 68^o F to ensure adequate condensation of the stack gas water vapor. The total moisture is determined volumetrically and gravimetrically.

Sample Trains

Sample trains are assembled, equilibrated to temperature, and leak checked before testing. Nozzle size is determined in the field by making triplicate measurements along three different diameters using a dial caliper. The three measurements may vary no more than 0.004 inches between the high and low values. At the conclusion of each run, the sample trains are leak checked at the highest vacuum attained during the test run. Acceptable leakage rates are 0.02 cubic feet per minute or 4 percent of the average sampling rate (whichever is less).

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	N-5
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	**Time**	23-Feb-17	
Barometric Pressure		29.4	in Hg
Theoretical Critical Vacuum[1]		13.9	in Hg
Calibration Technician		BGF	

Factors/Conversions		
Std Temp	528	^{o}R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1] **For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.**

[2] **The Critical Orifice Coefficient, K', must be entered in English units, ($ft^3*^oR^{1/2}$)/(in.Hg*min).**

Run Time	**Metering Console**						**Critical Orifice**				
Elapsed	**DGM Orifice ΔH**	**Volume Initial**	**Volume Final**	**Outlet Temp Initial**	**Outlet Temp Final**	**Serial Number**	**Coefficient**	**Amb Temp Initial**	**Amb Temp Final**	**Actual Vacuum**
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	^oF	^oF		see above2	^oF	^oF	in Hg
20.0	0.6	558.028	567.107	68	71	48	0.3371	70	73	22
12.0	1.0	567.107	574.274	71	72	55	0.4419	73	74	18
8.0	1.9	583.767	590.134	72	74	63	0.5892	73	74	17

Results

Standardized Data				**Dry Gas Meter**				
				Calibration Factor		**Flowrate**	**ΔH @**	
Dry Gas Meter		**Critical Orifice**		**Value**	**Variation**	**Std & Corr**	**0.75 SCFM**	**Variation**
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
8.897	0.445	8.586	0.429	0.965	0.001	0.429	1.784	-0.017
7.004	0.584	6.741	0.562	0.962	-0.001	0.562	1.748	-0.053
6.219	0.777	5.992	0.749	0.963	0.000	0.749	1.871	0.070
Pretest Gamma	0.972	**% Deviation**	0.9	0.964	Y Average		1.801	ΔH≅ Αϖεραγε

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	N-5
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	**Time**	16-Mar-18	
Barometric Pressure		29.2	in Hg
Theoretical Critical Vacuum[1]		13.8	in Hg
Calibration Technician		BF	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	°R/in Hg

[1] For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2] The Critical Orifice Coefficient, K', must be entered in English units, ($ft^3 * {}^oR^{1/2}$)/(in.Hg*min).

Calibration Data										
Run Time	**Metering Console**					**Critical Orifice**				
Elapsed	**DGM Orifice ΔH**	**Volume Initial**	**Volume Final**	**Outlet Temp Initial**	**Outlet Temp Final**	**Serial Number**	**Coefficient**	**Amb Temp Initial**	**Amb Temp Final**	**Actual Vacuum**
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
6.0	3.6	636.842	643.451	76	77	73	0.8107	72	73	16
10.0	2.0	643.451	651.531	77	77	63	0.5892	80	78	18
9.0	1.1	651.531	656.986	77	77	55	0.4419	78	77	19

Standardized Data				**Dry Gas Meter**				
				Calibration Factor		**Flowrate**	**ΔH @**	
Dry Gas Meter		**Critical Orifice**		**Value**	**Variation**	**Std & Corr**	**0.75 SCFM**	**Variation**
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
6.410	1.068	6.159	1.027	0.961	0.006	1.027	1.882	-0.050
7.798	0.780	7.416	0.742	0.951	-0.004	0.742	1.986	0.054
5.253	0.584	5.013	0.557	0.954	-0.001	0.557	1.928	-0.004
Pretest Gamma	0.972	**% Deviation**	1.7	0.955	Y Average		1.932	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02.

APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	CAE 1
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	**Time**	9-Jan-18	
Barometric Pressure		29.3	in Hg
Theoretical Critical Vacuum^1		13.8	in Hg
Calibration Technician		BF	

Factors/Conversions		
Std Temp	528	^{o}R
Std Press	29.92	in Hg
K$_1$	17.647	^{o}R/in Hg

^{1}For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

^{2}The Critical Orifice Coefficient, K', must be entered in English units, (ft^3*^{o}R$^{1/2}$)/(in.Hg*min).

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P$_m$)	(V$_{mi}$)	(V$_{mf}$)	(t$_{mi}$)	(t$_{mf}$)		K'	(t$_{amb}$)	(t$_{amb}$)	
min	in H$_2$O	cubic feet	cubic feet	^{o}F	^{o}F		see above2	^{o}F	^{o}F	in Hg
9.3	1.9	135.921	143.401	75	75	63	0.5892	76	75	15
17.0	0.4	143.401	148.887	75	74	40	0.2366	75	75	23
9.0	1.1	148.887	154.334	74	75	55	0.4419	75	75	20
12.3	0.7	154.334	159.966	75	75	48	0.3371	75	74	22
6.5	3.7	159.966	167.118	75	74	73	0.8107	75	75	15

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
(V$_{m(std)}$)	(Q$_{m(std)}$)	(Vcr$_{(std)}$)	(Q$_{cr(std)}$)	(Y)	(ΔY)	(Q$_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
7.271	0.786	6.908	0.747	0.950	-0.006	0.747	1.873	-0.088
5.317	0.313	5.100	0.300	0.959	0.004	0.300	2.123	0.162
5.289	0.588	5.043	0.560	0.954	-0.002	0.560	1.833	-0.128
5.458	0.446	5.239	0.428	0.960	0.004	0.428	2.032	0.071
6.990	1.075	6.682	1.028	0.956	0.000	1.028	1.944	-0.017
				0.956	Y Average		1.961	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02.

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	N-5
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	**Time**	23-Feb-17	
Barometric Pressure		29.4	in Hg
Theoretical Critical Vacuum[1]		13.9	in Hg
Calibration Technician		BGF	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1] For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2] The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*^oR^{1/2})/(in.Hg*min)$.

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
20.0	0.6	558.028	567.107	68	71	48	0.3371	70	73	22
12.0	1.0	567.107	574.274	71	72	55	0.4419	73	74	18
8.0	1.9	583.767	590.134	72	74	63	0.5892	73	74	17

Results									
Standardized Data				Dry Gas Meter					
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
$(V_{m(std)})$	$(Q_{m(std)})$	$(Vcr_{(std)})$	$(Q_{cr(std)})$	(Y)	(ΔY)	$(Q_{m(std)(corr)})$	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
8.897	0.445	8.586	0.429	0.965	0.001	0.429	1.784	-0.017
7.004	0.584	6.741	0.562	0.962	-0.001	0.562	1.748	-0.053
6.219	0.777	5.992	0.749	0.963	0.000	0.749	1.871	0.070
Pretest Gamma	0.972	**% Deviation**	0.9	0.964	Y Average		1.801	ΔH≅ Αϖεραγε

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

Scott- Gross Company
Winchester, KY

EPA Protocol
Gas Mixture

Customer:	American Welding & Gas	Reference#:	030617SY-S
CGA:	590	Certification Date:	03/13/2017
Customer PO#:	183261	Expiration Date:	03/13/2025
Cylinder #:	EB0082218	Pressure, psig:	2000
Scott Gross P/N:	EPA3RATAO-2		

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Analyzed Cylinder-

Components	Certified Concentration	Expanded Uncertainty	Assay Dates
Oxygen	10.02%	0.5%	3/13/17
Carbon Dioxide	9.99%	0.6%	3/13/17
Nitrogen	Balance	-	-

Reference Standard-

Type/SRM Sample	Cylinder #	Concentration
Oxygen/ GMIS	EB0040572	9.96%
Carbon Dioxide/ GMIS	EB0046334	10.97%
Oxygen/ SRM	CAL015787	20.72%
Carbon Dioxide/ SRM	CAL016053	15.63%

Instrument-

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
Micro GC/ MTI M200	170612	3/13/2017	Thermal Conductivity

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. No correction required for interfering gases. Assayed at Global Calibration Gases LLC, Sarasota, Florida.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025:2005. Do not use this standard when cylinder pressure is below 150 psig.

Produced by:
Global Calibration Gases LLC.
1090 Commerce Blvd N.
Sarasota, Florida 34243 USA
PGVP Vendor ID.: N22017

Principal Analyst:
Date: 03/13/2017

Principal Reviewer:
Date: 03/13/2017

Scott- Gross Company
Winchester, KY

EPA Protocol

Gas Mixture

Customer:	Scott- Gross Company	Reference#:	101315SY-E
CGA:	590	Certification Date:	10/20/2015
Customer PO#:	113397	Expiration Date:	10/20/2023
Cylinder #:	CC458736	Pressure, psig:	2000
Scott Gross P/N:	EPA3RATAO-3		

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Analyzed Cylinder-

Components	Certified Concentration	Expanded Uncertainty	Assay Dates
Oxygen	20.02%	0.4%	10/20/15
Carbon Dioxide	19.99%	0.4%	10/20/15
Nitrogen	Balance	-	-

Reference Standard-

Type/SRM Sample	Cylinder #	Concentration
Oxygen/ GMIS	EB0054583	20.90%
Carbon Dioxide/ GMIS	EB0046314	17.92%
Oxygen/ SRM	CAL015787	20.72%
Carbon Dioxide/ SRM	CAL016053	15.63%

Instrument-

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
Micro GC/ MTI M200	170612	10/20/2015	Thermal Conductivity

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. *Analytical methodology does not require correction for analytical interference. Assayed at Global Calibration Gases LLC, Sarasota, Florida.

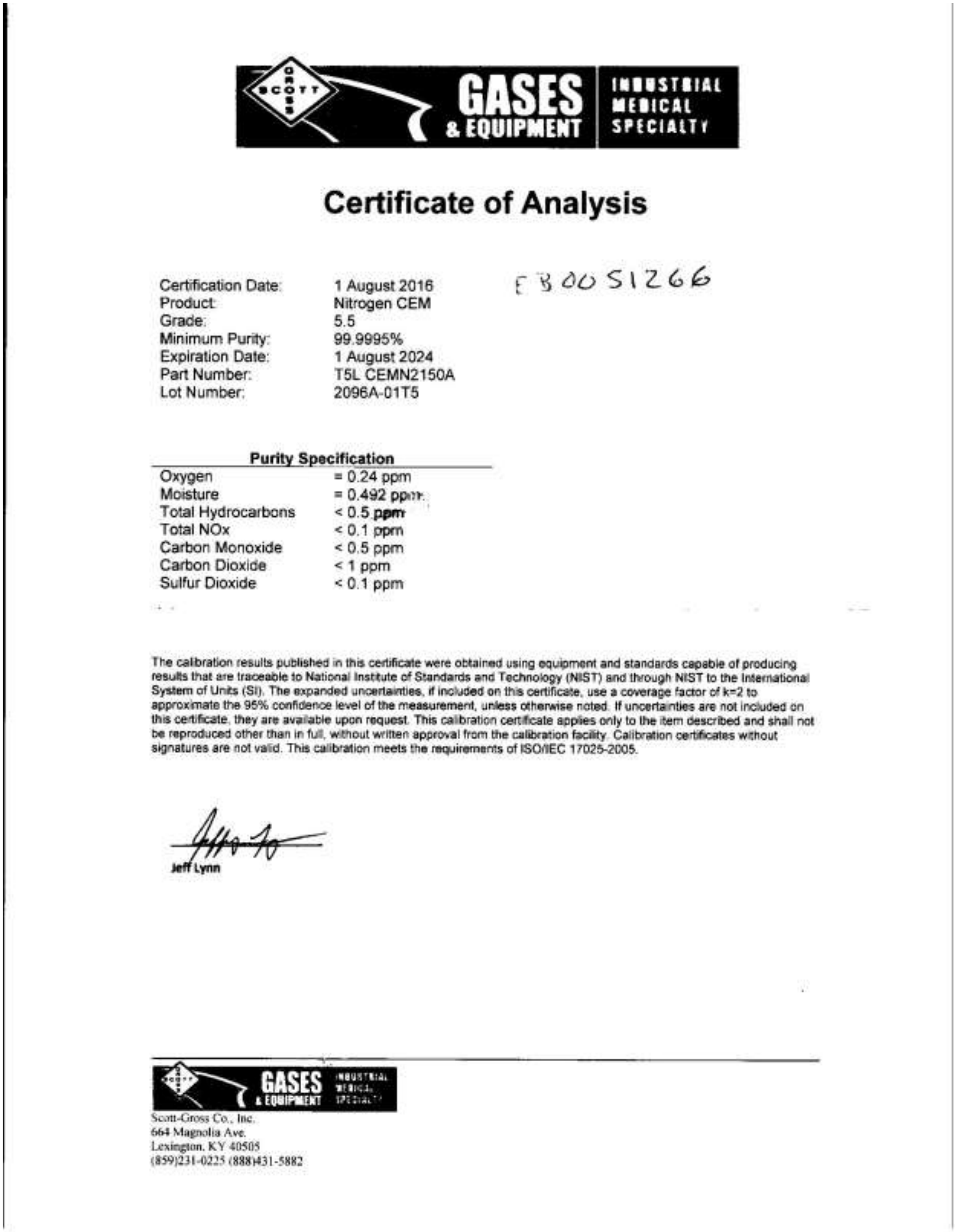
The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025-2005.

*Do not use this standard when cylinder pressure is below 150 psig.

Produced by:
Global Calibration Gases LLC.
1090 Commerce Blvd N.
Sarasota, Florida 34243 USA
PGVP Vendor ID.: N22015

Principal Analyst: Keith Williams
Date: 10/20/2015

Principal Reviewer: Nancy Homey
Date: 10/20/2015



SCOTT GROSS GASES & EQUIPMENT
INDUSTRIAL MEDICAL SPECIALTY

Certificate of Analysis

EB0051266

Certification Date:	1 August 2016
Product:	Nitrogen CEM
Grade:	5.5
Minimum Purity:	99.9995%
Expiration Date:	1 August 2024
Part Number:	T5L CEMN2150A
Lot Number:	2096A-01T5

Purity Specification

Oxygen	= 0.24 ppm
Moisture	= 0.492 ppm
Total Hydrocarbons	< 0.5 ppm
Total NOx	< 0.1 ppm
Carbon Monoxide	< 0.5 ppm
Carbon Dioxide	< 1 ppm
Sulfur Dioxide	< 0.1 ppm

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025-2005.

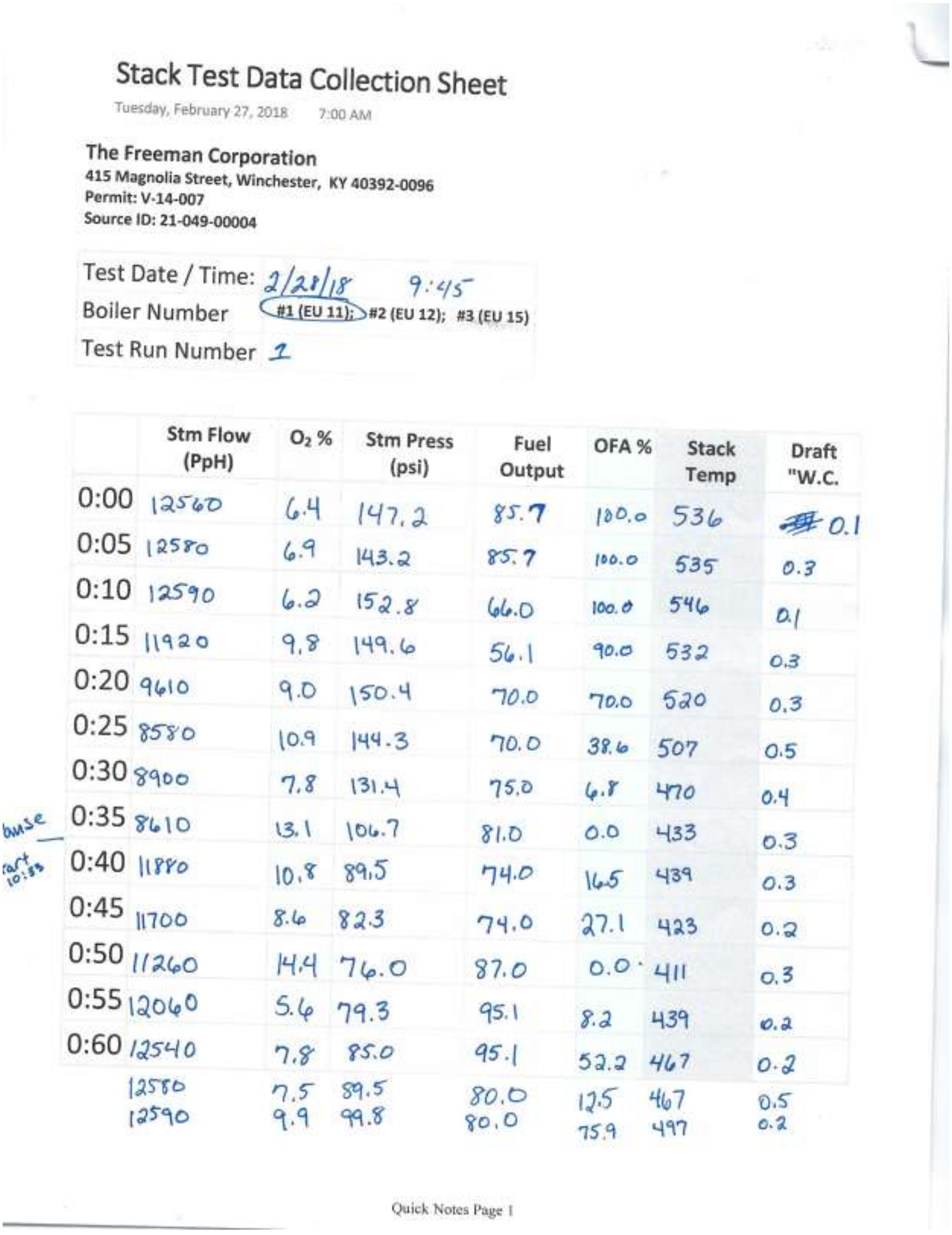
Jeff Lynn

GASES & EQUIPMENT INDUSTRIAL MEDICAL SPECIALTY

Scott-Gross Co., Inc.
664 Magnolia Ave.
Lexington, KY 40505
(859)231-0225 (888)431-5882

APPENDIX E

PROCESS DATA



Stack Test Data Collection Sheet

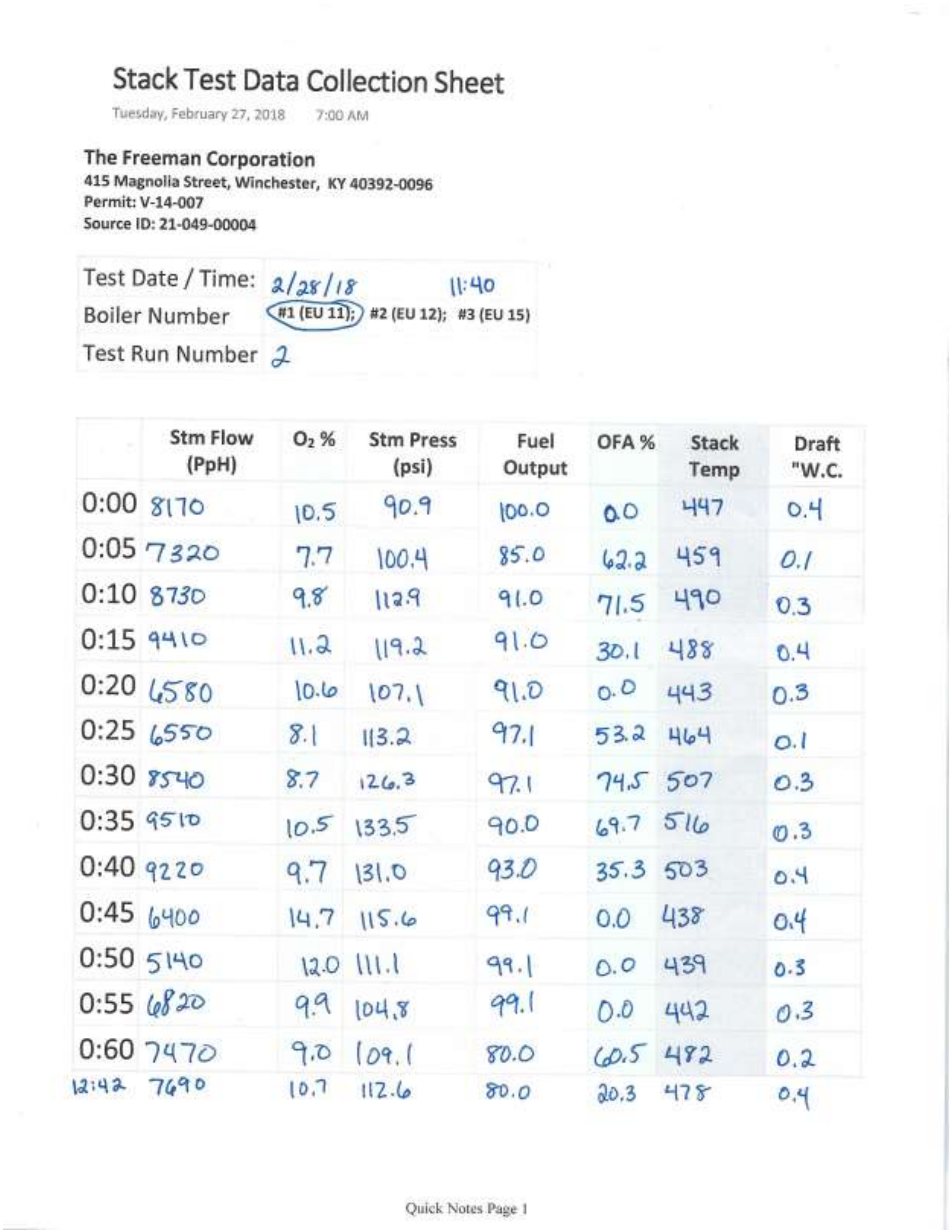
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time: 2/28/18 9:45
Boiler Number [✓ #1 (EU 11)]; #2 (EU 12); #3 (EU 15)
Test Run Number 1

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	12560	6.4	147.2	85.7	100.0	536	0.1
0:05	12580	6.9	143.2	85.7	100.0	535	0.3
0:10	12590	6.2	152.8	66.0	100.0	546	0.1
0:15	11920	9.8	149.6	56.1	90.0	532	0.3
0:20	9610	9.0	150.4	70.0	70.0	520	0.3
0:25	8580	10.9	144.3	70.0	38.6	507	0.5
0:30	8900	7.8	131.4	75.0	6.8	470	0.4
ause 0:35	8610	13.1	106.7	81.0	0.0	433	0.3
tart 10:33 0:40	11880	10.8	89.5	74.0	16.5	439	0.3
0:45	11700	8.6	82.3	74.0	27.1	423	0.2
0:50	11260	14.4	76.0	87.0	0.0	411	0.3
0:55	12060	5.6	79.3	95.1	8.2	439	0.2
0:60	12540	7.8	85.0	95.1	52.2	467	0.2
	12580	7.5	89.5	80.0	12.5	467	0.5
	12590	9.9	99.8	80.0	75.9	497	0.2

Quick Notes Page 1



Stack Test Data Collection Sheet

Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2/28/18 11:40
Boiler Number	[✓ #1 (EU 11);] #2 (EU 12); #3 (EU 15)
Test Run Number	2

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	8170	10.5	90.9	100.0	0.0	447	0.4
0:05	7320	7.7	100.4	85.0	62.2	459	0.1
0:10	8730	9.8	112.9	91.0	71.5	490	0.3
0:15	9410	11.2	119.2	91.0	30.1	488	0.4
0:20	6580	10.6	107.1	91.0	0.0	443	0.3
0:25	6550	8.1	113.2	97.1	53.2	464	0.1
0:30	8540	8.7	126.3	97.1	74.5	507	0.3
0:35	9510	10.5	133.5	90.0	69.7	516	0.3
0:40	9220	9.7	131.0	93.0	35.3	503	0.4
0:45	6400	14.7	115.6	99.1	0.0	438	0.4
0:50	5140	12.0	111.1	99.1	0.0	439	0.3
0:55	6820	9.9	104.8	99.1	0.0	442	0.3
0:60	7470	9.0	109.1	80.0	60.5	482	0.2
12:42	7690	10.7	112.6	80.0	20.3	478	0.4

Quick Notes Page 1

Stack Test Data Collection Sheet

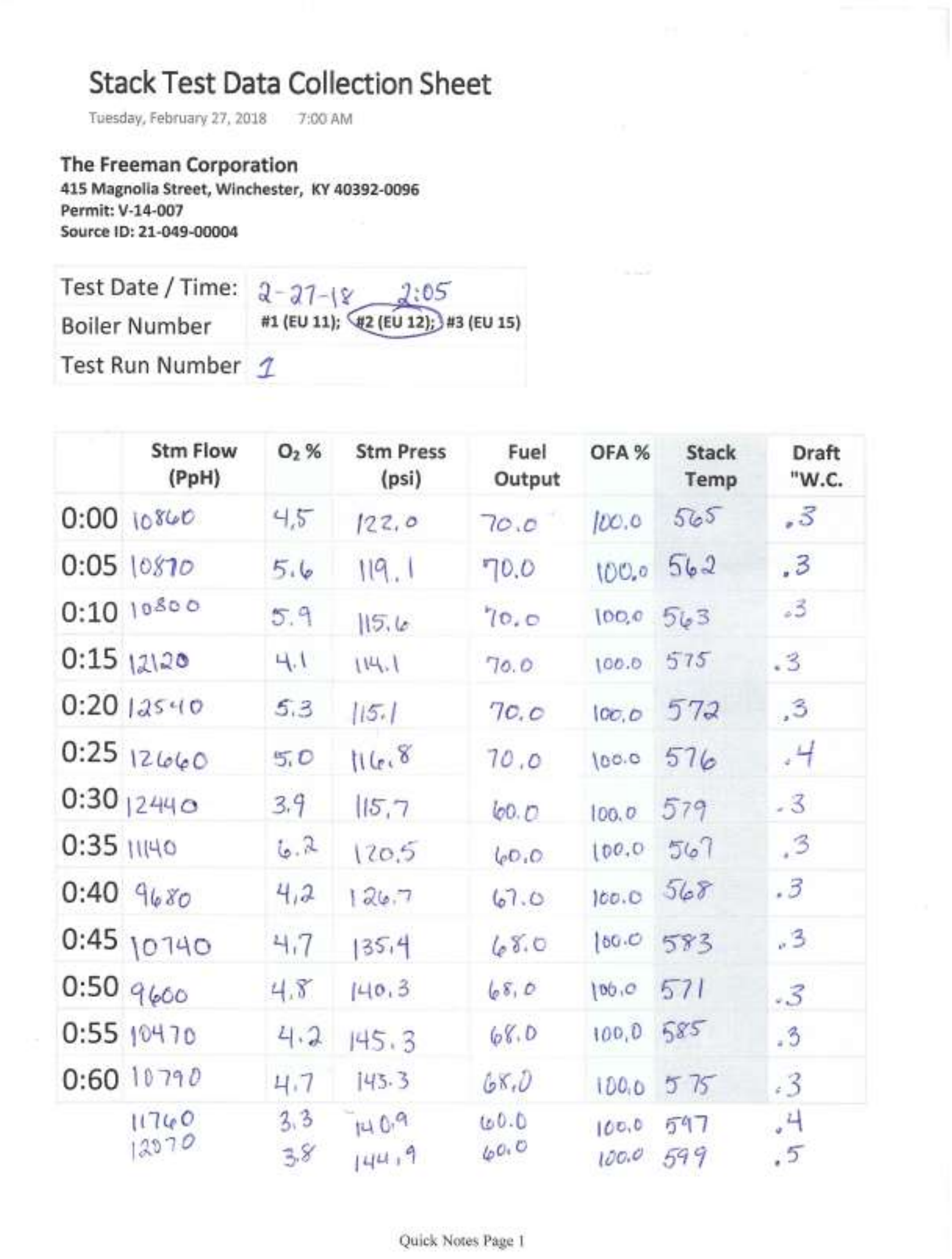
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-28-18 13:10
Boiler Number	[✓ #1 (EU 11)]; ~~#2 (EU 12); #3 (EU 15)~~
Test Run Number	3

	Stm Flow (PpH)	O_2 %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	11480	9.6	142.6	85.0	52.6	521	0.5
0:05	12160	9.1	143.8	90.2	46.9	516	0.4
0:10	12140	8.4	141.8	85.0	69.9	527	0.3
0:15	11090	7.1	140.2	90.0	64.6	519	0.2
0:20	12060	9.0	147.5	86.0	56.4	525	0.4
0:25	11930	9.7	147.7	86.0	80.2	532	0.3
0:30	12500	9.2	151.6	85.0	95.0	541	0.1
0:35	12350	8.0	148.0	85.0	94.2	537	0.2
0:40	12430	9.6	146.5	85.0	71.4	533	0.4
0:45	12150	9.0	149.3	85.0	100.0	539	0.1
0:50	12060	8.0	151.9	85.0	90.1	539	0.2
0:55	11030	7.6	151.3	85.0	70.7	534	0.3
0:60	10770	8.2	158.4	85.0	100.0	541	0.1
14:13	11360	7.9	162.8	85.0	100.0	545	0.1

Quick Notes Page 1



Stack Test Data Collection Sheet

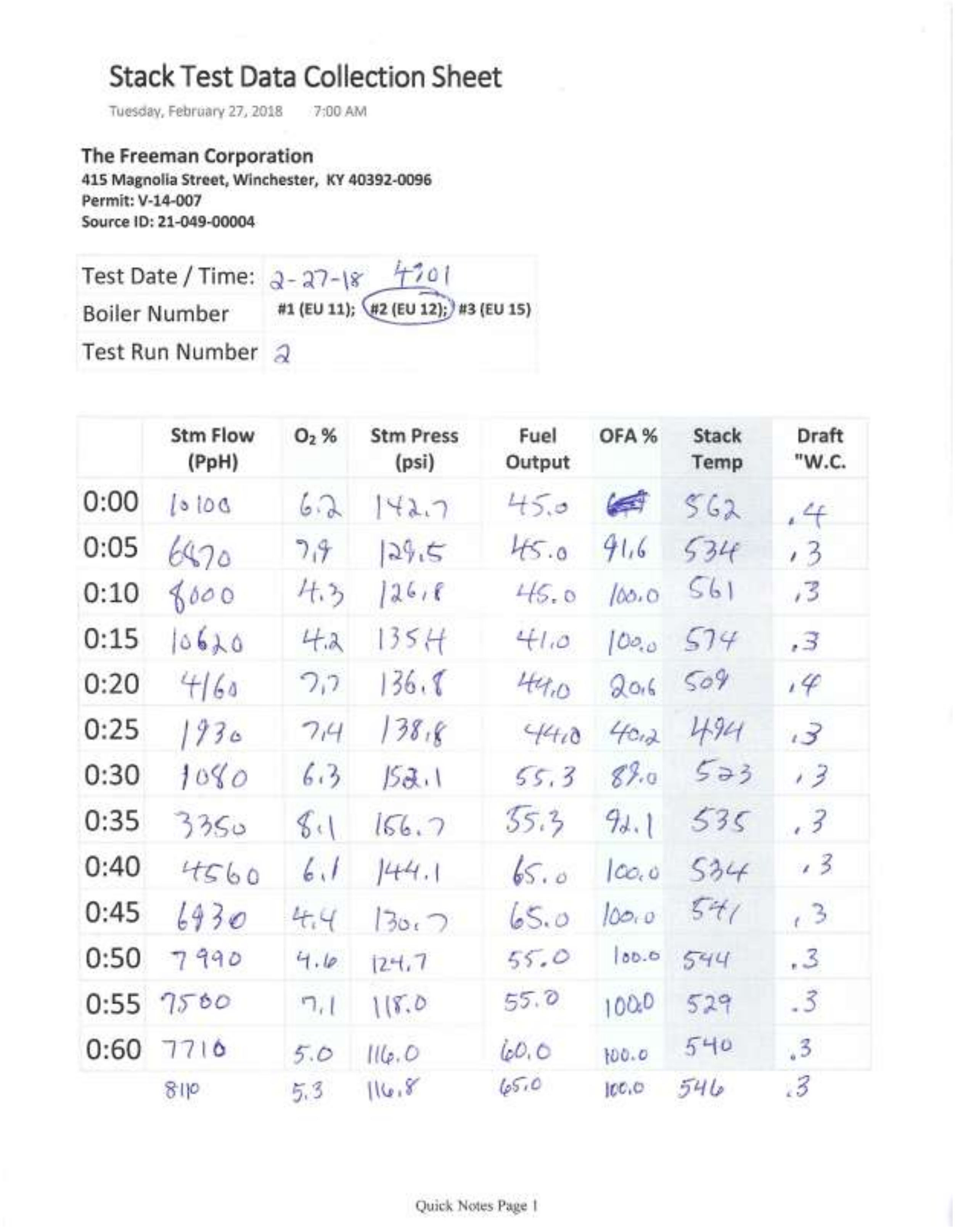
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 2:05
Boiler Number	#1 (EU 11); [✓ #2 (EU 12);] #3 (EU 15)
Test Run Number	1

	Stm Flow (PpH)	O_2 %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	10860	4.5	122.0	70.0	100.0	565	.3
0:05	10870	5.6	119.1	70.0	100.0	562	.3
0:10	10800	5.9	115.6	70.0	100.0	563	.3
0:15	12120	4.1	114.1	70.0	100.0	575	.3
0:20	12540	5.3	115.1	70.0	100.0	572	.3
0:25	12660	5.0	116.8	70.0	100.0	576	.4
0:30	12440	3.9	115.7	60.0	100.0	579	.3
0:35	11140	6.2	120.5	60.0	100.0	567	.3
0:40	9680	4.2	126.7	67.0	100.0	568	.3
0:45	10740	4.7	135.4	68.0	100.0	583	.3
0:50	9600	4.8	140.3	68.0	100.0	571	.3
0:55	10470	4.2	145.3	68.0	100.0	585	.3
0:60	10790	4.7	143.3	68.0	100.0	575	.3
	11760	3.3	140.9	60.0	100.0	597	.4
	12070	3.8	144.9	60.0	100.0	599	.5

Quick Notes Page 1



Stack Test Data Collection Sheet

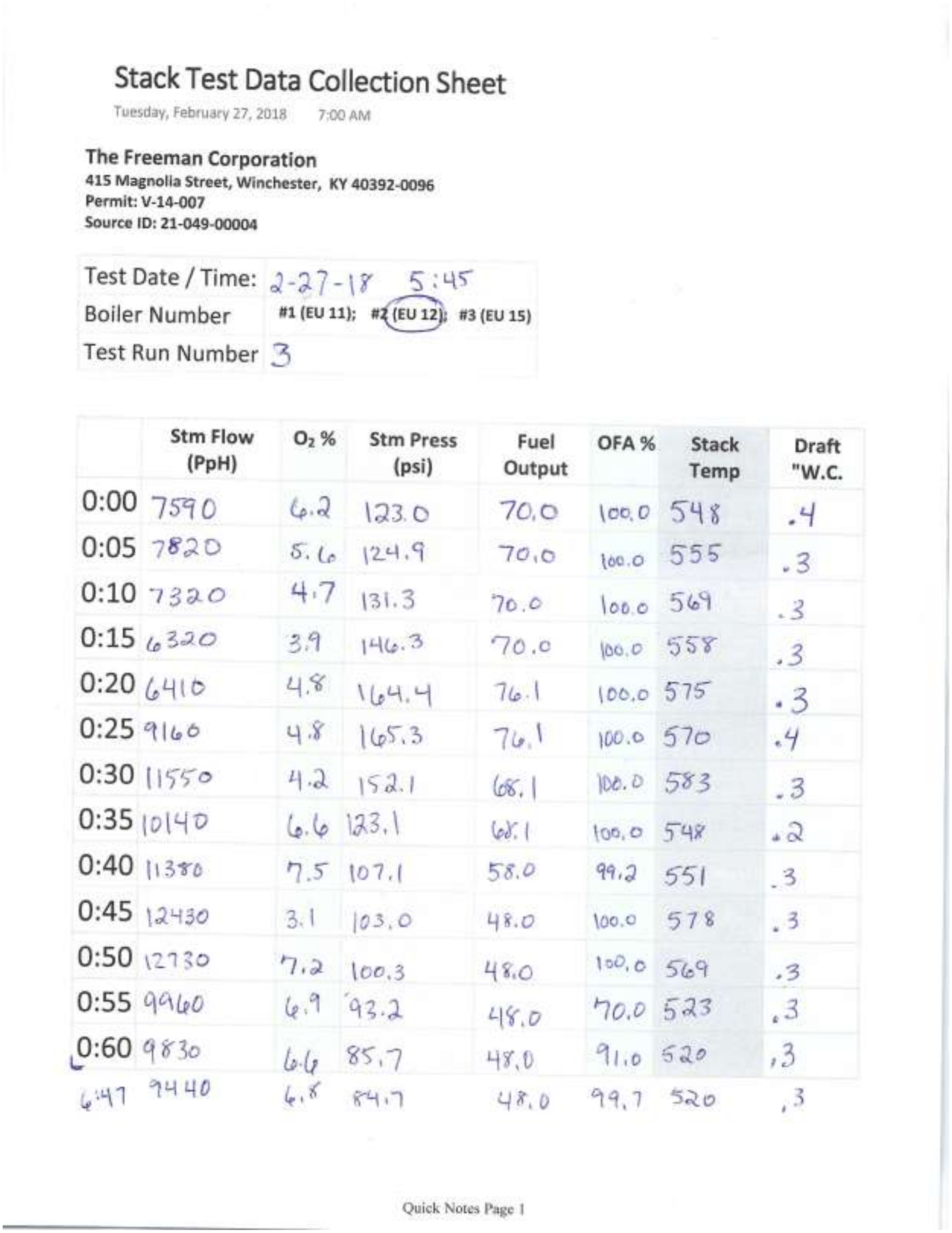
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 4901
Boiler Number	#1 (EU 11); [✓ #2 (EU 12);] #3 (EU 15)
Test Run Number	2

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	10100	6.2	142.7	45.0	[illegible]	562	.4
0:05	6870	7.9	129.5	45.0	91.6	534	.3
0:10	8000	4.3	126.8	45.0	100.0	561	.3
0:15	10620	4.2	135.4	41.0	100.0	574	.3
0:20	4160	7.7	136.8	44.0	20.6	509	.4
0:25	1930	7.4	138.8	44.0	40.2	494	.3
0:30	1080	6.3	152.1	55.3	89.0	523	.3
0:35	3350	8.1	156.7	55.3	92.1	535	.3
0:40	4560	6.1	144.1	65.0	100.0	534	.3
0:45	6930	4.4	130.7	65.0	100.0	541	.3
0:50	7990	4.6	124.7	55.0	100.0	544	.3
0:55	7500	7.1	118.0	55.0	100.0	529	.3
0:60	7710	5.0	116.0	60.0	100.0	540	.3
	8110	5.3	116.8	65.0	100.0	546	.3

Quick Notes Page 1



Stack Test Data Collection Sheet

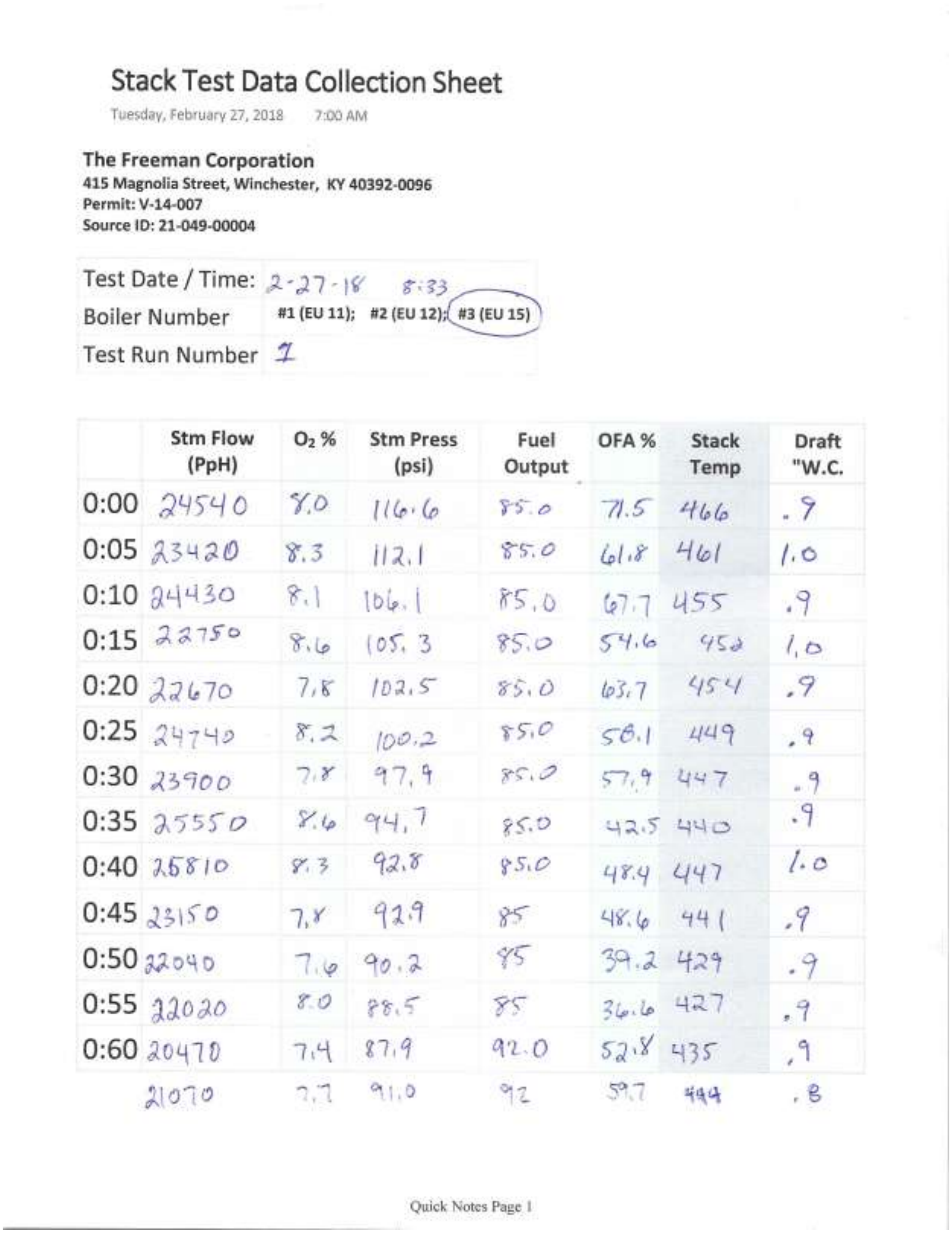
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 5:45
Boiler Number	#1 (EU 11); [✓ #2 (EU 12)]; #3 (EU 15)
Test Run Number	3

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	7590	6.2	123.0	70.0	100.0	548	.4
0:05	7820	5.6	124.9	70.0	100.0	555	.3
0:10	7320	4.7	131.3	70.0	100.0	569	.3
0:15	6320	3.9	146.3	70.0	100.0	558	.3
0:20	6410	4.8	164.4	76.1	100.0	575	.3
0:25	9160	4.8	165.3	76.1	100.0	570	.4
0:30	11550	4.2	152.1	68.1	100.0	583	.3
0:35	10140	6.6	123.1	68.1	100.0	548	.2
0:40	11380	7.5	107.1	58.0	99.2	551	.3
0:45	12430	3.1	103.0	48.0	100.0	578	.3
0:50	12730	7.2	100.3	48.0	100.0	569	.3
0:55	9960	6.9	93.2	48.0	70.0	523	.3
0:60	9830	6.6	85.7	48.0	91.0	520	.3
6:47	9440	6.8	84.7	48.0	99.7	520	.3

Quick Notes Page 1



Stack Test Data Collection Sheet

Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 8:33
Boiler Number	#1 (EU 11); #2 (EU 12); [✓ #3 (EU 15)]
Test Run Number	1

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	24540	8.0	116.6	85.0	71.5	466	.9
0:05	23420	8.3	112.1	85.0	61.8	461	1.0
0:10	24430	8.1	106.1	85.0	67.7	455	.9
0:15	22750	8.6	105.3	85.0	54.6	452	1.0
0:20	22670	7.8	102.5	85.0	63.7	454	.9
0:25	24740	8.2	100.2	85.0	58.1	449	.9
0:30	23900	7.8	97.9	85.0	57.9	447	.9
0:35	25550	8.6	94.7	85.0	42.5	440	.9
0:40	25810	8.3	92.8	85.0	48.4	447	1.0
0:45	23150	7.8	92.9	85	48.6	441	.9
0:50	22040	7.6	90.2	85	39.2	429	.9
0:55	22020	8.0	88.5	85	36.6	427	.9
0:60	20470	7.4	87.9	92.0	52.8	435	.9
	21070	7.7	91.0	92	59.7	444	.8

Quick Notes Page 1

Stack Test Data Collection Sheet

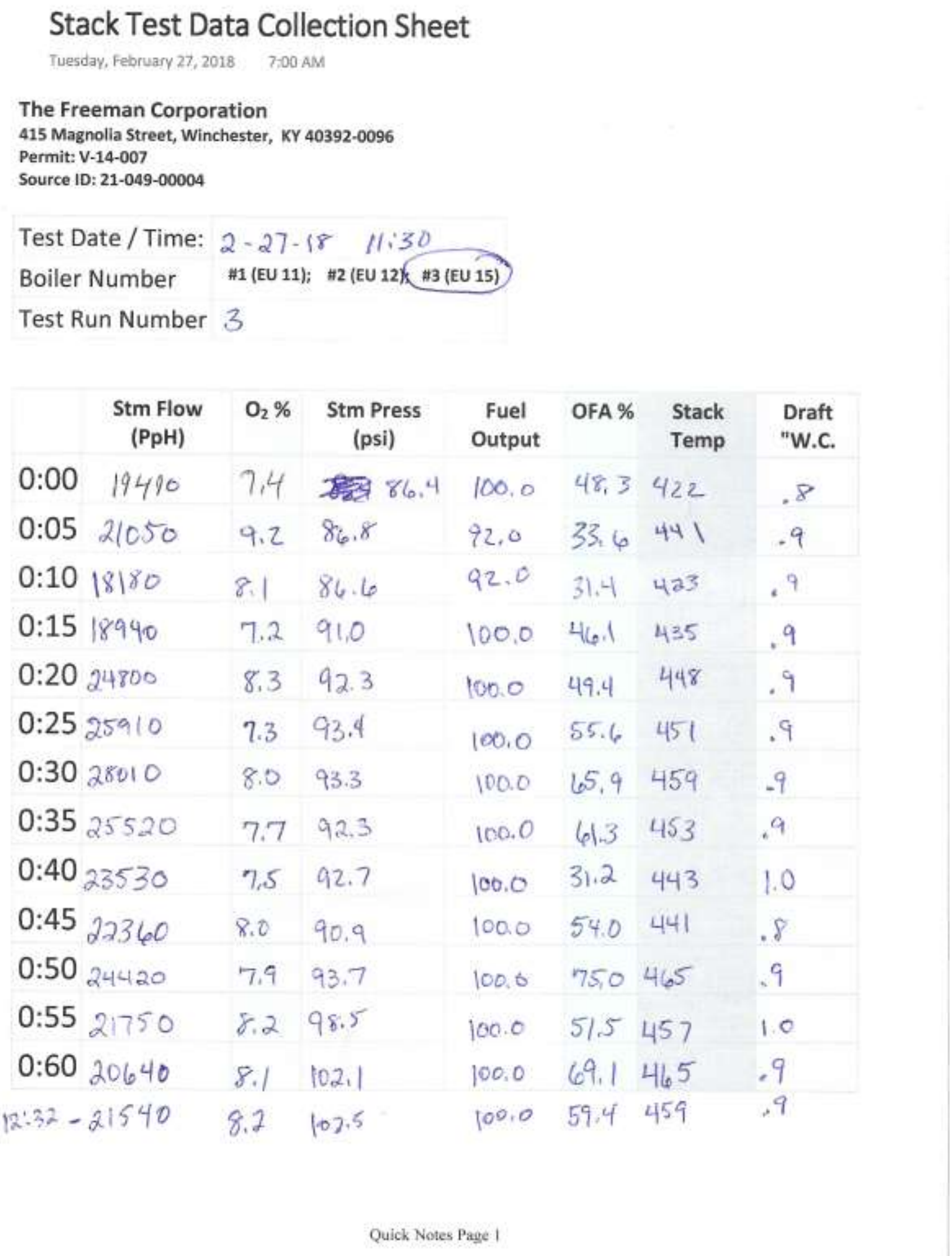
Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 10:05
Boiler Number	#1 (EU 11); #2 (EU 12); [✓ #3 (EU 15)]
Test Run Number	2

	Stm Flow (PpH)	O_2 %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	25860	8.5	93.6	92.0	45.5	444	1.0
0:05	25865	8.4	92.2	89.6	49.0	444	.9
0:10	22990	8.0	90.5	89.0	43.7	436	.9
0:15	23880	8.5	86.3	87.0	19.8	421	.9
0:20	18280	5.4	87.3	89.0	50.8	422	.9
0:25	24650	9.1	90.5	92.0	45.2	443	1.0
0:30	25210	8.6	88.2	92.0	34.4	429	.9
0:35	18010	7.2	89.4	92.0	48.8	430	.9
0:40	21140	8.3	94.5	92.0	63.7	444	.8
0:45	24770	7.6	94.2	92.0	64.4	444	.9
0:50	22050	7.7	90.6	92.0	37.7	424	.9
0:55	23270	8.8	89.6	92.0	47.2	436	.9
0:60	23780	8.0	85.9	92.0	37.0	425	.9
	23840	8.3	83.9	92	30.2	426	.9

Quick Notes Page 1



Stack Test Data Collection Sheet

Tuesday, February 27, 2018 7:00 AM

The Freeman Corporation
415 Magnolia Street, Winchester, KY 40392-0096
Permit: V-14-007
Source ID: 21-049-00004

Test Date / Time:	2-27-18 11:30
Boiler Number	**#1 (EU 11); #2 (EU 12);** [✓ **#3 (EU 15)**]
Test Run Number	3

	Stm Flow (PpH)	O₂ %	Stm Press (psi)	Fuel Output	OFA %	Stack Temp	Draft "W.C.
0:00	19410	7.4	86.4	100.0	48.3	422	.8
0:05	21050	9.2	86.8	92.0	33.6	441	.9
0:10	18180	8.1	86.6	92.0	31.4	423	.9
0:15	18940	7.2	91.0	100.0	46.1	435	.9
0:20	24800	8.3	92.3	100.0	49.4	448	.9
0:25	25910	7.3	93.4	100.0	55.6	451	.9
0:30	28010	8.0	93.3	100.0	65.9	459	.9
0:35	25520	7.7	92.3	100.0	61.3	453	.9
0:40	23530	7.5	92.7	100.0	31.2	443	1.0
0:45	22360	8.0	90.9	100.0	54.0	441	.8
0:50	24420	7.9	93.7	100.0	75.0	465	.9
0:55	21750	8.2	98.5	100.0	51.5	457	1.0
0:60	20640	8.1	102.1	100.0	69.1	465	.9
12:32 -	21540	8.2	102.5	100.0	59.4	459	.9

Quick Notes Page 1

CEDAR CREEK
ENGINEERING INC

Pure Science for Clean Water®

20 September 2019

Mr. Zachary Bittner,
Kentucky Division for Air Quality
300 Sower Boulevard
Frankfort, KY 40601

RE: Freeman Corporation – AI No 811
Source ID 21-049-00004
Activity APE20190001
Permit V-19-022

Dear Mr. Bittner,

This letter is offered in response to your correspondence of August 22, 2019.

1. EP 44, 45, and 46 are cyclones which receive scrap wood from chippers and other wood processing sources. These are not the multiclones which control exhaust from the wood-fired boilers.

The emission factor for EP 44, 45, and 46 was obtained from AQ-EF02 (attached) published by the Oregon DEQ. You will see that AQ-EF02 gives the emission factor for a medium efficiency cyclone as 0.5 lb per ton. This is equivalent to 0.5/2000 lb/lb, or 0.00025. From this it is determined that the efficiency of these cyclones is 1 – 0.00025, or 0.99975 (99.975%).

AP 42 Table 1.6-1 provides emission factors for PM from wood residue combustion and does not provide an emission factor for a cyclone similar to EP 44, 45, or 46.

Emission Points 11, 12, and 15 are wood-fired boilers, including their multiclones. The multiclones are integral to the boilers and therefore not listed as separate emission points.

PM emissions from these units were measured during the stack test in 2018 and are given below:

Boiler No. 1 – 0.428 lb/MMBTU

Boiler No. 2 - 0.208 lb/MMBTU

Boiler No. 3 – 0.245 lb/MMBTU

These values were measured in the field by FBT Environmental Services, LLC in February 2018. They are highlighted in bold in the attached Table 3a_rev1 to indicate they are site-specific, measured values.

2. The efficiency values shown on DEP7007N were produced by comparing the field-measured, post-control PM emission values to book values for uncontrolled emissions from wood-fired boilers.

   We made an error in our use of these book values. We used an emission factor from the WebFire Factors database for a wood-fired boiler (moisture >20%) (Factor ID 3517). The emission factors given in this database for PM was 8.80 LB/TON. The error we made was to incorporate this value into our calculations as if it had units of LB/MMBTU. A correct value, from Table 1.6-1 is 0.56 LB/MMBTU.

   This error led to exaggerated Uncontrolled Unlimited Potential values on DEP7007N, and proportionately exaggerated efficiencies. The actual emission rate, Controlled Limited Potential for PM, was not affected because this is the field-measured value.

   Note that only PMTOT was measured during field testing; the distribution of PM2.5/PM10/PMTOT is assumed to match Table 1.6-1: 0.768/0.893/1.000.

   Tables 3a and 3b have been revised to reflect use of emission factors from Table 1.6-1 for Bark/Bark and Wet Wood with No Control for PM, PM10, and PM2.5. The DEP 7007N forms for EP 11, 12, and 15 have also been corrected. Additional notes have also been added to the 7007N's.

3. Attached please find revised DEP 7007B forms for emission points where throughput rates on the DEP7007B did not match values given in the tables.

4. The installation dates shown on DEP7007B are correct to the best of our knowledge. Note that the designation of certain units as "proposed" in the current permit, V-14-007, appears to be a typo, since the 2014 application included the installation dates. Also, since the addition of these units qualifies as an insignificant or trivial activity under Section 6 of 401 KAR 52:020, they would presumably qualify for Off-Permit Changes, and, according to Section 17, be excepted from permit revision requirements.

5. Attached please find records documenting the initial compliance demonstration for energy assessment.

Thank you very much for your attention to this project. Should you have any questions or concerns, please do not hesitate to call.

Sincerely,
CEDAR CREEK ENGINEERING, INC.

Paul Rogers

Paul Rodgers, PE

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # _______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
011	Emission Unit Name: **Boiler No. 1 - Wood Fired** Date Constructed: 1991 HAPs present? ☐ Yes ☑ No Emission Point Name: **Boiler No. 1** Source ID: EP 11 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 11 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	12.0	8,760	12		8760

Division Use Only: F___ Reviewer __________ Supervisor __________

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission* Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
011											
	NOX	0.220	AP 42		0.0%	2.64	2.64		11.56	11.56	
	CO	0.600	AP 42		0.0%	7.20	7.20		31.54	31.54	
	SO2	0.025	AP 42		0.0%	0.30	0.30		1.31	1.31	
	VOC	0.017	AP 42		0.0%	0.20	0.20		0.89	0.89	
	PM2.5	0.43	AP 42	Integral Multiclone	23.6%	5.16	3.94		22.60	17.27	
	PM 10	0.50	AP 42	KyEIS Control ID #: **011**	23.6%	6.00	4.58		26.28	20.08	
	PM Tot	0.56	AP 42		23.6%	6.72	5.13		29.43	22.49	

PM2.5 0.329 Calculated Controlled Emission Factor derived from AP 42 PM2.5/PMTOT = (0.43/0.56) X 0.428
PM10 0.382 Calculated Controlled Emission Factor derived from AP 42 PM10/PMTOT = (0.50/0.56) X 0.428
PM Tot ***0.428*** Controlled Emission Factor from 2018 Stack Test

Pollutant Overall Efficiency = (Uncontrolled Unlimited Potential - Controlled Limited Potential)/Uncontrolled Unlimited Potential

* uncontrolled emission factor per AP 42 Table 1.6-1

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
012	Emission Unit Name: **Boiler No. 2 - Wood Fired** Date Constructed: 1991 HAPs present? ☐ Yes ☑ No Emission Point Name: **Boiler No. 1** Source ID: EP 12 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 12 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	10.0	8,760	10		8760

Division Use Only: F___ Reviewer __________ Supervisor __________

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission* Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
012											
	NOX	0.220	AP 42		0.0%	2.20	2.20		9.64	9.64	
	CO	0.600	AP 42		0.0%	6.00	6.00		26.28	26.28	
	SO2	0.025	AP 42		0.0%	0.25	0.25		1.10	1.10	
	VOC	0.017	AP 42		0.0%	0.17	0.17		0.74	0.74	
	PM2.5	0.43	AP 42	Integral Multiclone	62.9%	4.30	1.60		18.83	7.00	
	PM 10	0.50	AP 42	KyEIS Control ID #: **012**	62.9%	5.00	1.86		21.90	8.13	
	PM Tot	0.56	AP 42		62.9%	5.60	2.08		24.53	9.11	

PM2.5	0.160	Calculated Controlled Emission Factor derived from AP 42 PM2.5/PMTOT = (0.43/0.56) X 0.428
PM10	0.186	Calculated Controlled Emission Factor derived from AP 42 PM10/PMTOT = (0.50/0.56) X 0.428
PM Tot**	***0.208***	Controlled Emission Factor from 2018 Stack Test

Pollutant Overall Efficiency = (Uncontrolled Unlimited Potential - Controlled Limited Potential)/Uncontrolled Unlimited Potential

* uncontrolled emission factor per AP 42 Table 1.6-1

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007N

Emissions, Stacks, and Controls Information

Applicant Name: The Freeman Corporation

Log # ______

SECTION I. Emissions Unit and Emission Point Information

KyEIS ID #	Emissions Unit and Emission Point Descriptions	Maximum Operating Parameters		Permitted Operating Parameters		
		Hourly Operating Rate (SCC Units/hr)	Annual Operating Hours (hrs/yr)	Hourly Operating Rate (SCC Units/hr)	Annual Operating Rate (SCC Units/yr)	Annual Operating Hours (hrs/yr)
015	Emission Unit Name: **Boiler No. 3 - Wood Fired** Date Constructed: 1996 HAPs present? ☐ Yes ☑ No Emission Point Name: **Boiler No. 1** Source ID: EP 15 SCC Code: 10300903 SCC Units: mmBtu KyEIS Stack #: EP 15 Fuel Ash Content: Fuel Sulfur Content: Fuel Heat Content Ratio: 100% Applicable Regulations: 401 KAR 59:015	28.7	8,760	28.7		8760

Division Use Only: F___ Reviewer __________ Supervisor __________

DEP7007N
(continued)

SECTION I. Emission Units and Emission Point Information (continued)

KyEIS ID #	Emission Factors			Control Equipment		Hourly (lb/hr) Emissions			Annual (tons/yr) Emissions		
	Pollutant	Emission* Factor (lb/SCC Units)	Emission Factor Basis	Control Equipment Association	Pollutant Overall Efficiency (%)	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable	Uncontrolled Unlimited Potential	Controlled Limited Potential	Allowable
015											
	NOX	0.220	AP 42		0.0%	6.31	6.31		27.66	27.66	
	CO	0.600	AP 42		0.0%	17.22	17.22		75.42	75.42	
	SO2	0.025	AP 42		0.0%	0.72	0.72		3.14	3.14	
	VOC	0.017	AP 42		0.0%	0.49	0.49		2.14	2.14	
	PM2.5	0.43	AP 42	Integral Multiclone	56.3%	12.34	5.40		54.05	23.65	
	PM 10	0.50	AP 42	KyEIS Control ID #: **015**	56.3%	14.35	6.28		62.85	27.50	
	PM Tot	0.56	AP 42		56.3%	16.07	7.03		70.40	30.80	

PM2.5	0.188	Calculated Controlled Emission Factor derived from AP 42 PM2.5/PMTOT = (0.43/0.56) X 0.428
PM10	0.219	Calculated Controlled Emission Factor derived from AP 42 PM10/PMTOT = (0.50/0.56) X 0.428
PM Tot**	***0.245***	Controlled Emission Factor from 2018 Stack Test

Pollutant Overall Efficiency = (Uncontrolled Unlimited Potential - Controlled Limited Potential)/Uncontrolled Unlimited Potential

* uncontrolled emission factor per AP 42 Table 1.6-1

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
08	Cyclone 4	B	24 x 7 x 50	Freeman installed cyclone (size 20) [mfg unknown]	9/15/06
44	Cyclone 1	B	24 x 7 x 50	Freeman installed cyclone (size 38) [mfg unknown].	1997
45	Cyclone 2	B	24 x 7 x 50	Associated Metal Works fan and cyclone (size 42)	11/22/08 4/15/06
46	Cyclone 3	B	24 x 7 x 50	Freeman installed cyclone (size 22) [mfg unknown]	9/15/06
48	Nicholson Chipper	B	24 x 7 x 50	Nicholson drum chipper (35" x 24")	4/15/04

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units) Maximum Hourly Rated Capacity (Specify Units) (10a)	Quantity Output* (Specify Units) Maximum Annual (Specify Units) (10b)
08	Chipped wood waste from EP07	1,680 LB/HR	Chipped wood waste – boiler fuel	1,680 LB/HR	
44	Chipped wood waste from EP 21, EP 34	~~3501~~ 3,652 LB/HR updated 8/30/19	Chipped wood waste – boiler fuel	~~3,501~~ LB/HR 3,652	
45	Sawdust and wood chips from EP 14b, EP 18, EP 19, EP 20	1,745 LB/HR	Chipped wood waste – boiler fuel	1,745 LB/HR	
46	Chipped wood waste from EP47	3,248 LB/HR	Chipped wood waste – boiler fuel	3,247 LB/HR	
48	Log ends and sawdust from EP 19, EP 30	3,328 LB/HR	Chipped wood waste – boiler fuel	3,324 LB/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

08: Discharge of PM from Cyclone 4 at rate of 0.5 lbs PM per ton of throughput – 1,680 lbs/hr throughput yields 0.420 lbs PM/hr or 1.76 tons/yr

44: Discharge of PM from Cyclone 1 at rate of 0.5 lbs PM per ton of throughput – 3,501 lbs/hr throughput yields 0.875 lbs PM/hr or 3.68 tons/yr

45: Discharge of PM from Cyclone 2 at rate of 0.5 lbs PM per ton of throughput – 1,745 lbs/hr throughput yields 0.436 lbs PM/hr or 1.83 tons/yr

46: Discharge of PM from Cyclone 3 at rate of 0.5 lbs PM per ton of throughput – 3,248 lbs/hr throughput yields 0.812 lbs PM/hr or 3.41 tons/yr

48: Uncontrolled chipping process yields 2.0 lbs PM per ton of throughput - 3,328 LB/HR throughput yields 3.328 LB PM/HR or 13.98 tons/yr

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
14 A	Log debarking	B	24 x 7 x 50	TS Mfg butt end reducer & Nicholson debarker	2/26/06
14 B	Log flitching	B	24 x 7 x 50	Cremona SAT Model 5200 with Bandsaw head attachment, conveyors and banders	7/31/90
62	Log debarking	B	24 x 7 x 50	NEW TS Mfg butt end reducer and bark bin	Future

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
14 A	Logs	4,000 DF/HR	Debarked logs (Sliced and Rotary combined)	3,520 DF/HR	
14 B	Debarked logs (Sliced only)	1,428 DF/HR	Flitches (log ¼'s, 1/3's, ½'s)	~~1,400~~ DF/HR 1399 Updated 8/30/19	
62	Logs	4,000 DF/HR	Debarked logs	3,520 DF/HR	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

14A, 62: Bark generated at an average of 1.86 LB/DF or 14,880 LB/HR combined and conveyed to truck for sale to mulch producer. Insignificant source of PM.

14B: Sawdust generated at an average of 0.116 LB/DF or 166 LB/HR to Cyclone 2 (EP 45).

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
32	Peeling Blocks	B	24 x 7 x 50	Coe M249 66" Lathe	11/31/91
33	Rotary Clipping	B	24 x 7 x 50	Raute Rotary Clipper & Vacuum Stacker	8/27/07
34	Rotary Chipper	B	24 x 7 x 50	Black Clawson Chipper and Conveyor system (chips transferred to Cyclone 1 (EP 44))	2/28/95 relocated 8/27/07

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
32	Debarked Blocks	4,000 DF/HR	Rotary Veneer	3,440 DF/HR	See Table 4a
33	Rotary Veneer	3,440 DF/HR	Clipped Rotary Veneer	2,958 DF/HR	
34	Rotary veneer waste from EP32 and EP33 and EP55-60	~~2,358~~ 2,509 LB/HR updated 8/30/2019	Boiler Fuel	~~2,358~~ LB/HR 2,509	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Rotary cores from EP32 are generated at an average of 0.392 LB/DF or 1,568 LB/HR and transferred to Fulghum Chipper (EP 47) for chipping into boiler fuel.

Rotary peeling and clipping (EP32 and EP33 combined) woodwaste is generated at an average of 0.538 LB/DF or 1,851 LB/HR and transferred to the Rotary Chipper (EP 34) for chipping into boiler fuel.

Chipped woodwaste from Rotary Chipper (EP34) is transferred to Cyclone 1 (EP 44)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
47	Chipper	B	24 x 7 x 50	Fulghum chipper	9/15/06

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
47	Slicer backerboards from EP22 and EP25b; rotary cores from EP32	~~2,240~~ LB/HR 3,248 updated 8/30/19	Chipped wood waste - boiler fuel	~~2,240~~ LB/HR 3,248	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

100% of input backerboard wood waste chipped and transferred to Cyclone 3

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Table 2_rev1

Summary of Maximum Potential Emissions

The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

Source	Pollutant	Uncontrolled Emissions		Controlled Emissions	
		LB/HR	TON/YR	LB/HR	TON/YR
Combustion	NOX	11.2	48.9	11.2	48.9
Combustion	CO	30.4	133.2	30.4	133.2
Combustion	SO2	1.3	5.6	1.3	5.6
Combustion	VOC	0.9	3.8	0.9	3.8
Combustion	PM-2.5	21.8	95.5	10.9	47.9
Combustion	PM-10	25.4	111.1	12.7	55.7
Combustion	PM Total	28.4	124.4	14.2	62.4
Wood Process Operations	NOX	0.0	0.0	0.0	0.0
Wood Process Operations	CO	0.0	0.0	0.0	0.0
Wood Process Operations	SO2	0.0	0.0	0.0	0.0
Wood Process Operations	VOC	0.00015	0.00066	0.00015	0.00066
Wood Process Operations	Ammonia	0.051	0.223	0.051	0.223
Wood Process Operations	PM-2.5	7.7	32.3	7.7	32.3
Wood Process Operations	PM-10	8.9	37.5	8.9	37.5
Wood Process Operations	PM Total	10.0	42.0	10.0	42.0
Total Plant Sources	NOX	11.2	48.9	11.2	48.9
Total Plant Sources	CO	30.4	133.2	30.4	133.2
Total Plant Sources	SO2	1.3	5.6	1.3	5.6
Total Plant Sources	VOC	0.9	3.8	0.9	3.8
Total Plant Sources	Ammonia	0.1	0.2	0.1	0.2
Total Plant Sources	PM-2.5	29.5	127.8	18.6	80.2
Total Plant Sources	PM-10	34.3	148.6	21.7	93.2
Total Plant Sources	PM Total	38.4	166.4	24.3	104.4

Table 3a_rev1
Emission Factors and Control Efficiencies for Combustion Units

The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Install Date	Status	Operating Basis (HR/YR)	Fuel	Control	Maximum Input (MMBTU/HR)[4]	Uncontrolled Emission Factors (LB/MMBTU)[1]							Post-Control Emission Factors (LB/MMBTU)						
								NOX	CO	PM2.5[3]	PM 10[3]	PM	SO2	VOC	NOX	CO	PM2.5[3]	PM 10[3]	PM[2]	SO2	VOC
11	Boiler # 1	Feb-91	Active	8760	WOOD	11 MULTICLONE	12.0	*0.220*	*0.600*	*0.430*	*0.500*	*0.560*	*0.025*	*0.017*	*0.220*	*0.600*	*0.329*	*0.382*	***0.428***	*0.025*	0.017
12	Boiler # 2	May-91	Active	8760	WOOD	11 MULTICLONE	10.0	*0.220*	*0.600*	*0.430*	*0.500*	*0.560*	*0.025*	*0.017*	*0.220*	*0.600*	*0.160*	*0.186*	***0.208***	*0.025*	0.017
15	Boiler # 3	Aug-96	Active	8760	WOOD	11 MULTICLONE	28.7	*0.220*	*0.600*	*0.430*	*0.500*	*0.560*	*0.025*	*0.017*	*0.220*	*0.600*	*0.188*	*0.219*	***0.245***	*0.025*	0.017

1 AP-42 Fifth Edition Section 1.6 "Wood Residue Combustion in Boilers," September 2003

2 Emission factors from FBT Particulate Emissions Evaluation Report (March 24, 2018)

3 Assumes PM2.5/PM10/PMTOT = 0.768/0.893/1 per AP-42 per AP 42 Table 1.6-1

4 nominal boiler ratings

blue italics = book values
bold blue italics *= field measured values*
0.430 = black italics = calculated values

Table 3b_rev1
Maximum Potential Emissions for Combustion Units - 8760 Hours Per Year

The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Fuel	Maximum Potential UNCONTROLLED Emissions (TON/YR)							Maximum Potential CONTROLLED Emissions (TON/YR)						
				NOX	CO	PM2.5	PM 10	PM TOT	SO2	VOC	NOX	CO	PM2.5	PM 10	PM TOT	SO2	VOC
11	Boiler # 1	Active	WOOD	11.56	31.54	22.61	26.28	29.43	1.31	0.89	11.56	31.54	17.28	20.09	22.50	1.31	0.89
12	Boiler # 2	Active	WOOD	9.64	26.28	18.84	21.90	24.53	1.10	0.74	9.64	26.28	7.00	8.14	9.11	1.10	0.74
15	Boiler # 3	Active	WOOD	27.66	75.42	54.06	62.86	70.40	3.14	2.14	27.66	75.42	23.65	27.50	30.80	3.14	2.14
TOTALS				48.9	133.2	95.5	111.1	124.4	5.6	3.8	48.9	133.2	47.9	55.7	62.4	5.6	3.8

EP No.	Name	Status	Fuel	Maximum Potential UNCONTROLLED Emissions (LB/HR)							Maximum Potential CONTROLLED Emissions (LB/HR)						
				NOX	CO	PM2.5	PM 10	PM TOT	SO2	VOC	NOX	CO	PM2.5	PM 10	PM TOT	SO2	VOC
11	Boiler # 1	Active	WOOD	2.64	7.20	5.16	6.00	6.72	0.30	0.20	2.64	7.20	3.94	4.59	5.14	0.30	0.20
12	Boiler # 2	Active	WOOD	2.20	6.00	4.30	5.00	5.60	0.25	0.17	2.20	6.00	1.60	1.86	2.08	0.25	0.17
15	Boiler # 3	Active	WOOD	6.31	17.22	12.34	14.35	16.07	0.72	0.49	6.31	17.22	5.40	6.28	7.03	0.72	0.49
TOTALS				11.2	30.4	21.8	25.4	28.4	1.3	0.9	11.2	30.4	10.9	12.7	14.2	1.3	0.9

9/3/2019

Table 5_rev1
Maximum Potential Emissions - Log Debarking and Haul Roads
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 19	Flitch Cut-off Saw	SKINNED LOGS	FLITCHES	BULK WOOD WASTE	2,400	DF/HR	0.96	DF/DF	2,304	DF/HR	0.240	LB/DF	576	LB/HR	Product to EP20
EP 30	Rotary Cut-off Saw	RAW MATERIAL - LOGS	CUT BLOCKS	BULK WOOD WASTE	4,000	DF/HR	0.77	DF/DF	3,080	DF/HR	1.166	LB/DF	4,664	LB/HR	Product to EP31; Waste to EP48
EP 48	Nicholson Chipper	BULK WOOD WASTE	BOILER FUEL	PM	5,240	LB/HR	0.999	LB/HR	5,235	LB/HR	0.001	LB/HR	5.240	LB/HR	
													22.01	TON/YR	

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 10	Haul Roads & Log Yard	MILES DRIVEN	NA	PM	2,000	MI/YR	NA	NA	NA	NA	2.257	LB/MI	0.54	LB/HR	
													2.26	TON/YR	

(1) wood processing emission factors from in-house measurements

(2) chipper emission factor from 2009 permit application

EP No.	Name	Input	Product	Waste	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[1]	Units	Note
EP 42	Wood waste loading to boi	WOOD WASTE	BOILER FUEL	PM	4.2	TON/HR	NA	NA	NA	NA	0.389	LB/TON	1.65	LB/HR	
													6.9	TON/YR	

(1) wood processing emission factors from in-house measurements

(2) chipper emission factor from 2009 permit application

FINAL REPORT

PARTICULATE EMISSIONS EVALUATIONS
BOILERS 1, 2, & 3

EXECUTIVE SUMMARY

FBT Environmental Services LLC (FBT) was retained by Moore Ventures LLC, to perform particulate matter (PM) emissions evaluations on three wood-fired boilers controlled by multiclones at The Freeman Corporation in Winchester, Kentucky. The purpose of the tests was to demonstrate compliance with emissions limits imposed by the facility's Air Quality Permit V14-007 issued by the Kentucky Division for Air Quality.

Particulate matter emissions test results are presented in Table 1. These results show that the three boilers met their respective particulate matter emissions limits.

Table 1 Emissions Summary

	Avg. Steam Flow lbs/hr	Avg. PM Emissions lbs/million Btu	PM Emissions Limits lbs/million Btu
Boiler 1 (EU-11)	10,278	0.4279	0.428
Boiler 2 (EU-12)	9,007	0.208	0.359
Boiler 3 (EU-15)	23,007	0.245	0.397

Table 1.6-1. EMISSION FACTORS FOR PM FROM WOOD RESIDUE COMBUSTION[a]

Fuel	PM Control Device	Filterable PM		Filterable PM-10[b]		Filterable PM-2.5[b]	
		Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING
Bark/Bark and Wet Wood	No Control[c]	0.56[d]	C	0.50[e]	D	0.43[e]	D
Dry Wood	No Control[c]	0.40[f]	A	0.36[e]	D	0.31[e]	D
Wet Wood	No Control[c]	0.33[g]	A	0.29[e]	D	0.25[e]	D
Bark	Mechanical Collector *	0.54[h]	D	0.49[e]	D	0.29[e]	D
Bark and Wet Wood	Mechanical Collector*	0.35[i]	C	0.32[e]	D	0.19[e]	D
Dry Wood	Mechanical Collector*	0.30[j]	A	0.27[e]	D	0.16[e]	D
Wet Wood	Mechanical Collector*	0.22[k]	A	0.20[e]	D	0.12[e]	D
All Fuels[m]	Electrolyzed Gravel Bed	0.1[m]	D	0.074[e]	D	0.065[e]	D
All Fuels[m]	Wet Scrubber	0.066[n]	A	0.065[e]	D	0.065[e]	D
All Fuels[m]	Fabric Filter	0.1[o]	C	0.074[e]	D	0.065[e]	
All Fuels[m]	Electrostatic Precipitator	0.054[p]	B	0.04[e]	D	0.035[e]	
		Condensible PM					
All Fuels[m]	All Controls/No Controls	0.017[q]	A				

Table 1.6-1. (cont.)

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. CPM = Condensible Particulate Matter. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] PM-10 = particulate matter less than or equal to 10 microns in aerodynamic diameter. PM-2.5 = particulate matter less than or equal to 2.5 microns in aerodynamic diameter. Filterable PM = PM captured and measured on the filter in an EPA Method 5 (or equivalent) sampling train. Condensible PM = PM captured and measured in an EPA Method 202 (or equivalent) sampling train.

[c] Factor represents boilers with no controls, Breslove separators, Breslove separators with reinjection, and mechanical collectors with reinjection. [*]

[*] Mechanical collectors include cyclones and multiclones. (Asterisk added 4/2012 to denote separate notation in the table.)

[d] References 19-21, 88.

[e] Cumulative mass % provided in Table 1.6-6 for Bark and Wet Wood-fired boilers multiplied by the Filterable PM factor.

[f] References 22-32, 88.

[g] References 26, 33-36, 88.

[h] References 37, 38, 88.

[i] References 26, 39-41, 88.

[j] References 26, 27, 34, 42-54, 88.

[k] Reference 55-57, 88.

[l] All fuels = Bark, Bark and Wet Wood, Dry Wood, and Wet Wood.

[m] References 27, 58, 88.

[n] References 26, 59-66, 88.

[o] References 26, 67-70, 88.

[p] References 26, 71-74, 88.

[q] References 19-21, 25, 28, 29, 31, 32, 36-41, 46, 51, 53-60, 62 - 65, 67-69, 72-75, 88.

Table 1.6-2. EMISSION FACTORS FOR NO_x, SO_2, AND CO FROM WOOD RESIDUE COMBUSTION[a]

Source Category[c]	NO_x[b]		SO_2[b]		CO[b]	
	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMBtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING
Bark/bark and wet wood/wet wood-fired boiler	0.22[d]	A	0.025[e]	A	0.60[f,g,i,j]	A
Dry wood-fired boilers	0.49[h]	C	0.025[e]	A	0.60[f,g,i,j]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. NO_x = Nitrogen oxides, SO_2 = Sulfur dioxide, CO = Carbon monoxide.

[b] Factors represent boilers with no controls or with particulate matter controls.

[c] These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[d] References 19, 33, 34, 39, 40, 41, 55, 62-64, 67, 70, 72, 78, 79, 88-89.

[e] References 26, 45, 50, 72, 88-89.

[f] References 26, 59, 88-89.

[g] References 19, 26, 39-41, 60-64, 67, 68, 70, 75, 79, 88-89.

[h] References 30, 34, 45, 50, 80, 81, 88-89.

[i] References 26, 30, 45-51, 80-82, 88-89.

[j] Emission factor is for stokers and dutch ovens/fuel cells. References 26, 34, 36, 55, 60, 65, 71, 72, 75. **CO Factor for fluidized bed combustors is 0.17 lb/MMbtu.** References 26, 72, 88-89.

Table 1.6-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS, TOC, VOC, NITROUS OXIDE, AND CARBON DIOXIDE FROM WOOD RESIDUE COMBUSTION[a]

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Acenaphthene	**9.1 E-07**[c]	B
Acenaphthylene	**5.0 E-06**[d]	A
Acetaldehyde	**8.3 E-04**[e]	A
Acetone	**1.9 E-04**[f]	D
Acetophenone	**3.2 E-09**[g]	D
Acrolein	**4.0 E-03**[h]	C
Anthracene	**3.0 E-06**[i]	A
Benzaldehyde	**<8.5 E-07**[j]	D
Benzene	**4.2 E-03**[k]	A
Benzo(a)anthracene	**6.5 E-08**[l]	B
Benzo(a)pyrene	**2.6 E-06**[m]	A
Benzo(b)fluoranthene	**1.0 E-07**[l]	B
Benzo(e)pyrene	**2.6 E-09**[f]	D
Benzo(g,h,i)perylene	**9.3 E-08**[n]	B
Benzo(j,k)fluoranthene	**1.6 E-07**[o]	D
Benzo(k)fluoranthene	**3.6 E-08**[p]	B
Benzoic acid	**4.7 E-08**[q]	D
bis(2-Ethylhexyl)phthalate	**4.7 E-08**[g]	D
Bromomethane	**1.5 E-05**[f]	D
2-Butanone (MEK)	**5.4 E-06**[f]	D
Carbazole	**1.8 E-06**[f]	D
Carbon tetrachloride	**4.5 E-05**[r]	D
Chlorine	**7.9 E-04**[s]	D
Chlorobenzene	**3.3 E-05**[f]	D
Chloroform	**2.8 E-05**[f]	D
Chloromethane	**2.3 E-05**[f]	D
2-Chloronaphthalene	**2.4 E-09**[f]	D
2-Chlorophenol	**2.4 E-08**[u]	C
Chrysene	**3.8 E-08**[c]	B
Crotonaldehyde	**9.9 E-06**[j]	D
Decachlorobiphenyl	**2.7 E-10**[r]	D
Dibenzo(a,h)anthracene	**9.1 E-09**[l]	B
1,2-Dibromoethene	**5.5 E-05**[f]	D
Dichlorobiphenyl	**7.4 E-10**[r]	C
1,2-Dichloroethane	**2.9 E-05**[r]	D
Dichloromethane	**2.9 E-04**[v]	D
1,2-Dichloropropane	**3.3 E-05**[f]	D
2,4-Dinitrophenol	**1.8 E-07**[w]	C
Ethylbenzene	**3.1 E-05**[f]	D
Fluoranthene	**1.6 E-06**[x]	B
Fluorene	**3.4 E-06**[i]	A
Formaldehyde	**4.4 E-03**[y]	A
Heptachlorobiphenyl	**6.6E-11**[r]	D

Table 1.6-3. (cont.)

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Hexachlorobiphenyl	**5.5 E-10**[r]	D
Hexanal	**7.0 E-06**[z]	D
Heptachlorodibenzo-p-dioxins	**2.0 E-09**[aa]	C
Heptachlorodibenzo-p-furans	**2.4 E-10**[aa]	C
Hexachlorodibenzo-p-dioxins	**1.6 E-06**[aa]	C
Hexachlorodibenzo-p-furans	**2.8 E-10**[aa]	C
Hydrogen chloride	**1.9 E-02**[j]	C
Indeno(1,2,3,c,d)pyrene	**8.7 E-08**[l]	B
Isobutyraldehyde	**1.2 E-05**[z]	D
Methane	**2.1 E-02**[f]	C
2-Methylnaphthalene	**1.6 E-07**[z]	D
Monochlorobiphenyl	**2.2 E-10**[r]	D
Naphthalene	**9.7 E-05**[ab]	A
2-Nitrophenol	**2.4 E-07**[w]	C
4-Nitrophenol	**1.1 E-07**[w]	C
Octachlorodibenzo-p-dioxins	**6.6 E-08**[aa]	B
Octachlorodibenzo-p-furans	**8.8 E-11**[aa]	C
Pentachlorodibenzo-p-dioxins	**1.5 E-09**[aa]	B
Pentachlorodibenzo-p-furans	**4.2 E-10**[aa]	C
Pentachlorobiphenyl	**1.2 E-09**[r]	D
Pentachlorophenol	**5.1 E-08**[ac]	C
Perylene	**5.2 E-10**[f]	D
Phenanthrene	**7.0 E-06**[ad]	B
Phenol	**5.1 E-05**[ae]	C
Propanal	**3.2 E-06**[z]	D
Propionaldehyde	**6.1 E-05**[f]	D
Pyrene	**3.7 E-06**[af]	A
Styrene	**1.9 E-03**[f]	D
2,3,7,8-Tetrachlorodibenzo-p-dioxins	**8.6 E-12**[aa]	C
Tetrachlorodibenzo-p-dioxins	**4.7 E-10**[ag]	C
2,3,7,8-Tetrachlorodibenzo-p-furans	**9.0 E-11**[aa]	C
Tetrachlorodibenzo-p-furans	**7.5 E-10**[aa]	C
Tetrachlorobiphenyl	**2.5 E-09**[r]	D
Tetrachloroethene	**3.8 E-05**[t]	D
o-Tolualdehyde	**7.2 E-06**[j]	D
p-Tolualdehyde	**1.1 E-05**[z]	D
Toluene	**9.2 E-04**[v]	C
Trichlorobiphenyl	**2.6 E-09**[r]	C
1,1,1-Trichloroethane	**3.1 E-05**[t]	D
Trichloroethene	**3.0 E-05**[t]	D
Trichlorofluoromethane	**4.1 E-05**	D
2,4,6-Trichlorophenol	**<2.2 E-08**[ak]	C

Table 1.6-3. (cont.)

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Vinyl Chloride	**1.8 E-05**[r]	D
o-Xylene	**2.5 E-05**[v]	D
Total organic compounds (TOC)	**0.039**[ai]	D
Volatile organic compounds (VOC)	**0.017**[aj]	D
Nitrous Oxide (N_2O)	**0.013**[ak]	D
Carbon Dioxide (CO_2)	**195**[al]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] Factors are for boilers with no controls or with particulate matter controls.

[c] References 26, 34, 36, 59, 60, 65, 71-73, 75.

[d] References 26, 33, 34, 36, 59, 60, 65, 71-73, 75.

[e] References, 26, 35, 36, 46, 50, 59, 60, 65, 71-75.

[f] Reference 26.

[g] Reference 33.

[h] Reference 26, 50, 83.

[i] References 26, 34, 36, 59, 60, 65, 71-73, 75.

[j] References 26, 50.

[k] References 26, 35, 36, 46, 59, 60, 65, 70, 71-75.

[l] References 26, 36, 59, 60, 65, 70-75.

[m] References 26, 33, 36, 59, 60, 65, 70-73, 75.

[n] References 26, 33, 36, 59, 60, 65, 71-73, 75.

[o] Reference 34.

[p] References 26, 36, 60, 65, 71-75.

[q] References 26, 33.

[r] References 26.

[s] Reference 83.

[t] References 26, 72.

[u] References 35, 60, 65, 71, 72.

[v] References 26, 72.

[w] References 35, 60, 65, 71, 72.

[x] References 26, 33, 34, 59, 60, 65, 71-75.

[y] References 26, 28, 35, 36, 46 - 51, 59, 60, 65, 70, 71-75, 79, 81, 82.

[z] Reference 50.

[aa] Reference 26, 45.

[ab] References 26, 33, 34, 36, 59, 60, 65, 71-75, 83.

[ac] References 26, 35, 60, 65, 71, 72.

[ad] References 26, 33, 34, 36, 59, 60, 65, 71 - 73.

[ae] References 26, 33, 34, 35, 60, 65, 70, 71, 72.

[af] References 26, 33, 34, 36, 59, 60, 65, 71 - 73, 83.

[ag] References 26, 45.

[ah] References 26, 35, 60, 65, 71.

[ai] TOC = total organic compounds. Factor is the sum of all factors in table except nitrous oxide and carbon dioxide.

[aj] VOC volatile organic compounds. Factor is the sum of all factors in table except hydrogen chloride, chlorine, formaldehyde, tetrachloroethene, 1,1,1,-trichloroethane, dichloromethane, acetone, nitrous oxide, methane, and carbon dioxide.

[ak] Reference 83.

[al] References 19 - 26, 33 - 49, 51- 57, 77, 79 - 82, 84 - 86.

Table 1.6-4. EMISSION FACTORS FOR TRACE ELEMENTS FROM WOOD RESIDUE COMBUSTION[a]

Trace Element	Average Emission Factor (lb/MMBtu)[b]	EMISSION FACTOR RATING
Antimony	**7.9 E-06**[c]	C
Arsenic	**2.2 E-05**[d]	A
Barium	**1.7 E-04**[c]	C
Beryllium	**1.1 E-06**[e]	B
Cadmium	**4.1 E-06**[f]	A
Chromium, total	**2.1 E-05**[g]	A
Chromium, hexavalent	**3.5 E-06**[h]	C
Cobalt	**6.5 E-06**[i]	C
Copper	**4.9 E-05**[g]	A
Iron	**9.9 E-04**[k]	C
Lead	**4.8 E-05**[l]	A
Manganese	**1.6 E-03**[d]	A
Mercury	**3.5 E-06**[m]	A
Molybdenum	**2.1 E-06**[c]	D
Nickel	**3.3 E-05**[n]	A
Phosphorus	**2.7 E-05**[c]	D
Potassium	**3.9 E-02**[c]	D
Selenium	**2.8 E-06**[o]	A
Silver	**1.7 E-03**[p]	D
Sodium	**3.6 E-04**[c]	D
Strontium	**1.0 E-05**[c]	D
Tin	**2.3 E-05**[c]	D
Titanium	**2.0 E-05**[c]	D
Vanadium	**9.8 E-07**[c]	D
Yttrium	**3.0 E-07**[c]	D
Zinc	**4.2 E-04**[o]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] Factors are for boilers with no controls or with particulate matter controls.

[c] Reference 26.

[d] References 26, 33, 36, 46, 59, 60, 65, 71-73, 75, 81.

[e] References 26, 35, 36, 46, 59, 60, 65, 71-73, 75.

[f] References 26, 35, 36, 42, 46, 59, 60, 65, 71-73, 75, 81.

[g] References 26, 34, 35, 36, 42, 59, 60, 65, 71-73, 75, 81.

[h] References 26, 36, 46, 59, 60, 71, 72, 73, 75.

[i] References 26, 34, 83.

[j] References 26, 33-36, 46, 59, 60, 65, 71-73, 75, 81.

[k] References 26, 71, 72, 81.

[l] References 26, 33-36, 46, 59, 60, 65, 71-73, 75.

[m] References 26, 35, 36, 46, 59, 60, 65, 71-73, 75, 81.

[n] References 26, 33 - 36, 46, 59, 60, 65, 71-73, 75, 81.

[o] References 26, 33, 35, 46, 59, 60, 65, 71-73, 75, 81.

[p] Reference 34.

EMISSION FACTORS
WOOD PRODUCTS

AQ-EF02

Process Equipment	Description	Throughput Units	Pounds of Pollutant per Throughput Unit[1]				
			PM[2]	SO_2	NO_x	CO	VOC
Wood-Fired Boilers	Dutch Oven	1000 lb steam	0.4[3]	0.014	0.31[4]	3.0[4]	0.13
	Spreader-Stoker	1000 lb steam	0.4[3]	0.014	0.31[4]	2.0[4, 5]	0.13
	Fuel Cell	1000 lb steam	0.4[3]	0.014	0.31[4]	1.0[4, 6]	0.13
Veneer Dryer – Gas Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.52	NA[7]	0.12	0.02	0.22
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.29	NA	0.12	0.02	0.22
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.15	NA	0.12	0.02	0.22
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.10	NA	0.12	0.02	0.22
Veneer Dryer – Steam Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	1.01	NA	NA	NA	0.04
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.56	NA	NA	NA	0.04
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.25	NA	NA	NA	0.04
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.15	NA	NA	NA	0.04
Veneer Dryer – Wood Fired	All species (<20% moisture in fuel)	1000 ft^2 (3/8" basis)	0.75[8]	NA	0.4	1.4	0.2
	All species (≥20% moisture in fuel)	1000 ft^2 (3/8" basis)	1.50	NA	0.4	1.4	0.2
Cyclone- Dry and Green chips, Shavings, Hogged Fuel/Bark, Green Sawdust	Medium Efficiency	Bone dry tons	0.5	NA	NA	NA	NA
	High Efficiency	Bone dry tons	0.2	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.001	NA	NA	NA	NA
Cyclone - Sanderdust	High Efficiency	Bone dry tons	2.0	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.04	NA	NA	NA	NA
Target Box		Bone dry tons	0.1	NA	NA	NA	NA
Lumber Dry Kilns	Douglas Fir	1000 board feet	0.02[9]	NA	NA	NA	0.6
	Hemlock	1000 board feet	0.05[9]	NA	NA	NA	0.39[12]
	Ponderosa Pine	1000 board feet	ND[10]	NA	NA	NA	1.7[10]
Press Vents - uncontrolled	Particleboard	1000 ft^2 (3/4" basis)	SS[11]	NA	NA	NA	SS
	Hardboard	1000 ft^2 (1/8" basis)	SS	NA	NA	NA	SS

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[1] The emissions factors listed in this table should only be used when better information (i.e., source test data) is not available.

[2] The PM_{10} and $PM_{2.5}$ fractions are dependent upon the type of control equipment. See AQ-EF03 for estimated PM_{10} and $PM_{2.5}$ fractions.

[3] The PM factors are equivalent to 0.1 gr/dscf at 65% boiler efficiency. For other allowable emissions concentrations, the emission factor may be ratioed (e.g., 0.2/0.1 gr/dscf x 0.40 = 0.80 lb/10^3 steam).

[4] These factors are based on collective source tests as of 1992.

[5] Spreader-Stokers with small combustion chambers may exhibit higher CO levels.

[6] Recent tests have shown CO levels in the range of 0.1 to 0.5.

[7] There is no applicable emission factor because the pollutant is either not emitted or emitted at negligible levels.

[8] Based on statewide rule limit.

[9] Based on OSU study (2000)

[10] No data available, but expected to be less than Douglas fir factor.

[11] Use source specific data because most plants have performed source testing.

[12] Based on OSU Study (2006)

CEDAR CREEK
ENGINEERING INC

Pure Science for Clean Water®

OFF-PERMIT CHANGE NOTICE

TO: Kentucky Division for Air Quality

FROM: Paul Rodgers, PE

RE: Freeman Corporation - AI No. 811
Permit No. V-14-007

DATE: 25 May 2022

Freeman Corporation is planning to make changes to equipment identified as emission units on their Title V permit. The proposed changes satisfy the requirements under Chapter 052:020 Section 17 to qualify as off-permit changes.

The equipment to be replaced is the belt conveyor system which feeds wood waste to the plant's wood-fired boilers. On the permit, this conveyor is divided into two emission units: EU 41 (Sawdust Unloading from Silos), and EU42 (Chip Unloading from Storage to Boilers).

The existing conveyor system is to be replaced with a new conveyor system which will perform the same basic function as the existing conveyor – delivering wood fuel from storage to the boilers – but will be safer and more efficient. The new conveyor will be fully enclosed with sheet metal, reducing emissions of wood dust from the transfer operation by an estimated 85% (*Emissions Inventory Guidance*, Antelope Valley Air Quality Management District, April 2000).

The new system will be designed and built in-house by Freeman Corp. Construction is anticipated to begin in July 2022, and the system to be operational by September 2022.

Note that while EP 41 is listed as an insignificant activity on the air permit, EP42 is listed in Section B as a Fugitive Emission point. Total emissions from EP 42 were estimated at 2.57 LB/HR, or 10.8 TON/YR. Based on the control efficiency given above, 85%, these values would be reduced to 0.386 LB/HR, or 1.62 TON/YR.

The amount of wood waste unloaded on a monthly basis will continue to be monitored, and these records maintained, in accordance with permit requirements. It is not anticipated that the change will result in the applicability of any new requirements. It is understood that these changes are to be incorporated into the permit upon renewal.

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CEDAR CREEK
ENGINEERING INC
Pure Science for Clean Water®

OFF-PERMIT CHANGE NOTICE

TO: Kentucky Division for Air Quality

FROM: Paul Rodgers, PE

RE: Freeman Corporation - AI No. 811
Permit No. V-14-007

DATE: 2 January 2023

Freeman Corporation proposes changes to the methods used to quantify the mass of fuel burned in its wood-fired boilers. This Off-Permit Change Notice documents those changes.

Freeman is nearing completion of installation of a new conveyor system which delivers wood fuel from storage to boilers, as described in the 25 May 2022 Off-Permit Change Notice. The new conveyor is fully enclosed with sheet metal, reducing emissions of wood dust from the transfer operation by an estimated 85%.

It was anticipated that the mass of wood fuel would be measured using a belt scale on the new conveyor, similar to the method used on the old conveyor. However, the original scale that measured the weight of wood dust as it was transported to the boilers could not be made to work with the new conveyor system. An alternate means of measuring the mass of wood burned in the boilers has been developed based on analytical data for the fuel content of wood burned, steam meter data, and an assumed boiler efficiency.

It is noted that the belt scale has long been considered to be a source of inaccuracy in calculations which rely on the mass of fuel delivered to the boilers. Since January 2021, steam meter readings and efficiency performance have been used to support estimates of the mass of wood burned at the facility.

Fuel Content

Wood fuel samples are sent to a laboratory each week for analysis for heat content. These values are generally very consistent, as shown in Table 1, below

Table 1
Heat Content of Wood Fuel Samples
Lab Data

Sample ID	Heat Content (BTU/LB)	
6-Jan-22	13.02	
13-Jan-22	12.82	Avg = 12.48
29-Jan-22	11.59	
2-Feb-22	10.88	
9-Feb-22	11.96	
16-Feb-22	11.71	
23-Feb-22	11.78	
2-Mar-22	11.85	
9-Mar-22	10.96	
16-Mar-22	11.84	
23-Mar-22	11.95	
30-Mar-22	13.03	
6-Apr-22	10.60	
13-Apr-22	13.74	
21-Apr-22	11.10	
28-Apr-22	11.26	
4-May-22	14.27	
19-May-22	13.65	
25-May-22	11.58	
1-Jun-22	11.56	
10-Jun-22	11.52	
15-Jun-22	10.92	
22-Jun-22	13.50	
29-Jun-22	12.07	
Average	12.05	
+/- (95% confidence)	0.41	

Steam Meter

Each boiler is equipped with a steam meter to measure the amount of steam energy produced by that boiler. Readings are recorded daily, summarized in Table 2 for the first six months of 2022:

Table 2
Steam Produced per Steam Meter

	Boiler #1		Boiler #2		Boiler #3	
	Operating Time (hr)	Steam Produced (MMBTU)	Operating Time (hr)	Steam Produced (MMBTU)	Operating Time (hr)	Steam Produced (MMBTU)
January-22	701	5,614	-	-	662	5,772
February-22	515	3,769	-	-	650	5,347
March-22	459	4,046	-	-	677	5,166
April-22	533	3,672	-	-	596	5,754
May-22	511	3,677	-	-	534	5,137
June-22	23	170	298	1,585	609	5,614

Boiler Efficiency

In general, efficiencies of wood-fired boilers vary considerably, from one type of unit to another, as well as between the same unit operating under different conditions. According to the EPA, typical efficiency for biomass-fired boilers is 75%. To be conservative, and to maintain consistency with prior reporting, Freeman proposes to use a boiler efficiency value of 50%.

Using these values, it is possible to estimate the mass of wood burned:

$$\frac{steam\ produced \cdot MMBTU}{efficiency \cdot heat\ content \cdot \frac{MMBTU}{TON}} = mass\ of\ wood\ burned \cdot TON$$

Using steam meter data from January 2022, and average heat content for that month, the mass of wood burned in Boiler 1 is determined as follows:

$$\frac{5614 \cdot MMBTU}{0.50 \cdot 12.48 \cdot \frac{MMBTU}{TON}} = 900 \cdot TON$$

This method is believed to provide more accurate values for the mass of wood burned than were provided by the belt scale. It is intended that this method will be used henceforth to calculate the mass of wood fuel burned in the boilers.

It is understood that the steam meter now becomes the principal mechanism used to estimate the mass of wood fuel burned, and that the mass of wood fuel burned is a key parameter dictating boiler emissions. Meter readings must be recorded daily, and the meter maintained in good working order. The meter must be calibrated periodically.

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CEDAR CREEK
ENGINEERING INC

Pure Science for Clean Water®

23 August 2024

Mr. Ossama Ateyeh
Kentucky Division for Air Quality
300 Sower Drive
Frankfort KY 40601

Re: The Freeman Corporation
AI No. 811

Dear Mr. Ateyeh,

Following is information to address issues recently discussed related to the Freeman Corp air permit application.

Attached please find a copy of AQ-EF02, emission factors from the State of Oregon Department of Environmental Quality.

Values used to represent the heat content of wood were obtained from AP42 Section 1.6 and are shown below:

Heat Content of Wood - AP42		
4,500	BTU/LB	wet
8,000	BTU/LB	dry

The maximum annual potential emission in tons for PM for EP 08 (Cyclone 4), is calculated as follows:

$$throughput\,\frac{lb}{hr}\cdot \max operating\ schedule\,\frac{hr}{yr}\cdot\frac{1\ ton}{2000\ lb}\cdot emission\ factor\,\frac{lb\ PM}{ton}\cdot\frac{1\ ton}{2000\ lb}$$
$$= PM\ emission\ rate\,\frac{ton}{yr}$$

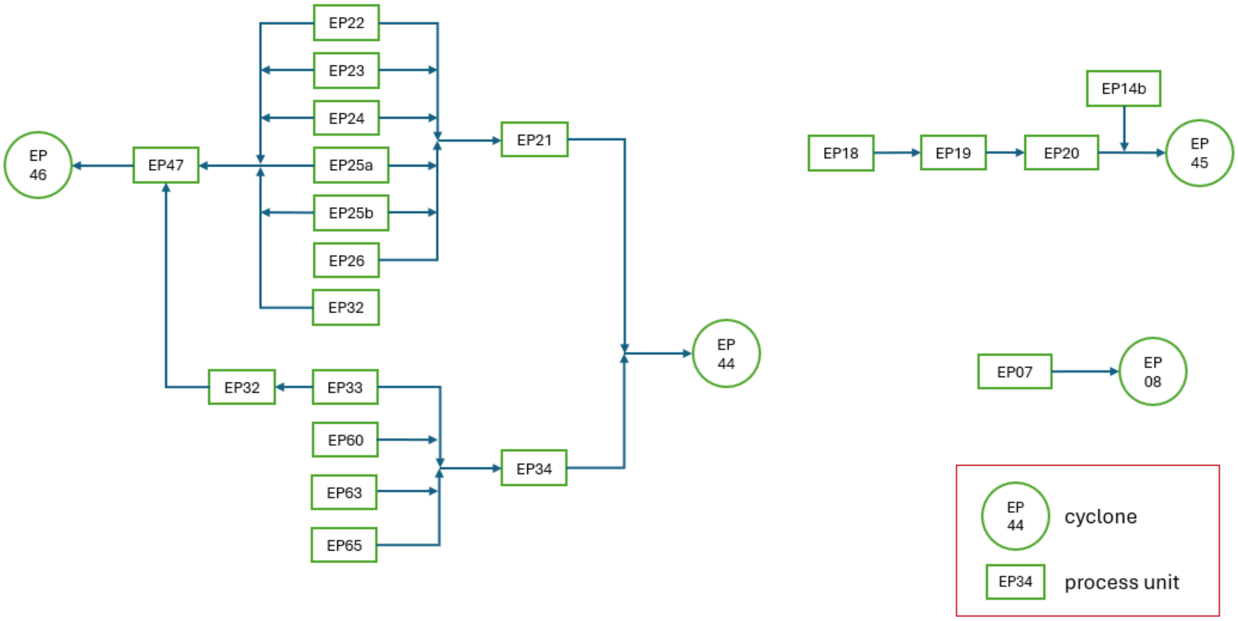
or,

$$1680\,\frac{lb}{hr}\cdot 24\,\frac{hr}{day}\cdot 7\,\frac{days}{week}\cdot 50\,\frac{weeks}{year}\cdot\frac{1\ ton}{2000\ lb}\cdot 0.5\,\frac{lb\ PM}{ton}\cdot\frac{1\ ton}{2000\ lb} = 1.76\,\frac{ton}{yr}$$

The equation given on p. 102 in the permit application (p. 3 of 7 of DEP 7007 CC), comes from Table 4a, where, for certain process units, 0.381 LB of waste wood is generated for every DF (Doyle Foot) of wood processed by those units. Freeman Corp routinely measures production based on DF and has developed these factors from experience. So, for example, if 1,000 DF of wood passes through EP22 (Slicer #3) then 381 pounds of waste wood (clippings) would be generated and sent to the Veneer Mill Hog, and then on to Cyclone 1. Cyclone 1 is assumed to operate at the efficiency given in AQ-EF02, 0.5 pounds of emissions for every 2,000 pounds processed. Thus:

$$wood\ processed \cdot DF \cdot \left[\frac{0.381 \cdot waste\ wood \cdot LB}{wood\ processed \cdot DF}\right] \cdot \frac{0.5 \cdot waste\ wood\ emission \cdot\ LB}{2000 \cdot waste\ wood \cdot LB}$$
$$= waste\ wood\ emission \cdot LB$$

Throughputs for each cyclone are given on Tables 4a thru 4d in the permit application. To understand these tables, be sure to follow comments in the Notes column, which describe the destination of emissions from each unit. The schematic below depicts contributions to the different cyclones by the processes included on the tables. Note that several units discharge to two different receiving units. For example EP22 sends CLIPPINGS to EP21, a chipper; EP22 also sends BACKERBOARDS to EP47, a different kind of chipper. Final discharge to the atmosphere is via cyclone for all of the units represented below:



A number of units have been taken out of service since the application was submitted, one unit replaced with a new model, and one unit put into service. These changes as well as changes in operations dictate changes in descriptions of EP40 and EP65. These changes are reflected on revised Table 1, Table 2, Table 4a, as well as 7007B and 7007DD, and are summarized below:

- EP37 has been removed
- EP40 is now labeled as “Chip Unloading from Trucks to Storage”
- EP41 has been removed
- EP55 has been removed
- EP56 has been removed
- EP57 has been removed
- EP58 has been removed
- EP59 has been removed
- EP60 has been relabeled to read “Super Clipper (Capital)”
- EP61 has been removed
- EP65 should be labeled ACTIVE

The density of 86 types of wood, expressed as grams of dry mass per cubic centimeter of green volume, provided by California State University and summarized below, were utilized to determine the average value used in the permit application. Note that the average density, expressed below as in g/cc, is equivalent to 36.0 lb/cf.

Common name	Density, g/cc	Common name	Density, g/cc	Common name	Density, g/cc
Ash, black	0.526	Douglas fir (mountain)	0.446	Oak, post	0.738
Ash, blue	0.603	Elm, American	0.554	Oak, red	0.657
Ash, green	0.61	Elm, rock	0.658	Oak, scarlet	0.709
Ash, white	0.638	Elm, slippery	0.568	Oak, swamp chestnut	0.756
Aspen	0.401	Fir, balsam	0.414	Oak swamp white	0.792
Aspen, large tooth	0.412	Fir, silver	0.415	Oak, white	0.71
Basswood	0.398	Concalco Alves	0.96	Persimmon	0.776
Beech	0.655	Gum, black	0.552	Pine, eastern white	0.373
Beech, blue	0.717	Gum, blue	0.796	Pine, jack	0.461
Birch, gray	0.552	Gum, red	0.53	Pine, loblolly	0.593
Birch, paper	0.6	Gum, tupelo	0.524	Pine, longleaf	0.638
Birch, sweet	0.714	Hemlock eastern	0.431	Pine, pitch	0.542
Birch, yellow	0.668	Hemlock, mountain	0.48	Pine, red	0.507
Buckeye, yellow	0.383	Hemlock, western	0.432	Pine, shortleaf	0.584
Butternut	0.404	Hornbeam	0.762	Poplar, balsam	0.331
Cedar, eastern red	0.492	Larch, western	0.587	Poplar, yellow	0.427
Cedar, northern white	0.315	Locust, black or yellow	0.708	Redwood	0.436
Cedar, southern white	0.352	Locust honey	0.666	Rosewood, Bolivian	0.71
Cedar, western red	0.344	Magnolia, cucumber	0.516	Rosewood, E. Indian	0.78
Cherry, black	0.534	Maple, black	0.62	Sassafras	0.473
Cherry, wild red	0.425	Maple, red	0.546	Sourwood	0.593
Chestnut	0.454	Maple, silver	0.506	Spruce, black	0.428
Cocobolo	1.1	Maple, sugar	0.676	Spruce, red	0.413
Coralwood	1.1	Oak, black	0.669	Spruce, white	0.431
Corkwood	0.207	Oak, bur	0.671	Sycamore	0.539
Cottonwood, eastern	0.433	Oak, canyon live	0.838	Tamarack	0.558
Cypress, southern	0.482	Oak, laurel	0.674	Walnut, black	0.562
Dogwood (flowering)	0.796	Oak, live	0.977	Willow, black	0.408
Douglas fir (coast type)	0.512	Oak, pin	0.677		
AVERAGE					0.577

Thank you very much for your attention to this project. Please do not hesitate to contact me if you require additional information.

Sincerely,
CEDAR CREEK ENGINEERING, INC.

Paul Rodgers, PE

State of Oregon
Department of Environmental Quality

AQ-EF02
Wood Products

Emission Factors

Process Equipment	Description	Throughput Units	Pounds of Pollutant per Throughput Unit[1]				
			PM[2]	SO_2	NO_X	CO	VOC
Wood-Fired Boilers	Dutch Oven	1000 lb steam	0.4[3]	0.014	0.31[4]	3.0[4]	0.13
	Spreader-Stoker	1000 lb steam	0.4[3]	0.014	0.31[4]	2.0[4, 5]	0.13
	Fuel Cell	1000 lb steam	0.4[3]	0.014	0.31[4]	1.0[4, 6]	0.13
Veneer Dryer – Gas Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.52	NA[7]	0.12	0.02	0.22
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.29	NA	0.12	0.02	0.22
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.15	NA	0.12	0.02	0.22
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.10	NA	0.12	0.02	0.22
Veneer Dryer – Steam Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	1.01	NA	NA	NA	0.04
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.56	NA	NA	NA	0.04
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.25	NA	NA	NA	0.04
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.15	NA	NA	NA	0.04
Veneer Dryer – Wood Fired	All species (<20% moisture in fuel)	1000 ft^2 (3/8" basis)	0.75[8]	NA	0.4	1.4	0.2
	All species (20% moisture in fuel)	1000 ft^2 (3/8" basis)	1.50	NA	0.4	1.4	0.2
Cyclone- Dry and Green chips, Shavings, Hogged Fuel/Bark, Green Sawdust	Medium Efficiency	Bone dry tons	0.5	NA	NA	NA	NA
	High Efficiency	Bone dry tons	0.2	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.001	NA	NA	NA	NA
Cyclone - Sanderdust	High Efficiency	Bone dry tons	2.0	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.04	NA	NA	NA	NA
Target Box		Bone dry tons	0.1	NA	NA	NA	NA
Lumber Dry Kilns	Douglas Fir	1000 board feet	0.02[9]	NA	NA	NA	See AQ-EF09
	Hemlock	1000 board feet	0.05[9]	NA	NA	NA	
	Ponderosa Pine	1000 board feet	ND[10]	NA	NA	NA	
Press Vents-uncontrolled	Particleboard	1000 ft^2 (3/4" basis)	SS[11]	NA	NA	NA	SS
	Hardboard	1000 ft^2 (1/8" basis)	SS	NA	NA	NA	SS

[1] The emissions factors listed in this table should only be used when better information (i.e., source test data) is not available.

[2] The PM10 and PM2.5 fractions are dependent upon the type of control equipment. See AQ-EF03 for estimated PM10 and PM2.5 fractions.

[3] The PM factors are equivalent to 0.1 gr/dscf at 65% boiler efficiency. For other allowable emissions concentrations, the emission factor may be ratioed (e.g., 0.2/0.1 gr/dscf x 0.40 = 0.80 lb/10^3 steam).

[4] These factors are based on collective source tests as of 1992.
[5] Spreader-Stokers with small combustion chambers may exhibit higher CO levels.
[6] Recent tests have shown CO levels in the range of 0.1 to 0.5.
[7] There is no applicable emission factor because the pollutant is either not emitted or emitted at negligible levels.
[8] Based on statewide rule limit.
[9] Based on OSU study (2000)
[10] No data available, but expected to be less than Douglas fir factor.
[11] Use source specific data because most plants have performed source testing.

Table 1
Listing of Emission Points
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Unit Type	Emission Type	Control
EP 07	Veneer Clipping Lines 1, 2, & 3 & Chipper	ACTIVE	WOOD CUTTING	PM	08 CYCLONE 4
EP 08	CYCLONE 4 - Dry Veneer Hog Cyclone	ACTIVE	CYCLONE	PM	NONE
EP 10	Haul Roads & Log Yard	ACTIVE	ROAD	PM	NONE
EP 11	Boiler No.1	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	11 CYCLONE
EP 12	Boiler No. 2	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	12 CYCLONE
EP 14a	Butt-end Reducer, Debarker, Hog & Bark Loading	ACTIVE	WOOD CUTTING	PM	NONE
EP 14b	SAT Flitch Saws	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 15	Boiler No. 3	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	15 CYCLONE
EP 16	Log Cooking Vats - Sliced	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 17	Log Cooking Vats - Rotary	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 18	Skinning Line	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 19	Flitch Cut-off Saw	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 20	Flitch Planing and Grooving	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 21	Veneer Mill Hog	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 22	Slicer # 3 - Capital half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 23	Slicer # 4 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 24	Slicer # 3 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25a	Slicer # 1 - Fezer slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25b	Slicer # 2 - Fezer half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 26	Flitch Rip Saw	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 27	Weber Dryer - # 4	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 28	Babcock Dryer - # 5	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29a	Omeco Dryer - # 1	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29b	Fezer Dryer - # 3	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 30	Rotary Cut-off Saw (transferred via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 31	Rotary Debarker, Williams Hog (via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 32	Rotary Peeler - Coe 4-ft Lathe	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 33	Rotary Clipping Line	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 34	Rotary Veneer Chipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 35	Cremona Dryer - #7	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 36	Raute Dryer - #8	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 38	Watering Logs with Pond Water	ACTIVE	POND	INSIGNIFICANT	NONE
EP 39	Crating Trim Saw	ACTIVE	WOOD CUTTING	INSIGNIFICANT	NONE
EP 40	Chip Unloading from Trucks to Storage	ACTIVE	TRANSFER	INSIGNIFICANT	NONE
EP 42	Veneer Chips unloading from Storage to Boilers	ACTIVE	TRANSFER	PM	NONE
EP 43	Wemhoner Press Line	ACTIVE	PRESS	INSIGNIFICANT	NONE
EP 44	CYCLONE 1	ACTIVE	CYCLONE	PM	NONE
EP 45	CYCLONE 2	ACTIVE	CYCLONE	PM	NONE
EP 46	CYCLONE 3	ACTIVE	CYCLONE	PM	NONE
EP 47	Rotary Core Chipper	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 48	Nicholson Chipper (Lilly pad)	ACTIVE	WOOD CUTTING	PM	NONE
EP 50 a-h	Rotary & Veneer Mill Roof Vent Fans (8)	ACTIVE	ROOF FAN	INSIGNIFICANT	NONE
EP 60	Super Clipper (Capital)	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 62	NEW Butt-end Reducer, Bark Bin	ACTIVE	WOOD CUTTING	PM	NONE
EP 63	Paul Saw_01	ACTIVE	WOOD CUTTING	PM	NONE
EP 64	Paul Saw_02	FUTURE	WOOD CUTTING	PM	NONE
EP 65	Veneer Sizing Bandsaw	ACTIVE	WOOD CUTTING	PM	NONE

8/23/2024

Table 2
Summary of Maximum Potential Emissions
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

Source	Pollutant	Uncontrolled Emissions		Controlled Emissions	
		LB/HR	TON/YR	LB/HR	TON/YR
Combustion	NOX	11.2	48.9	11.2	48.9
Combustion	CO	30.4	133.2	30.4	133.2
Combustion	SO2	1.3	5.6	1.3	5.6
Combustion	VOC	0.9	3.8	0.9	3.8
Combustion	PM-2.5	21.8	95.5	10.9	47.9
Combustion	PM-10	25.4	111.1	12.7	55.7
Combustion	PM Total	28.4	124.4	14.2	62.4
Wood Process Operations	NOX	0.0	0.0	0.0	0.0
Wood Process Operations	CO	0.0	0.0	0.0	0.0
Wood Process Operations	SO2	0.0	0.0	0.0	0.0
Wood Process Operations	VOC	0.0	0.0	0.0	0.0
Wood Process Operations	Ammonia	0.0	0.0	0.0	0.0
Wood Process Operations	PM-2.5*	7.6	31.9	7.6	31.9
Wood Process Operations	PM-10*	8.8	37.1	8.8	37.1
Wood Process Operations	PM Total	9.9	41.6	9.9	41.6
Total Plant Sources	NOX	11.2	48.9	11.2	48.9
Total Plant Sources	CO	30.4	133.2	30.4	133.2
Total Plant Sources	SO2	1.3	5.6	1.3	5.6
Total Plant Sources	VOC	0.9	3.8	0.9	3.8
Total Plant Sources	Ammonia	0.0	0.0	0.0	0.0
Total Plant Sources	PM-2.5	29.4	127.4	18.5	79.8
Total Plant Sources	PM-10	34.2	148.2	21.6	92.8
Total Plant Sources	PM Total	38.3	165.9	24.1	104.0

** PM2.5/PM10/PMTOT = 0.768/0.893/1 per AP-42 per AP 42 Table 1.6-1*

Table 4a

Maximum Potential Emissions from Cyclone 1

The Freeman Corporation
2019 Permit Renewal Application

EP No.	Name	Input Rate	Units	Production Factor	Units	Production	Production Units	Waste Emissions Factor[1]	Units	Waste Emissions[2,3]	Units	Note
EP 22	Slicer # 3 - Capital half round	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 23	Slicer # 4 - Capital slicer	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 24	Slicer # 5 - Capital slicer	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 25a	Slicer # 1 - Fezer slicer	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 25b	Slicer # 2 - Fezer half round	600	DF/HR	0.800	DF/DF	480	DF/HR	0.381	LB/DF	229	LB/HR	TO EP 21
EP 26	Flitch Rip Saw	600	DF/HR	1.000	DF/DF	600	DF/HR	0.0	LB/DF	0.0	LB/HR	TO EP 21; waste included in above
EP 21	Veneer Mill Hog	1,143	LB/HR	1.000	LB/LB	1,143	LB/HR	1.0	LB/LB	1143	LB/HR	assumes 100% input transferred TO EP44
EP 32	Rotary Peeler - Coe 4-ft Lathe	4,000	DF/HR	0.860	DF/DF	3,440	DF/HR	0.392	LB/DF	1,568	LB/HR	Product TO EP33; waste Cores TO EP47; see Table 4c
EP 33	Rotary Clipping	3,440	DF/HR	0.860	DF/DF	2,958	DF/HR	0.538	LB/DF	1,851	LB/HR	TO EP34; includes EP32 peeling waste
EP 60	Super Clipper (Capital)	10,000	SF/HR	1.000	SF/SF	10,000	SF/HR	0.0140	LB/SF	140	LB/HR	TO EP34
EP63	Paul Saw_01	600	DF/HR	0.970	DF/DF	582	DF/HR	0.084	LB/DF	50	LB/HR	TO EP34
EP64	Paul Saw_02	600	DF/HR	0.970	DF/DF	582	DF/HR	0.000	LB/DF	-	LB/HR	FUTURE
EP65	Veneer Sizing Bandsaw	600	DF/HR	0.970	DF/DF	582	DF/HR	0.084	LB/DF	50	LB/HR	TO EP34
EP 34	Rotary Veneer Chipper	2,092	LB/HR	1.000	LB/LB	2,092	LB/HR	1.0	LB/LB	2092	LB/HR	TO EP44
EP 44	CYCLONE 1	3,235	LB/HR	0.99975	LB/LB	3,234	LB/HR	0.00025	LB/LB	0.809	LB/HR	8,400 HR/YR
										3.40	TON/YR	

(1) emission factors from in-house measurements
(2) 1 DF =
(3) cyclone efficiency = 0.5/2000 LB/LB per AQ-EF02

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Department for Environmental Protection

DIVISION FOR AIR QUALITY

DEP7007B

MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
35	Rotary veneer drying	B	24 x 7 x 50	Cremona dryer	1/31/91
36	Rotary veneer drying	B	24 x 7 x 50	Raute dryer	fall 2002

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
35	Green veneer sheets	23,000 SF/hr	Dried veneer sheets	22,000 SF/hr	
36	Green veneer sheets	23,000 SF/hr	Dried veneer sheets	22,000 SF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

35 & 36: No waste generated. Shrinkage of ~4-7% due to moisture loss during drying process

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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DEP7007B
MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
40	Chip Unloading from Trucks to Storage	B	24 x 7 x 50	Freeman built hopper	8/4/97
42	Veneer chips and waste from storage containers to boilers	B	24 x 7 x 50	Freeman built storage containers and conveyors	8/4/97 3/15/06

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
40	Non-Freeman generated wood chips	4.24 tons/hr	Chips fed into silo	4.24 tons/hr	From maximum input to all wood waste boilers (see EP 11, 12, 15)
42	Wood waste from storage containers	4.24 tons/hr	Wood waste fed to boilers	4.24 tons/hr	

*(10a) Rated Capacity of Equipment (10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

DEP7007B
(Continued)

Emission Point # (1)	**Fuel Type for Process Heat (11)**	**Rated Burner Capacity (BTU/Hour) (12)**	**Fuel Composition**		**Fuel Usage Rates**		**Note:**
			% Sulfur (13a)	**% Ash (13b)**	**Maximum Hourly (14a)**	**Maximum Annual* (14b)**	**If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)**

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

40: Non-contained sawdust produced at an average rate of 0.13 lbs/hr (0.56 tons/year)

42: Non-contained sawdust produced at an average rate of 1.6 lbs/hr (6.9 tons/year)

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.

18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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MANUFACTURING OR PROCESSING OPERATIONS

(***Please read instructions before completing this form***)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
60	Super Clipper (Capital)	B	24 x 7 x 50	Super Clipper (Capital)	05/03/10

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of Each Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
60	Veneer	10,000 SF/HR	clipped veneer	10,000 SF/HR	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) **Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)**

Waste veneer from EP 60 combined and transferred to Rotary Veneer Chipper (EP 34) for chipping into boiler fuel.

17) **IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.**
18) **Material Safety Data Sheets with complete chemical compositions are required for each process.**

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

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MANUFACTURING OR PROCESSING OPERATIONS

(*Please read instructions before completing this form*)

Emission Point # (1)	Process Description (2)	Continuous or Batch (3)	Maximum Operating Schedule (Hours/Day, Days/Week, Weeks/Year (4)	Process Equipment (Make, Model, Etc.) (5)	Date Installed (6)
63	Paul Saw_01	B	24 x 7 x 50	Paul Maschinenfabrik, K34G/1500, veneer trimmer	7/1/2017
64	Paul Saw_02	B	24 x 7 x 50	Paul Maschinenfabrik, K34G/1500, veneer trimmer	Future
65	Veneer Sizing Bandsaw	B	24 x 7 x 50	Freeman-made	7/1/2017

Emission Point # (1)	List Raw Material(s) Used (7)	Maximum Quantity Input Of <u>Each</u> Raw Material (Specify Units/Hour) (8) See Item 18	Type of Products (9) See Item 18	Quantity Output* (Specify Units)	
				Maximum Hourly Rated Capacity (Specify Units) (10a)	Maximum Annual (Specify Units) (10b)
63	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	
64	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	
65	Veneer	600 DF/hr	Trimmed veneer	580 DF/hr	

***(10a) Rated Capacity of Equipment** **(10b) Should be entered only if applicant requests operating restrictions through federally enforceable limitations**

DEP7007B
(Continued)

IMPORTANT: Form DEP7007N, Emission, Stacks, and Controls Information must be completed for each emission unit listed below.

Emission Point # (1)	Fuel Type for Process Heat (11)	Rated Burner Capacity (BTU/Hour) (12)	Fuel Composition		Fuel Usage Rates		Note:
			% Sulfur (13a)	% Ash (13b)	Maximum Hourly (14a)	Maximum Annual* (14b)	If the combustion products are emitted along with the process emissions, indicate so in this column by writing "combined." (15)

16) Make a complete list of all wastes generated by each process (e.g. wastewater, scrap, rejects, cleanup waste, etc.). List the hourly (or daily) and annual quantities of each waste and the method of final disposal. (Use a separate sheet of paper, if necessary)

Waste veneer from EP 63, 64, 65 generated at an average of 20 DF/HR or 56 LB/HR per unit and transferred to Veneer Mill Hog (EP 21) for chipping into boiler fuel.

17) IMPORTANT: Submit a process flow diagram. Label all materials, equipment and emission point numbers.
18) Material Safety Data Sheets with complete chemical compositions are required for each process.

***(14b) Should be entered only if applicant requests operating restrictions through federally enforceable permit conditions.**

Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
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DEP7007DD

INSIGNIFICANT ACTIVITIES

INSIGNIFICANT ACTIVITY CRITERIA

1. Emissions from insignificant activities shall be counted toward the source's potential to emit;
2. Emissions from the activity shall not be subject to a federally enforceable requirement other than generally applicable requirements that apply to all activities and affected facilities such as 401 KAR 59:010, 61:020, 63:010, and others deemed generally applicable by the Cabinet;
3. The potential to emit a regulated air pollutant from the activity or affected facility shall not exceed 5 tons/yr.
4. The potential to emit of a hazardous air pollutant from the activity or affected facility shall not exceed 1,000 pounds/yr., or the deminimis level established under Section 112(g) of the Act, whichever is less;
5. The activity shall be included in the permit application, identifying generally applicable and state origin requirements.

Description of Activity Including Rated Capacity	Generally Applicable Regulations Or State Origin Requirements	Does the Activity meet the Insignificant Activity Criteria Listed Above?
EP 16 Log Cooking Vats - Sliced	401 KAR 59:010	All Insignificant Activities on the attached list meet the criteria described above.
EP 17 Log Cooking Vats - Rotary	401 KAR 59:010	
EP 27 Weber Dryer - # 4	401 KAR 59:010	
EP 28 Babcock Dryer - # 5	401 KAR 59:010	
EP 29a Omeco Dryer - # 1	401 KAR 59:010	
EP 29b Fezer Dryer - # 3	401 KAR 59:010	
EP 35 Cremona Dryer	401 KAR 59:010	
EP 36 Raute Dryer	401 KAR 59:010	
EP 39 Crating Trim Saw	401 KAR 59:010	
EP 38 Watering Logs with Pond Water	401 KAR 59:010	
EP 40 Chip Unloading from Trucks to Storage	401 KAR 63:010	
EP 43 Wemhoner press line	401 KAR 63:010	
EP 50 a-h Rotary & Veneer Mill Roof Vent Fans (8)	401 KAR 59:010	

SIGNATURE BLOCK

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

BY Paul R
Authorized Signature

8 / 23 / 2024
Date

Paul Rodgers
Typed or Printed Name of Signatory

PE
Title of Signatory

From: paul.rodgers@cedarcreekengineering.com
To: Ateyeh, Ossama (EEC)
Cc: "Scott Hisle"
Subject: Freeman Corp AI 811 - VOCs from Dryers
Date: Monday, September 9, 2024 4:00:57 PM
Attachments: Reply to O Ateyeh_9SEP2024.pdf

Mr. Ateyeh,

Attached please find a discussion of VOC emissions from dryers at The Freeman Corporation. Please do not hesitate to contact me if you have any questions or concerns.

Thanks very much,
Paul

Paul Rodgers, PE
CEDAR CREEK ENGINEERING, INC.
3245 Athens-Boonesboro Road
Winchester, KY 40391
Cell Phone: 859-227-7061

CEDAR CREEK
ENGINEERING INC
Pure Science for Clean Water®

9 September 2024

Mr. Ossama Ateyeh
Kentucky Division for Air Quality
300 Sower Drive
Frankfort KY 40601

Re: The Freeman Corporation
AI No. 811

Dear Mr. Ateyeh,

As requested, this letter is offered to document calculations that demonstrate that VOC emissions from the dryers at The Freeman Corporation do not exceed 5 tons per year, and therefore the dryers represent Insignificant Activities under the air permit. The table below presents results of our analysis:

EP	Name	Input Rate	Units	Base VOC Softwood Emission Factor - 3/8" Basis (LB/1000SF)[1]	VOC Softwood Emission Factor - 1/34" Basis (LB/1000SF)	Hardwood/ Softwood VOC Ratio[2]	Final Hardwood VOC Emission Factor - 1/34" Basis (LB/1000SF)	VOC Hardwood Emission Rate - 1/34" Basis (LB/HR)	VOC Emission Rate (TON/YR)
EP 27	Weber Dryer - # 4	30000	SF/HR	0.04	0.0031	0.24	0.00075	0.023	0.09
EP 28	Babcock Dryer - # 5	30000	SF/HR	0.04	0.0031	0.24	0.00075	0.023	0.09
EP 29a	Omeco Dryer - # 1	30000	SF/HR	0.04	0.0031	0.24	0.00075	0.023	0.09
EP 29b	Fezer Dryer - # 3	30000	SF/HR	0.04	0.0031	0.24	0.00075	0.023	0.09
EP 35	Cremona Dryer	23000	SF/HR	0.04	0.0031	0.24	0.00075	0.017	0.07
EP 36	Raute Dryer	23000	SF/HR	0.04	0.0031	0.24	0.00075	0.017	0.07

1 - Oregon AQ-EF02
2- Energy & Fuels (May 2015)

Each dryer is listed, along with its rated production capacity, in square feet per hour. The base VOC emission factor of 0.04 LB/1000SF is from Oregon AQ-EF02, and is for 3/8-inch thick, softwood (fir and hemlock) veneer. Because The Freeman Corporation produces veneer at an average thickness of 1/34-inch, this value has been reduced to 0.0031 (=0.04X((1/34)/(3/8)). Because The Freeman Corporation manufactures only hardwood veneer, this result is then adjusted by a factor of 0.24 to reflect VOC emissions from hardwoods, giving a final emission factor for 1/34-inch hardwood of 0.00075 LB/1000SF.

A VOC emission factor for hardwood veneer drying is not readily available. However, information found in the journal Energy and Fuels (11 September 2015) shows hardwoods yield approximately 0.24X the mass of VOCs that softwoods yield. (Mean values were found to be hardwood: 99 ± 8, ppb; softwood: 412 ± 25). Further support for this is given by a technical memorandum from the Commonwealth of Virginia which indicates VOC from softwood to be more than 10X the value for hardwoods (softwood VOC/hardwood VOC = 4.09/0.385).

From this, the calculation for EP 27 Weber Dryer - #4 yields the following:

$$VOC\ emission\ rate = 30{,}000\,\frac{SF}{HR}\cdot 0.0031\,\frac{LB\cdot softwood\cdot VOC}{1000\cdot SF}\cdot\frac{99}{412}\cdot\frac{LB\cdot hardwood\cdot VOC}{LB\cdot softwood\cdot VOC}\cdot\frac{8400\cdot HR}{YR}\cdot\frac{TON}{2000\cdot LB} = 0.09\cdot\frac{hardwood\cdot VOC\cdot TON}{YR}$$

The results indicate that VOC emissions from each dryer are below 5 tons per year, and therefore the dryers may be considered Insignificant Activities. Attached please find a copy of AQ-EF02, the article from Energy and Fuel, and the memorandum from the Virginia DEQ.

Thank you very much for your attention to this project. Please do not hesitate to contact me if you require additional information.

Sincerely,
CEDAR CREEK ENGINEERING, INC.

Paul

Paul Rodgers, PE

State of Oregon
DEQ Department of Environmental Quality

AQ-EF02
Wood Products

Emission Factors

Process Equipment	Description	Throughput Units	Pounds of Pollutant per Throughput Unit[1]				
			PM[2]	SO_2	NO_X	CO	VOC
Wood-Fired Boilers	Dutch Oven	1000 lb steam	0.4[3]	0.014	0.31[4]	3.0[4]	0.13
	Spreader-Stoker	1000 lb steam	0.4[3]	0.014	0.31[4]	2.0[4, 5]	0.13
	Fuel Cell	1000 lb steam	0.4[3]	0.014	0.31[4]	1.0[4, 6]	0.13
Veneer Dryer – Gas Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.52	NA[7]	0.12	0.02	0.22
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.29	NA	0.12	0.02	0.22
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.15	NA	0.12	0.02	0.22
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.10	NA	0.12	0.02	0.22
Veneer Dryer – Steam Heat	Doug Fir (uncontrolled)	1000 ft^2 (3/8" basis)	1.01	NA	NA	NA	0.04
	Doug Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.56	NA	NA	NA	0.04
	Hemlock, White Fir (uncontrolled)	1000 ft^2 (3/8" basis)	0.25	NA	NA	NA	0.04
	Hemlock, White Fir (Burley or 45% control)	1000 ft^2 (3/8" basis)	0.15	NA	NA	NA	0.04
Veneer Dryer – Wood Fired	All species (<20% moisture in fuel)	1000 ft^2 (3/8" basis)	0.75[8]	NA	0.4	1.4	0.2
	All species (20% moisture in fuel)	1000 ft^2 (3/8" basis)	1.50	NA	0.4	1.4	0.2
Cyclone- Dry and Green chips, Shavings, Hogged Fuel/Bark, Green Sawdust	Medium Efficiency	Bone dry tons	0.5	NA	NA	NA	NA
	High Efficiency	Bone dry tons	0.2	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.001	NA	NA	NA	NA
Cyclone - Sanderdust	High Efficiency	Bone dry tons	2.0	NA	NA	NA	NA
	Baghouse control	Bone dry tons	0.04	NA	NA	NA	NA
Target Box		Bone dry tons	0.1	NA	NA	NA	NA
Lumber Dry Kilns	Douglas Fir	1000 board feet	0.02[9]	NA	NA	NA	See AQ-EF09
	Hemlock	1000 board feet	0.05[9]	NA	NA	NA	
	Ponderosa Pine	1000 board feet	ND[10]	NA	NA	NA	
Press Vents-uncontrolled	Particleboard	1000 ft^2 (3/4" basis)	SS[11]	NA	NA	NA	SS
	Hardboard	1000 ft^2 (1/8" basis)	SS	NA	NA	NA	SS

[1] The emissions factors listed in this table should only be used when better information (i.e., source test data) is not available.

[2] The PM10 and PM2.5 fractions are dependent upon the type of control equipment. See AQ-EF03 for estimated PM10 and PM2.5 fractions.

[3] The PM factors are equivalent to 0.1 gr/dscf at 65% boiler efficiency. For other allowable emissions concentrations, the emission factor may be ratioed (e.g., 0.2/0.1 gr/dscf x 0.40 = 0.80 lb/10^3 steam).

[4] These factors are based on collective source tests as of 1992.
[5] Spreader-Stokers with small combustion chambers may exhibit higher CO levels.
[6] Recent tests have shown CO levels in the range of 0.1 to 0.5.
[7] There is no applicable emission factor because the pollutant is either not emitted or emitted at negligible levels.
[8] Based on statewide rule limit.
[9] Based on OSU study (2000)
[10] No data available, but expected to be less than Douglas fir factor.
[11] Use source specific data because most plants have performed source testing.

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VOCs Emissions from Multiple Wood Pellet Types and Concentrations in Indoor Air

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emissions, a series of laboratory and field measurements were conducted using softwood, hardwood, and blended wood pellets manufactured in New York. Evacuated canisters were used to collect air samples from the headspace of drums containing pellets and then in basements and pellet storage areas of homes and small businesses. Multiple peaks were identified during GC/MS and GC/FID analysis, and four primary VOCs were characterized and quantified: methanol, pentane, pentanal, and hexanal. Laboratory results show that total VOCs (TVOCs) concentrations for softwood (SW) were statistically ($p < 0.02$) higher than blended or hardwood (HW) (SW: 412 ± 25; blended: 203 ± 4; HW: 99 ± 8, ppb). The emission rate from HW was the fastest, followed by blended and SW, respectively. Emissions rates were found to range from 10^{-1} to 10^{-5} units, depending upon environmental factors. Field measurements resulted in airborne concentrations ranging from 67 ± 8 to 5000 ± 3000 ppb of TVOCs and 12 to 1500 ppb of aldehydes, with higher concentrations found in a basement with a large fabric bag storage unit after fresh pellet delivery and lower concentrations for aged pellets. These results suggest that large fabric bag storage units resulted in a substantial release of VOCs into the building air. Occupants of the buildings tested discussed concerns about odor and sensory irritation when new pellets were delivered. The sensory response was likely due to the aldehydes.

Subjects

Alcohols Inorganic Carbon Compounds Oxides Volatile Organic Compounds Wood

Introduction

Interest in wood as a building heating fuel is expanding in the United States. (1, 2) Wood pellets have become a popular choice for biomass due to their ease in transportation, storage, and use. Thus, it is important to understand their potential health impacts to building occupants. While immediate health concern with wood pellet storage is the off-gassing of carbon monoxide (CO), (3) another concern is the adverse impact of indoor air quality due to the off-gassing of volatile organic compounds (VOCs) from storage of wood pellets. (4-6) VOCs constitute a significant class of indoor air contaminants. A variety of nonindustrial building investigations and indoor air quality studies found that 60% of the VOCs indoors maybe the result of emission from building materials and furnishings. (7-10) The remaining VOCs may arise from activities in the home and/or infiltration of outside air.

The bulk storage of wood pellets in confined spaces produce various gases including carbon monoxide (CO), carbon dioxide (CO_2), methane (CH_4), and a variety of volatile organic carbons (VOCs) including hexanal and monoterpenes that accumulate in the air and can reach to concentrations that result in discomfort and may be a health hazard. (3, 16-20)

Svedberg and Galle (4) investigated complaints of eye irritation and odor in a pellet factory in Sweden. They identified the presence of hexanal, pentanal, methanol, acetone, and carbon monoxide. A subsequent study (5) investigated and described the presence and formation of volatile compounds (VOCs), particularly hexanal and carbon monoxide from the storage of wood pellets. They also monitored the emissions from kiln drying of wood and determine that the emissions were not specific to wood pellet production but were more general in nature. Svedberg et al. (5) concluded that the storage of wood pellets resulted in high levels of hexanal and carbon monoxide. Hexanal concentrations were measured to be ∼320 to 365 mg/m^3 with peak values near the pellet pile in a warehouse. In a domestic, sealed pellet storage room, values of 70–80 mg/m^3 were measured 18 h after a fresh pellets delivery. Adjacent to the storage room, hexanal concentrations of 0.056 to 0.084 mg/m^3 were observed. Carbon monoxide concentrations exceeded the Swedish permissible exposure level of 40 mg/m^3 in the warehouse and peaked at 123 ± 10 mg/m^3 in the domestic storage room 18 h after fresh pellet delivery. Their results showed a high potential for both occupational and residential health hazards.

Arshadi et al. (6) examined the VOC emissions from pellets made of blends of pine and spruce. The fatty and resin acid concentrations were measured using gas chromatography–mass spectrometry (GC/MS) for newly produced pellets and those aged for 2 and 4 weeks. The concentrations of aldehydes and ketones were determined by high performance liquid chromatography (HPLC) at 0, 2, and 4 weeks to explore the relationships between the fatty acid content and the resulting carbonyl emissions. They found a strong correlation between the pine fraction in the pellets and the fatty/resin acid content, but the influence decreased over the storage time. The fatty and resin acid concentrations decreased by 40% during the 4 week storage period. The drying temperature also influenced the aldehyde and ketone emissions of fresh pellets. The amounts of emitted aldehydes and ketones generally decreased by 45% during storage as the fatty/resin acids oxidized. Thus, they concluded that oxidation of the fatty acids was the primarily mechanism for the generation of the oxygenated VOCs. (16)

Also, Arshadi and Gref (21) suggested that the amounts and compositions of VOCs emitted from stored pellets were strongly correlated with the drying temperature and quality of the raw material products of the degradation of wood pellets during bulk storage.

Experimental System

The laboratory study of stored wood pellets was conducted in similar manner as Soto-Garcia et al.,(23) Kuang et al.,(24) and Fan and Bi.(25) The wood pellets were stored in 20 gallon steel drums (20 in. in height and 16 in. in diameter). Two quick connects were inserted through each lid. The drums were sealed by a metal ring with a gasket to maintain an airtight fit and avoid external reactions process. Measurements from each drum were performed every 24 h for around 30 days. Wood pellet samples were obtained from a local manufacturer. Because of the greater abundance of hardwood in northern New York, more hardwood pellets and blended softwood/hardwood pellets are sold in this area. Therefore, this study included hardwood, softwood and blended pellets (typically ∼60% hardwood). Emissions at different temperature conditions (6–8, 22, and 30 °C) were measured only for hardwood pellets. In general, the pellet samples were ∼6 mm in diameter and 6–25 mm in length with a bulk density of ∼18 kg/m^3 (40 lbs/ft^3). For more details, refer to Soto-García et al.(3)

VOCs samples were collected in the laboratory studies using 400 mL or 1 L evacuated stainless steel canisters (Entech, Inc., Simi Valley, CA) with a fused silica coating inside the canisters.(26) Each canister was cleaned and evacuated using an automatic canister cleaner (Entech 3100A, Entech, Inc., Simi Valley, CA). Samples were collected every 24 h for the duration of the experiment, approximately 20–30 days depending upon the temperature the drums were stored and when the concentrations plateaued. Using a quick release fitting attached to the canister and a complementary quick release fitting connected to the top of the drum, a headspace sample was collected (grab sample) with an evacuated canister. Immediately after sampling, the canisters were pressured to approximately 1.5 atm.

Field samples were collected from a variety of locations where pellets are stored, but mainly from work places (WP) and homes. The locations included the following: two residential basements (Massena and Lisbon, NY) (Home 1 and 2), Massena Chamber of Commerce (WP/CC), the Wild Center in Tupper Lake (WP/WC), Walker Center (WP/WAC), a field house at Clarkson University (CU) with an enclosed room, and a small storage unit supplying pellets for a 20 kW boiler. Storage capacities ranged from 2 ton to 30 ton of wood pellets and means of storage included fabric bags, a trailer, stacked individual bags, and wood enclosures. Table S2 contains details about the field sampling sites locations.

nature of the bin and its location relative to the structure to which it provides pellet storage. The Walker Center (WC) bin has electric heat that ensures that the pellets do not freeze.

Analysis

Within 1–3 days of collecting the laboratory samples, the canisters were analyzed using GC FID (Hewlett-Packard 5890 series II) for quantification. A subset of samples were analyzed using GC/MS (Hewlett-Packard 5890 series II with a 5971 mass spectrometer) to characterize and/or identify the major peaks in the pellet samples. Typical chromatograms for soft and hardwood pellets are shown in Figure S1

Field samples were analyzed on a Trace Gas Chromatograph Ultra (Thermo Electron Corp.) with a flame ionization detector (FID) using a 7100A preconcentrator (Entech, Inc., Simi Valley, CA). The sample from the canister was drawn into the preconcentrator from one of the four autosampling inlets. The oven temperature of the GC/FID was initially set for 50 °C and held for 2 min. The temperature increased, ramp 1, to 130 °C at a rate of 5 °C min^{-1}. Ramp 2 increased the temperature to 180 °C at a rate of 20 °C min^{-1} with the final holding time set at 20 min at 180 °C. Sample duration was 20.70 min. The flame ionization detector (FID) was set to a base temperature of 250 °C. The air, hydrogen, and make up were set to flows of 350, 35, and 30 mL/min, respectively.

The canisters were cleaned with ultrahigh-purity nitrogen as discussed in US EPA Method TO-15. (27) Blank corrections were not made to the measured concentrations in this study because all of the blank concentrations were well below the detection limits. The analytical precision for replicate analyses of the samples and standards was within ±10%. Five-point calibration curves were used to calculate the concentrations of the laboratory and field samples. Laboratory recovery and stability was done prior to the field sampling analysis and demonstrate stability of the analyses.

Results and Discussion

VOCs Off-Gassing Kinetics

Figure S2 shows the mean concentrations of the four major VOCs species, hexanal, pentanal, pentane, and methanol in the drums after their accumulation over 31 days. Mean values were found to be softwood (SW): 412 ± 25; blended: 203 ± 4; hardwood (HW): 99 ± 8, ppb). The pairwise differences among the three pellet types were examined using a 2-sided *t* test. The results showed that total VOCs (TVOCs) concentrations were different for each pairwise comparison. The most

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MEMORANDUM

TO: Regional Directors, Director – Air Permits, Director – Air Compliance, Director – Data Analysis and Planning, Director – Regulatory Affairs, Air Permit Managers, Air Compliance Managers

CC: Richard F. Weeks, Chief Deputy Director
James J. Golden, Deputy Director for Program Development

FROM: Michael G. Dowd – Director, Air Division

SUBJECT: APG-573: Lumber Kiln Emissions Calculations

DATE: September 30, 2010

Purpose:

The purpose of this document is to provide guidance to air permitting staff for calculating uncontrolled emissions from lumber kilns for permitting applicability. This guidance is not intended to cover every situation but should be applicable in most scenarios. Check with the regional air permit manager and/or the central office staff if a deviation from the guidance is deemed necessary.

Background:

On February 16, 2006, the United States Environmental Protection Agency (EPA) promulgated National Emission Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products (PCWP MACT) Manufacturing facilities. In this regulation, lumber kilns at PCWP manufacturing facilities and at any other kind of facility are included as an affected source. Although there are no specific requirements for lumber kilns (other than an initial notification requirement) contained in the PCWP MACT, emissions from the lumber kilns must be quantified and included toward determining major source applicability.

The PCWP MACT when originally promulgated in February 2006 contained an option that allowed facilities to submit a low-risk demonstration to EPA and if approved the facility would be exempt from the regulation.[1] As part of this low-risk demonstration (Table 2A to Appendix B of the PCWP MACT), EPA required testing of certain units to quantify emissions but for some hard-to-test units (including lumber kilns) emission factors were provided to quantify emissions. For lumber kilns Table 2A included emission factors for the following hazardous air pollutants (HAP[2]): acetaldehyde, acrolein, formaldehyde, and phenol. EPA notes that these were the most conservative factors available and were developed from drying southern pine.

In EPA's Response to Comments Document[i] a statement is made by EPA that volatile organic compound (VOC) emissions from hardwoods can be as high as those from softwoods. See excerpt below from page 26.

> 'Emission test data for HAP from hardwood lumber kilns were not available at the time Table 2A was developed, and to our knowledge, are not available today. Hardwood lumber is dried at a lower temperature for longer amounts of time than is softwood lumber. It has been documented that drying at higher temperatures results in increased HAP (methanol and formaldehyde) emissions from softwood lumber kilns. Therefore, one would expect that hardwood lumber kilns would have lower HAP emissions than softwood lumber kilns. However, this is not true for VOC. **Milota**[3] notes that VOC emissions from some hardwood lumber kilns can be significant (ranging from 0.3 to 4.3 pounds per thousand board feet [lb/MBF]), in some cases similar to emissions from softwood lumber kilns (ranging from 0.12 to 4.3 lb/MBF). Given that VOC emissions from hardwood lumber kilns can be significant and that HAP and VOC emissions profiles differ for softwood lumber kilns (as discussed elsewhere in this document), is unclear how HAP emissions may differ among softwood and hardwood lumber kilns in the absence of HAP emissions data from hardwood kilns.'

Because EPA concluded that VOC emissions from drying hardwood could be as high as those from softwood, confusion arose within regional offices as to what emission factor should be used. In an effort to substantiate EPA's conclusion that VOC emissions from hardwoods can be as high as softwoods, DEQ conducted a search to find hardwood lumber kiln drying test data to support EPA's claim. The most recent data found was in a study conducted by Beakler & Blankenhorn[ii] with results published in the November 2007 issue of the Forest Products Journal. Both red oak and white oak were tested. In this study, the highest VOC emission rate was for red oak at 0.358 lb/MBF.

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[1] On June 19, 2007, the United States Court of Appeals for the District of Columbia Circuit vacated EPA's provisions in the National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products that allowed demonstration of a low risk subcategory. As a result Appendix B referenced in this document was removed from the regulation.

[2] HAP means hazardous air pollutant and relates only to federal programs.

[3] Michael R. Milota, Department of Wood Science and Engineering. Oregon State University

DEQ contacted Dr. Milota to find out what study or stack tests he was referencing in the EPA document. In an email, Dr. Milota stated that the EPA reference was from a presentation that he made for the Forest Products Society in Montreal in 2002 where he cited a Rice[4] study that showed VOC emissions from red oak as high as 14 lb/MBF. He also included a more recent paper by R. W. Rice of the University of Maine which showed VOC emissions as high as 22 lb/MBF for red oak. However, Dr. Milota cautioned against using the results from this study as EPA protocol were not followed. Therefore, the results of these studies were not used in determining VOC emission factors.

Emissions from the lumber kiln drying of softwoods, particularly southern yellow pine are well documented in a National Council for Air and Stream Improvement (NCASI) Technical Information Document, Special Report 08-01.

The emission factors that were selected are provided in Table 1 along with the reference for each factor.

Applicability:

This guidance is applicable only to drying lumber in lumber kilns. This guidance is not applicable to veneer drying operations, rotary dryers or any other drying operation other than lumber kilns. For information regarding veneer drying operations or any other wood drying operation, please contact OAPP.

HAPs, PCWP MACT Applicability, and State Toxics

If the new lumber kiln is located at a major source of HAPs or if the addition of the new lumber kiln increases the HAP emissions such that the facility becomes major for HAP (Potential to Emit of 10 tons/year for an individual HAP and/or 25 tons/year for all HAPs at the facility), then the lumber kiln is subject to the PCWP MACT. The PCWP MACT does not impose any control or work practice requirements for lumber kilns.

The EPA rule writer told DEQ staff that there are no plans for a PCWP NESHAP for area sources. Therefore, state toxics do apply to lumber kilns located at area sources and toxic emissions must be quantified for permit applicability. Lumber kilns with toxic emissions that exceed the corresponding exemption level trigger minor NSR permitting and emission limits need to be included in the State Only Enforceable section of the permit unless operating restrictions are imposed such that the toxic emissions are reduced to below the exemption level. However, because the PCWP MACT floor indicates no controls for lumber kilns at major sources of HAP, it is unlikely an area source could feasibly control emissions. Also there would be inequity in requiring more rigorous control at an area source than at a major source. Therefore, in accordance with this policy, area source lumber kilns should be treated similarly to those located at a major

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[4] R.W. Rice, University of Maine, School of Forest Resources

source. Presumptive BACT for area source lumber kilns is operation of the lumber kiln in accordance with the manufacturer's recommendations and no add-on control. Given the modeling characteristics of wood kilns and other factors discussed in this document, DEQ has determined that toxic modeling (Rule 6-5) is not required for lumber kilns unless facility wide modeling for a particular toxic pollutant(s) is triggered by another emission unit at the facility. However, facility wide HAP emissions need to be quantified for major source applicability determination. If at some point in the future a technology for controlling emissions from lumber kilns is developed, this guidance will be re-evaluated and adjusted if necessary.

Permitting Applicability Emissions Calculations:

1. New Lumber Kiln at Existing Facility

VOC and VOC Toxics: Uncontrolled emissions are calculated based on the lumber kiln operating at its maximum design capacity for 8760 hours per year. Since lumber kilns are typically batch operations, the maximum load or charge that the lumber kiln can dry and the minimum drying time must be known (provided by the applicant). Most often the wood is measured in thousand board feet (MBF). For permitting applicability, drying times should not include the time required to move the wood product in and out of the lumber kiln. However, loading and unloading times are built-in if a permit is required and the applicant requests a limit on lumber throughput. Drying times can vary widely (several hours to weeks) depending on the type of wood and moisture content (initial and desired) of the wood. Drying times used in the examples in this document are not intended to be used as default values.

Although other variables may affect emissions (for example heartwood versus sapwood, season that the wood was harvested and length of time between harvesting and drying) for the purposes of this document these variables will not be considered.

If the application indicates that the lumber kiln will only be used for drying hardwood, then the emission factors for hardwood drying[5] may be used. If the lumber kiln is exempt from permitting, the permit exemption letter should state that only hardwood can be dried in the lumber kiln and that records must be kept for verification. If a permit is required, then a condition limiting the lumber kiln to drying hardwoods should be included.

If a mixture of hardwoods and softwoods or all softwoods will be dried in the lumber kiln, then the emission factors for softwoods must be used.

Five toxic pollutants should be evaluated for minor NSR permitting applicability: acetaldehyde, acrolein, formaldehyde, methanol, and phenol. Facility wide potential

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[5] For a more conservative emissions estimate, softwood factors could be used.

HAP emissions should also be calculated to determine if the facility is a major source of HAP.

Unless source specific testing data is available, the following emission factors are provided for calculating permitting and/or major source applicability. Deviations from using the provided emission factors must be justified and well documented in the engineering analysis.

Table 1: Emission Factors for wood drying in lumber kilns

Pollutant	Softwood (lb/MBF)	Reference	Hardwood (lb/MBF)	Reference
VOC *	4.09	(1)	0.358	(4)
Acetaldehyde	0.03	(1)	0.00032[6]	(5)
Acrolein	0.006	(2)	-	
Formaldehyde	0.04	(1)	-	
Methanol	0.24	(1)	-	
Phenol	0.01	(3)	-	

* VOC as pinene for softwood and as propane for hardwood

References

(1) NCASI Special Report 08-01, May 2008
(2) NCASI Technical Bulletin 845 Appendix BB
(3) Table 2A to Appendix B Emission factors for Plywood and Composite Wood Product MACT (Subpart DDDD)
(4) Beakler & Blankenhorn, Forest Products Journal, November 2007
(5) Solliday et al., Forest Products Journal, July/August 1999

Sample Calculation for a Hardwood Lumber Kiln

Maximum load: 63 MBF
Minimum drying time: 40 hours
Maximum number of loads per year: 219 (8760 hr/yr/ 40 hr/load)
VOC emission factor for hardwood: 0.358 lb VOC /MBF
Acetaldehyde emission factor for hardwood: 0.00032 lb Acetaldehyde/MBF

63MBF x 0.358 lb VOC/MBF x 219 loads/year x ton/2000lb = 2.47 tons VOC /yr

63MBF x 0.00032 lb VOC/MBF x 219 loads/year x ton/2000lb = 0.0022 tons VOC /yr

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[6] Reference ii refers to a study by Solliday et al. (1999) that showed the primary VHAP component of the non-condensable portion of VOC from drying of red oak is acetaldehyde. However, the non-condensable portion compared to the total VOC (mainly acetic acid) is only about 0.0009 percent or 0.00032 lb/MBF.

Table 2: Emissions Summary Table: New Hardwood Lumber Kiln

Pollutant	CAS	Uncontrolled Emissions		Exemption rate*		Exempt?
		Lbs/hr**	Tons/yr	Lbs/hr	Tons/yr	
VOC	N/A	N/A	2.47	N/A	10	Yes
Acetaldehyde	75070	0.000504	0.0022	8.91	26.1	Yes

*Exemption level for VOC comes from 9 VAC 5-80-1320 D; exemption level for acetaldehyde is from 9 VAC 5-80-1320 E.1.

** lbs/hr numbers are dependent on both batch size and hours of drying time. Hourly emissions are averaged over the entire drying time. (63 MBF/40 hours * toxic EF)

In this example, the addition of one lumber kiln drying only hardwood is exempt from minor New Source Review permitting. Keep in mind that HAPs from all emission units (boilers, generators, etc.) at the facility must be totaled for assessing major source HAP status for the facility.

Since the annual exemption rate for acetaldehyde is greater than the HAP major source threshold of 10 tons per year, a facility would become a major HAP source with a total hardwood lumber kiln throughput of 62,500,000 MBF per year.

Sample Calculation for a Softwood Lumber Kiln

Maximum load: 63 MBF
Minimum drying time: 24 hours
Maximum number of loads per year: 365
VOC emission factor for softwood: 4.09 lb VOC /MBF

63MBF x 4.09 lb VOC/MBF x 365 loads/year x ton/2000lb = 47.02 tons/yr

Table 3: Emissions Summary Table: New Softwood Lumber Kiln

Pollutant	CAS	Uncontrolled Emissions		Exemption rate*		Exempt?
		Lbs/hr**	Tons/yr	Lbs/hr	Tons/yr	
VOC	N/A	N/A	47.02	N/A	10	No
Acetaldehyde	75070	0.079	0.345	8.91	26.1	Yes
Acrolein	107028	0.0158	0.069	0.02277	0.03335	No
Formaldehyde	50000	0.105	0.50	0.0825	0.174	No
Methanol	67561	0.63	2.76	10.824	37.99	Yes
Phenol	108952	0.026	0.115	1.254	2.755	Yes

*Exemption level for VOC is from 9 VAC 5-80-1320 D; exemption levels for each HAP is from 9 VAC 5-80-1320 E.1.

** lbs/hr numbers are dependent on both batch size and hours of drying time. Hourly emissions are averaged over the entire drying time. (63 MBF/24 hours * toxic EF)

The new lumber kiln is subject to minor New Source Review (Article 6) permitting. Emission limits need to be included in the State Only Enforceable section of the permit for acrolein and formaldehyde unless operating restrictions are imposed such that the toxic emissions are reduced to below the corresponding exemption level. BACT is operating the lumber kiln in accordance with the manufacturer's recommendations and no add-on control. Acrolein and formaldehyde emissions do not need to be modeled. However, facility wide HAP emissions need to be quantified for major source applicability determination.

If the permittee plans to install three lumber kilns of this size, the facility would be major for VOC (141.06 tons VOC/yr) and subject to Title V permitting unless operating restrictions are imposed. Although this lumber kiln by itself is not a major source of HAPs, if the permittee wanted to install four lumber kilns this size, the facility would be major for HAPs unless operating restrictions were imposed. As stated before, HAPs from all emission units (boilers, generators, etc.) at the facility must be totaled for assessing major source HAP status for the facility.

2. Throughput Increase for Permitted Lumber Kiln

VOC: If a lumber kiln was previously permitted and the permit contains a throughput limit, a net emission increase calculation must be made. Current uncontrolled emissions are based on the permitted throughput. The new uncontrolled emissions are based on the uncontrolled emissions calculated with the lumber kiln operating at its maximum design capacity. The permittee does not want to restrict throughput.

Sample Calculation for Softwood

Current uncontrolled VOC emissions

Maximum load: 63 MBF
Minimum drying time: 24 hours
Permitted throughput limit: 12,600 MBF/year
Maximum number of loads per year: 200
VOC Emission factor for softwood: 4.09 lb VOC /MBF

12, 600 MBF/year x 4.09 lb VOC/MBF x ton/2000lb = 25.77 tons VOC/yr

New uncontrolled VOC emissions

Maximum load: 63 MBF
Minimum drying time: 24 hours
Maximum number of loads per year: 365
VOC Emission factor for softwood: 4.09 lb VOC /MBF

63MBF x 4.09 lb VOC/MBF x 365 loads/year x ton/2000lb = 47.02 tons VOC/yr

NEI = 47.02 tons/yr – 25.77 tons/yr = 21.25 tons/yr

There is no NEI calculation for state toxics. Toxics emissions are always based on potential to emit. Since the permittee does not want a throughput limit, the potential to emit is equal to uncontrolled emissions.

Table 4: State Toxics Emissions Summary Table: Modified Lumber Kiln

Pollutant	CAS	Potential Emissions		Exemption rate*		Exempt?
		Lbs/hr**	Tons/yr	Lbs/hr	Tons/yr	
Acetaldehyde	75070	0.07875	0.344925	8.91	26.1	Yes
Acrolein	107028	0.1575	0.068985	0.02277	0.03335	No
Formaldehyde	50000	0.105	0.4599	0.0825	0.174	No
Methanol	67561	0.63	2.7594	10.824	37.99	Yes
Phenol	108952	0.02625	0.114975	1.254	2.755	Yes

* exemption levels for each HAP is from 9 VAC 5-80-1320 E.1.
** lbs/hr numbers are dependent on both batch size and hours of drying time. Hourly emissions are averaged over the entire drying time. (63 MBF/24 hours * toxic EF)

As shown above, the NEI exceeds the modification threshold level of 10 tons/yr for VOC and the potential to emit for both acrolein and formaldehyde exceed their respective exemption levels. Therefore this is a modification subject to minor NSR permitting. Emission limits need to be included in the State Only Enforceable section of the permit for acrolein and formaldehyde unless operating restrictions are imposed such that the toxic emissions are reduced to below the corresponding exemption level. BACT is operating the lumber kiln in accordance with the manufacturer's recommendations and no add-on control. Acrolein and formaldehyde emissions do not need to be modeled. However, facility wide HAP emissions need to be quantified for major source applicability determination.

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[i] National Emission Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products Background Information for Amendments to Final Standards, Summary of Public Comments and Responses, dated January 2006

[ii] Quantification of the VOCs released during kiln-drying red oak and white oak lumber.(volatile organic compounds), By Brian W. Beakler & Paul R. Blankenhorn & Nicole R. Brown & Matthew S. Scholl & Lee R. Stover, Forest Products Journal, November 2007

Ateyeh, Ossama (EEC)

From:	paul.rodgers@cedarcreekengineering.com
Sent:	Friday, October 18, 2024 12:11 PM
To:	Ateyeh, Ossama (EEC)
Cc:	'Scott Hisle'
Subject:	The Freeman Corp

Ossama,

I looked into your question about the use of Doyle feet in calculations for The Freeman Corp air permit application. There are two different uses of the term "pounds per Doyle foot." One is a factor for converting from volume (DF) to mass (LB); the other is as a factor similar to an emission factor, where the amount of scrap or waste generated by a process is expressed as mass of waste per Doyle foot of wood processed.

"Doyle feet," or "Doyle board feet," is a measurement used in the lumber industry to estimate the amount of useable wood contained in a log:

- Doyle board feet = $(D-4)^2 xL/16$, where: D is log diameter, in inches and L is log length, in feet

It can be seen that Doyle board feet is actually a measure of volume. Note that 1 standard board-foot = 12 X 1 X 1 in^3.

Thus, if Doyle feet is the measurement used in a process, but mass is needed, a conversion can be applied. On Table 4b (below), a conversion rate is provided in the footnotes: 1 DF = 2.8 LB. This is not an exact or universal conversion value, but one based on average wood density.

The second use of the term "pounds per Doyle foot" is in connection with calculating the amount of waste generated by a process, similar to an emission factor. Using this factor, the amount of waste generated can be calculated from the amount of wood processed, in Doyle feet. So, for example for EP No. 14b, Flitch Saws, the mass of waste (sawdust) generated by this unit (166 LB/HR) and sent on to the next process (Cyclone 2) is calculated from the Input Rate of 1,428 DF/HR and the Waste Emission Factor of 0.116 LB/DF (1,428 DF/HR X 0.116 LB/DF = 166 LB/HR):

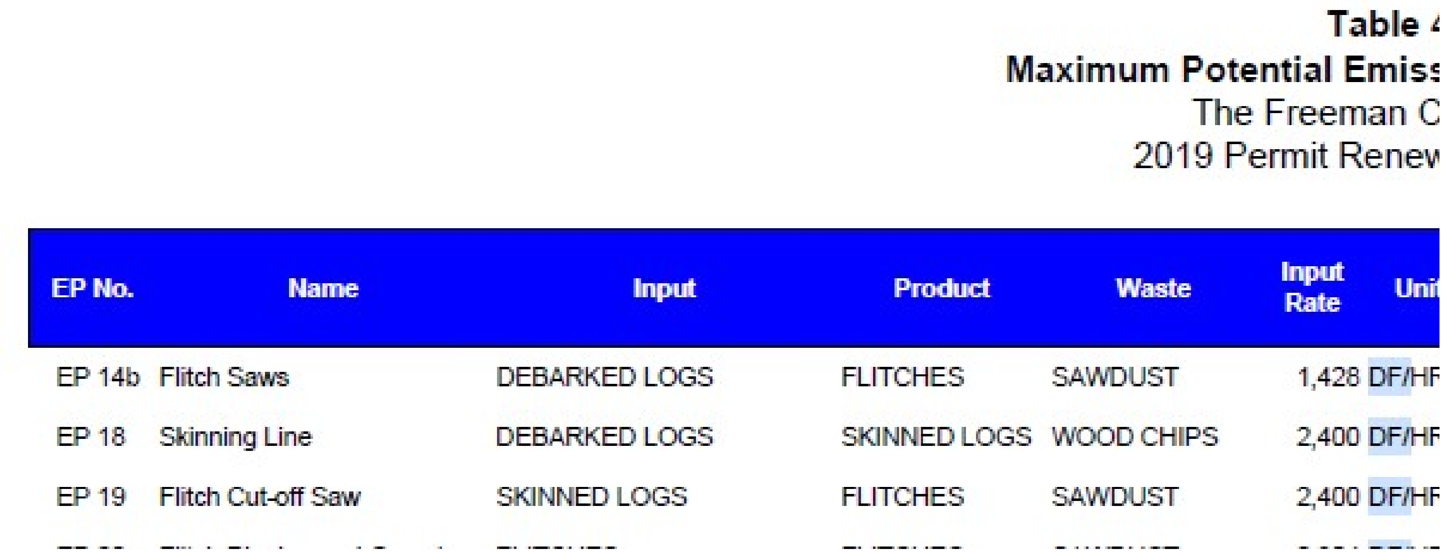

Table
Maximum Potential Emis
The Freeman C
2019 Permit Renew

EP No.	Name	Input	Product	Waste	Input Rate	Uni
EP 14b	Flitch Saws	DEBARKED LOGS	FLITCHES	SAWDUST	1,428	DF/H
EP 18	Skinning Line	DEBARKED LOGS	SKINNED LOGS	WOOD CHIPS	2,400	DF/H
EP 19	Flitch Cut-off Saw	SKINNED LOGS	FLITCHES	SAWDUST	2,400	DF/H

Note that these waste emission factors were developed by The Freeman Corp, based on in-house measurements.

I hope this resolves what may appear to be an inconsistency in the use of the units of Doyle feet in the air permit application. Please don't hesitate to contact me if you have any other questions or concerns.

Thanks very much,
Paul

Paul Rodgers, PE
CEDAR CREEK ENGINEERING, INC.
3245 Athens-Boonesboro Road
Winchester, KY 40391
Cell Phone: 859-227-7061

Table 1
Listing of Emission Points
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application
Revision 06/18/2024

EP No.	Name	Status	Unit Type	Emission Type	Control
EP 07	Veneer Clipping Lines 1, 2, & 3 & Chipper	ACTIVE	WOOD CUTTING	PM	08 CYCLONE 4
EP 08	CYCLONE 4 - Dry Veneer Hog Cyclone	ACTIVE	CYCLONE	PM	NONE
EP 10	Haul Roads & Log Yard	ACTIVE	ROAD	PM	NONE
EP 11	Boiler No.1	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	11 CYCLONE
EP 12	Boiler No. 2	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	12 CYCLONE
EP 14a	Butt-end Reducer, Debarker, Hog & Bark Loading	ACTIVE	WOOD CUTTING	PM	NONE
EP 14b	SAT Flitch Saws	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 15	Boiler No. 3	ACTIVE	BOILER	NOX, CO, SO2, VOC, PM	15 CYCLONE
EP 16	Log Cooking Vats - Sliced	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 17	Log Cooking Vats - Rotary	ACTIVE	COOKING VAT	INSIGNIFICANT	NONE
EP 18	Skinning Line	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 19	Flitch Cut-off Saw	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 20	Flitch Planing and Grooving	ACTIVE	WOOD CUTTING	PM	45 CYCLONE 2
EP 21	Veneer Mill Hog	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 22	Slicer # 3 - Capital half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 23	Slicer # 4 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 24	Slicer # 3 - Capital slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25a	Slicer # 1 - Fezer slicer	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 25b	Slicer # 2 - Fezer half round	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 26	Flitch Rip Saw	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 27	Weber Dryer - # 4	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 28	Babcock Dryer - # 5	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29a	Omeco Dryer - # 1	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 29b	Fezer Dryer - # 3	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 30	Rotary Cut-off Saw (transferred via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 31	Rotary Debarker, Williams Hog (via hopper)	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 32	Rotary Peeler - Coe 4-ft Lathe	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 33	Rotary Clipping Line	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 34	Rotary Veneer Chipper	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
EP 35	Cremona Dryer - #7	ACTIVE	DRYER	INSIGNIFICANT	NONE
EP 36	Raute Dryer - #8	ACTIVE	DRYER	INSIGNIFICANT	NONE
~~EP 37~~	~~Splicing/Jointing/Gluing Line (glue vapor)~~	~~ACTIVE~~	~~GLUING~~	~~INSIGNIFICANT~~	~~NONE~~
~~EP 37~~	~~Splicing/Jointing/Gluing Line (wood waste)~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~INSIGNIFICANT~~	~~NONE~~
EP 38	Watering Logs with Pond Water	ACTIVE	POND	INSIGNIFICANT	NONE
EP 39	Crating Trim Saw	ACTIVE	WOOD CUTTING	INSIGNIFICANT	NONE
EP 40	Chip~~Sawdust~~ unloading ~~into silo~~from trucks	ACTIVE	TRANSFER	INSIGNIFICANT	NONE
EP 41	Chip~~Sawdust~~ unloading from Silo to Boilers	ACTIVE	TRANSFER	INSIGNIFICANT	NONE
EP 42	Veneer Chips unloading from Storage to Boilers	ACTIVE	TRANSFER	PM	NONE
EP 43	Wemhoner Press Line	ACTIVE	PRESS	INSIGNIFICANT	NONE
EP 44	CYCLONE 1	ACTIVE	CYCLONE	PM	NONE
EP 45	CYCLONE 2	ACTIVE	CYCLONE	PM	NONE
EP 46	CYCLONE 3	ACTIVE	CYCLONE	PM	NONE
EP 47	Rotary Core Chipper	ACTIVE	WOOD CUTTING	PM	46 CYCLONE 3
EP 48	Nicholson Chipper (Lilly pad)	ACTIVE	WOOD CUTTING	PM	NONE
EP 50 a-h	Rotary & Veneer Mill Roof Vent Fans (8)	ACTIVE	ROOF FAN	INSIGNIFICANT	NONE

6/28/2019

Table 1
Listing of Emission Points
The Freeman Corporation - Winchester, Kentucky
2019 Permit Renewal Application

EP No.	Name	Status	Unit Type	Emission Type	Control
~~EP 55~~	~~Prentice Clipper~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~44 CYCLONE 1~~
~~EP 56~~	~~Ompec Clipper~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~44 CYCLONE 1~~
~~EP 57~~	~~Double Knife Guillotine~~	~~INACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~44 CYCLONE 1~~
~~EP 58~~	~~Lawson Clipper~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~44 CYCLONE 1~~
~~EP 59~~	~~Seybold Clipper~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~44 CYCLONE 1~~
EP 60	Super Clipper (Capital)~~Elliot Bay Clipper~~	ACTIVE	WOOD CUTTING	PM	44 CYCLONE 1
~~EP 61~~	~~Zeno Grinder~~	~~ACTIVE~~	~~WOOD CUTTING~~	~~PM~~	~~NONE~~
EP 62	NEW Butt-end Reducer, Bark Bin	ACTIVE	WOOD CUTTING	PM	NONE
EP 63	Paul Saw_01	ACTIVE	WOOD CUTTING	PM	NONE
EP 64	Paul Saw_02	FUTURE	WOOD CUTTING	PM	NONE
EP 65	Veneer Sizing Bandsaw	~~FUTURE~~ACTIVE	WOOD CUTTING	PM	NONE

KENTUCKY DIVISION FOR AIR QUALITY
KENTUCKY EMISSIONS INVENTORY SYSTEM
DETAILED PLANT INFORMATION

2023 Emissions Survey

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Freeman Corp
Freeman Corp
PO Box 96
Winchester, KY 40392

Plant Location
415 Magnolia St
Winchester, KY 40391

Attn: Mr. Scott S Hisle
Phone: 859-355-1421
Fax: 859-744-4363
Latitude: 38.007420
Longitude: -84.184080
E-mail: shisle@freemancorp.com

Record Date	Principal Product	Number of Employees	Area in Acres
2024/01	WOOD MANU.	270	38.30

State Plant Classification

8; TitleV Major/SynthMnr

SIC Code	SIC Description	NAIC Code	NAIC Description
2435	Hardwood Veneer and Plywood	321211	Hardwood Veneer and Plywood Manufacturing

Program Code	Subpart	Operating Status	Compliance Status
9-NSPS	9-DC-Small Indus-Com-InstitnSteamGenratr	O-Operating	3-In Compliance - Inspection
G-Area Source MACT	G-6J-Ind/Com/Inst Boilers	O-Operating	
Title V Permit	Not Applicable	O-Operating	3-In Compliance - Inspection
0-SIP Source	Not Applicable	O-Operating	3-In Compliance - Inspection

Plant Emission Totals in Tons Per Year

Pollutant ID/CAS	Pollutant Description	Actual	Actual Uncontrolled	Title V PTE	Max Potential
71-43-2	Benzene	0.3149933	0.3149933	0.9326773	0.9326773
124-38-9	Carbon Dioxide	14624.6880000	14624.6880000	43302.8734164	43302.8734164
630-08-0	CO (Carbon Monoxide)	44.9990400	44.9990400	133.2396105	133.2396105
50-00-0	Formaldehyde	0.3299930	0.3299930	0.9770905	0.9770905
7647-01-0	Hydrochloric Acid	1.4249696	1.4249696	4.2192543	4.2192543
74-82-8	Methane	1.5749664	1.5749664	4.6633864	4.6633864
10024-97-2	Nitrous Oxide	0.9749792	0.9749792	2.8868582	2.8868582
10102-44-0	NO2 (Nitrogen Dioxide)	16.4996480	16.4996480	48.8545239	48.8545239
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	32.9150060	33.3021690	179.5214486	179.5214486
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	24.4954455	24.8826085	81.1238964	81.1238964
PM-FIL	PT (Particulate Matter)	33.5501720	35.4193890	185.5314108	185.5314108
7446-09-5	SO2 (Sulfur Dioxide)	1.8749600	1.8749600	5.5516504	5.5516504
VOC	VOC (Volatile Organic Compounds)	1.6081342	1.6081342	9.9088655	9.9088655

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Plant Notes from MasterFile:

PLANT BACKGROUND NOTES:

79.299 PTS 1 AND 2 CEASED OPERATION 8-23-77.EQUIPMENT HAS BEEN DISMANTLED

PERMIT EVAL & REVIEW NOTES:

83.027 6860/CONST. OF A SIDE CLIPPER & A VENEER CHIPPER

E I SECTION NOTES:

85.179 8276/CONSTRUCTION OF NEW WOOD FIRED BOILER

90.284 B075/CONST. OF A NEW 12MMBTU/HR WOOD FIRE BOILER & PRODUCTION INCREASE AT EM PT 06 (02).

96.159 E443/INSTALLATION OF A WOOD/BARK FIRED BOILER

87.029 EMISSION POINTS 01 & 02 TEPEE WASTE BURNER WERE DELETED ON 1-28-87

9/13/04 Emission factors are post-control for emission points that show a control efficiency of zero associated with control equipment. The emission points exhaust inside the building.

Source in violation - no compliance certification form completed. log 54048, 8/26/04 REG

Per 2003 survey, PM10/PT emission factors for EQPT-3,4,10 revised. 9/29/04 mkd

Per V-08-047, COMB05 - emission unit 13 - Wet Wood Boiler #4 was removed. 10/28/09 mlm.

Per 2009 survey, SCC codes changed back to tons at EQPT05,EQPT06, EQPT07, EQPT11, EQPT12, and EQPT27. The emission factor was from V-08-047 and was adjusted to tons. 5/31/10 mlm.

Per V-14-007: Comb 01, Comb 02, Comb 05 removed from permit and database. Eqpt 02, Eqpt 21, Eqpt 22 removed from database due to being duplicates of pre-existing equipment. 11/17/2017 jfl.

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

EMISSIONS SUMMARY BY Equipment ID (SI):

Equipment ID (SI):	**Equipment Description**	**Record Date**
COMB0000000003 011	Wood-Fired Boiler #1 (EU11)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
71-43-2	Benzene	0.1263721	0.1263721	0.2207520	0.2207520
124-38-9	Carbon Dioxide	5867.2770000	5867.2770000	10249.2013666	10249.2013666
630-08-0	CO (Carbon Monoxide)	18.0531600	18.0531600	31.5360042	31.5360042
50-00-0	Formaldehyde	0.1323898	0.1323898	0.2312640	0.2312640
7647-01-0	Hydrochloric Acid	0.5716834	0.5716834	0.9986401	0.9986401
74-82-8	Methane	0.6318606	0.6318606	1.1037602	1.1037602
10024-97-2	Nitrous Oxide	0.3911518	0.3911518	0.6832801	0.6832801
10102-44-0	NO2 (Nitrogen Dioxide)	6.6194920	6.6194920	11.5632015	11.5632015
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	4.9345304	4.9345304	8.6198412	8.6198412
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	4.9345304	4.9345304	8.6198412	8.6198412
PM-FIL	PT (Particulate Matter)	4.9345304	4.9345304	8.6198412	8.6198412
7446-09-5	SO2 (Sulfur Dioxide)	0.7522150	0.7522150	1.3140002	1.3140002
VOC	VOC (Volatile Organic Compounds)	0.5115062	0.5115062	0.8935201	0.8935201

Equipment ID (SI):	**Equipment Description**	**Record Date**
COMB0000000004 012	Wood-Fired Boiler #2 (EU12)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
71-43-2	Benzene	0.0215418	0.0215418	0.1839601	0.1839601
124-38-9	Carbon Dioxide	1000.1550000	1000.1550000	8541.0037580	8541.0037580
630-08-0	CO (Carbon Monoxide)	3.0774000	3.0774000	26.2800116	26.2800116
50-00-0	Formaldehyde	0.0225676	0.0225676	0.1927201	0.1927201
7647-01-0	Hydrochloric Acid	0.0974510	0.0974510	0.8322004	0.8322004
74-82-8	Methane	0.1077090	0.1077090	0.9198004	0.9198004
10024-97-2	Nitrous Oxide	0.0666770	0.0666770	0.5694003	0.5694003
10102-44-0	NO2 (Nitrogen Dioxide)	1.1283800	1.1283800	9.6360042	9.6360042
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.9437360	0.9437360	8.0592036	8.0592036
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.9437360	0.9437360	8.0592036	8.0592036
PM-FIL	PT (Particulate Matter)	0.9437360	0.9437360	8.0592036	8.0592036
7446-09-5	SO2 (Sulfur Dioxide)	0.1282250	0.1282250	1.0950005	1.0950005
VOC	VOC (Volatile Organic Compounds)	0.0871930	0.0871930	0.7446003	0.7446003

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description**	**Record Date**
COMB0000000006 015	Wood-Fired Boiler #3 (EU15)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
71-43-2	Benzene	0.1670794	0.1670794	0.5279652	0.5279652
124-38-9	Carbon Dioxide	7757.2560000	7757.2560000	24512.6682918	24512.6682918
630-08-0	CO (Carbon Monoxide)	23.8684800	23.8684800	75.4235947	75.4235947
50-00-0	Formaldehyde	0.1750355	0.1750355	0.5531064	0.5531064
7647-01-0	Hydrochloric Acid	0.7558352	0.7558352	2.3884138	2.3884138
74-82-8	Methane	0.8353968	0.8353968	2.6398258	2.6398258
10024-97-2	Nitrous Oxide	0.5171504	0.5171504	1.6341779	1.6341779
10102-44-0	NO2 (Nitrogen Dioxide)	8.7517760	8.7517760	27.6553181	27.6553181
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	13.4061296	13.4061296	42.3629191	42.3629191
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	13.4061296	13.4061296	42.3629191	42.3629191
PM-FIL	PT (Particulate Matter)	13.4061296	13.4061296	42.3629191	42.3629191
7446-09-5	SO2 (Sulfur Dioxide)	0.9945200	0.9945200	3.1426498	3.1426498
VOC	VOC (Volatile Organic Compounds)	0.6762736	0.6762736	2.1370019	2.1370019

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000001 007	Clipping Chipper (EU07)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.3420000	0.3420000	2.6411400	2.6411400
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1539000	0.1539000	1.1885130	1.1885130
PM-FIL	PT (Particulate Matter)	0.3420000	0.3420000	2.6411400	2.6411400

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000003 010	Haul Roads and Log Yard (EU10)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.1659270	0.5530900	1.5700069	1.5700069
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1659270	0.5530900	1.5700069	1.5700069
PM-FIL	PT (Particulate Matter)	0.8010930	2.6703100	7.5799691	7.5799691

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000004 14a,b	Debarker, Fletch Mill (EU14a,14b)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0198452	0.0198452	0.1899694	0.1899694
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0029768	0.0029768	0.0284954	0.0284954
PM-FIL	PT (Particulate Matter)	0.0198452	0.0198452	0.1899694	0.1899694

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000005 027	Indirect Heated Veneer Dryer (IA2)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
VOC	VOC (Volatile Organic Compounds)	0.0609984	0.0609984	0.3185048	0.3185048

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000006 028	Indirect Heated Veneer Dryer (IA2)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
VOC	VOC (Volatile Organic Compounds)	0.0590216	0.0590216	0.3277817	0.3277817

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000007 29a	Indirect Heated Veneer Dryer (IA2)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
VOC	VOC (Volatile Organic Compounds)	0.0178618	0.0178618	0.3277817	0.3277817

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000008 030	Bolt Cut-Off Saw (EU30)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	1.1600000	1.1600000	63.1946400	63.1946400
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1740000	0.1740000	9.4791960	9.4791960
PM-FIL	PT (Particulate Matter)	1.1600000	1.1600000	63.1946400	63.1946400

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000009 031	Round-Up Lather (EU31)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0017400	0.0017400	0.4535928	0.4535928
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0003306	0.0003306	0.0861826	0.0861826
PM-FIL	PT (Particulate Matter)	0.0017400	0.0017400	0.4535928	0.4535928

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000010 323334	Rotary Peeler, Clipping Line, Veneer Chipper (EU32,33,34)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0246368	0.0246368	2.2065871	2.2065871
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0036955	0.0036955	0.3309881	0.3309881
PM-FIL	PT (Particulate Matter)	0.0246368	0.0246368	2.2065871	2.2065871

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000011 035	Indirect Heated Veneer Dryer (IA2)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
VOC	VOC (Volatile Organic Compounds)	0.1610386	0.1610386	0.1082298	0.1082298

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000012 036	Indirect Heated Veneer Dryer (IA2)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
VOC	VOC (Volatile Organic Compounds)	0	0	0.1607986	0.1607986

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000013 040	Sawdust Unloading into Silos (EU40)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0181860	0.0181860	0.9096209	0.9096209
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0027279	0.0027279	0.1364431	0.1364431
PM-FIL	PT (Particulate Matter)	0.0181860	0.0181860	0.9096209	0.9096209

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000014 041	Sawdust Unloading from Silos (EU41)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0435165	0.0435165	2.1765928	2.1765928
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0065275	0.0065275	0.3264889	0.3264889
PM-FIL	PT (Particulate Matter)	0.0435165	0.0435165	2.1765928	2.1765928

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000015 18	Skinning Line 1 (EU18)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0056074	0.0056074	0.2522782	0.2522782
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0008418	0.0008418	0.0378728	0.0378728
PM-FIL	PT (Particulate Matter)	0.0056074	0.0056074	0.2522782	0.2522782

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000016 19	Flitch Cutoff Saw (EU19)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0000577	0.0000577	0.0342658	0.0342658
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0000087	0.0000087	0.0051699	0.0051699
PM-FIL	PT (Particulate Matter)	0.0000577	0.0000577	0.0342658	0.0342658

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000017 20	Planer and Groover (EU20)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0206185	0.0206185	0.6222064	0.6222064
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0030937	0.0030937	0.0933597	0.0933597
PM-FIL	PT (Particulate Matter)	0.0206185	0.0206185	0.6222064	0.6222064

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000018 042	Chip Unloading from Storage to Boilers (EU42)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.3767100	0.3767100	5.6142840	5.6142840
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0565065	0.0565065	0.8421426	0.8421426
PM-FIL	PT (Particulate Matter)	0.3767100	0.3767100	5.6142840	5.6142840

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000019 21	Veneer Mill Hog (EU21)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.7142025	0.7142025	0.8347185	0.8347185
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1074255	0.1074255	0.1255527	0.1255527
PM-FIL	PT (Particulate Matter)	0.7142025	0.7142025	0.8347185	0.8347185

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000020 26	Flitch Ripsaw (EU26)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0133110	0.0133110	0.1257498	0.1257498
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0025310	0.0025310	0.0239108	0.0239108
PM-FIL	PT (Particulate Matter)	0.0133110	0.0133110	0.1257498	0.1257498

Equipment ID (SI):	Equipment Description	Record Date
EQPT0000000023 37	Joiner/ Splicer/ Gluer (IA7)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		ACTUAL EMISSIONS (TONS/YEAR)	UNCONTROLLED EMISSIONS (TONS/YEAR `	TITLE V PTE (TONS/YEAR)	MAX POTENTIAL (TONS/YEAR)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0	0	0.3504280	0.3504280
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0	0	0.3504280	0.3504280
PM-FIL	PT (Particulate Matter)	0	0	0.3504280	0.3504280
VOC	VOC (Volatile Organic Compounds)	0	0	4.5628650	4.5628650

Facility ID:	2104900004	**AI ID:**	811	**YEAR OF INVENTORY:**	2023	Clark County

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000024	Cutting Kiln Dried Lumber (EU39)	2015/02
39		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.2915640	0.2915640	0.7481916	0.7481916
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1312038	0.1312038	0.3366862	0.3366862
PM-FIL	PT (Particulate Matter)	0.2915640	0.2915640	0.7481916	0.7481916

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000025	Rotary Core Chipper (EU47)	2015/02
47		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.1337500	0.1337500	1.4673000	1.4673000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0254125	0.0254125	0.2787870	0.2787870
PM-FIL	PT (Particulate Matter)	0.1337500	0.1337500	1.4673000	1.4673000

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000026	Nicholson Chipper (EU48)	2015/02
48		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.6250000	0.6250000	12.0888000	12.0888000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1187500	0.1187500	2.2968720	2.2968720
PM-FIL	PT (Particulate Matter)	0.6250000	0.6250000	12.0888000	12.0888000

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000027	Indirect Heated Veneer Dryer (IA2)	2015/02
29b		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
VOC	VOC (Volatile Organic Compounds)	0.0342410	0.0342410	0.3277817	0.3277817

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000028	Slicing Machines 1-5 (EU22-25b)	2015/02
22-25b		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	9.3470000	9.3470000	2.6499000	2.6499000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	4.2061500	4.2061500	1.1924550	1.1924550
PM-FIL	PT (Particulate Matter)	9.3470000	9.3470000	2.6499000	2.6499000

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000032	Veneer Clipping Machines (EU55-60)	2015/02
55-60		

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR `**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0290000	0.0290000	15.1110000	15.1110000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0043500	0.0043500	2.2666500	2.2666500
PM-FIL	PT (Particulate Matter)	0.0290000	0.0290000	15.1110000	15.1110000

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description**	**Record Date**
EQPT0000000033 62	Butt End Reducer (EU62)	2015/02

POLLUTANT ID/CAS and DESCRIPTION		**ACTUAL EMISSIONS (TONS/YEAR)**	**UNCONTROLLED EMISSIONS (TONS/YEAR**	**TITLE V PTE (TONS/YEAR)**	**MAX POTENTIAL (TONS/YEAR)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.2979375	0.2979375	7.2382128	7.2382128
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0446906	0.0446906	1.0857319	1.0857319
PM-FIL	PT (Particulate Matter)	0.2979375	0.2979375	7.2382128	7.2382128

Compliance by Equipment ID (SI):

Equipment ID (SI)		**Equipment ID (SI) Description**	**Program Compliance Status**	**Operating Status**	**Compliance Status**
COMB0000000003	011	Wood-Fired Boiler #1 (EU11)	0-SIP Source	O-Operating	3-In Compliance - Inspection
COMB0000000003		Wood-Fired Boiler #1 (EU11)	9-NSPS	O-Operating	3-In Compliance - Inspection
COMB0000000003		Wood-Fired Boiler #1 (EU11)	G-Area Source MACT	O-Operating	4-In Compliance - Certification
COMB0000000004	012	Wood-Fired Boiler #2 (EU12)	0-SIP Source	O-Operating	4-In Compliance - Certification
COMB0000000004		Wood-Fired Boiler #2 (EU12)	9-NSPS	O-Operating	4-In Compliance - Certification
COMB0000000004		Wood-Fired Boiler #2 (EU12)	G-Area Source MACT	O-Operating	4-In Compliance - Certification
COMB0000000006	015	Wood-Fired Boiler #3 (EU15)	0-SIP Source	O-Operating	3-In Compliance - Inspection
COMB0000000006		Wood-Fired Boiler #3 (EU15)	9-NSPS	O-Operating	3-In Compliance - Inspection
COMB0000000006		Wood-Fired Boiler #3 (EU15)	G-Area Source MACT	O-Operating	4-In Compliance - Certification
Equipment ID (SI)		**Equipment ID (SI) Description**	**Program Compliance Status**	**Operating Status**	**Compliance Status**
EQPT0000000001	007	Clipping Chipper (EU07)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000003	010	Haul Roads and Log Yard (EU10)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000004	14a,b	Debarker, Fletch Mill (EU14a,14b)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000005	027	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000006	028	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000007	29a	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000008	030	Bolt Cut-Off Saw (EU30)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000009	031	Round-Up Lather (EU31)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000010	323334	Rotary Peeler, Clipping Line, Veneer Chipper (EU32,33,	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000011	035	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000012	036	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	9-In Compliance - Shut Down
EQPT0000000013	040	Sawdust Unloading into Silos (EU40)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000014	041	Sawdust Unloading from Silos (EU41)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000015	18	Skinning Line 1 (EU18)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000016	19	Flitch Cutoff Saw (EU19)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000017	20	Planer and Groover (EU20)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000018	042	Chip Unloading from Storage to Boilers (EU42)	0-SIP Source	O-Operating	3-In Compliance - Inspection
EQPT0000000019	21	Veneer Mill Hog (EU21)	0-SIP Source	O-Operating	2-In Compliance - Source Test
EQPT0000000020	26	Flitch Ripsaw (EU26)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000023	37	Joiner/ Splicer/ Gluer (IA7)	0-SIP Source	O-Operating	9-In Compliance - Shut Down
EQPT0000000024	39	Cutting Kiln Dried Lumber (EU39)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000025	47	Rotary Core Chipper (EU47)	0-SIP Source	O-Operating	2-In Compliance - Source Test
EQPT0000000026	48	Nicholson Chipper (EU48)	0-SIP Source	O-Operating	2-In Compliance - Source Test
EQPT0000000027	29b	Indirect Heated Veneer Dryer (IA2)	0-SIP Source	O-Operating	2-In Compliance - Source Test
EQPT0000000028	22-25b	Slicing Machines 1-5 (EU22-25b)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000032	55-60	Veneer Clipping Machines (EU55-60)	0-SIP Source	O-Operating	4-In Compliance - Certification
EQPT0000000033	62	Butt End Reducer (EU62)	0-SIP Source	O-Operating	4-In Compliance - Certification

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule			% Annual Throughput			
		Hours/Day	Days/Week	Weeks/Year	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
COMB0000000003 011	Wood-Fired Boiler #1 (EU11) Wickes Model 62755 Capacity: 12.00 MMBtu/hr Fuel: Wood Waste	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	55.30	3.00		4767.00	11.24	450.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 011

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Tons Wood Burned	10300903	External Combustion Boilers, Commercial/Institutional (1-03), Wood/Bark Waste (1-03-009), Wood-fired Boiler (1-03-009-03)

Number of Boilers: 1

Boiler Number and Capacity (mmBTU/hr):

ID#1: 12

SCC Units:

Tons Wood Burned

Applicable Regulation

59:015; 40 CFR 60, Subpart Dc; 40 CFR 63, Subpart 6J

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
02/28/1991	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.304348	6541.000000	8760.00	11426.00	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
71-43-2	Benzene	0.0386400				0.12637212	0.12637212	0.22075203
124-38-9	Carbon Dioxide	1794.0000000				5867.27700000	5867.27700000	10249.20136656
630-08-0	CO (Carbon Monoxide)	5.5200000				18.05316000	18.05316000	31.53600420
50-00-0	Formaldehyde	0.0404800				0.13238984	0.13238984	0.23126403
7647-01-0	Hydrochloric Acid	0.1748000				0.57168340	0.57168340	0.99864013
74-82-8	Methane	0.1932000				0.63186060	0.63186060	1.10376015
10024-97-2	Nitrous Oxide	0.1196000				0.39115180	0.39115180	0.68328009
10102-44-0	NO2 (Nitrogen Dioxide)	2.0240000				6.61949200	6.61949200	11.56320154
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	1.5088000				4.93453040	4.93453040	8.61984115
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	1.5088000				4.93453040	4.93453040	8.61984115
PM-FIL	PT (Particulate Matter)	1.5088000				4.93453040	4.93453040	8.61984115
7446-09-5	SO2 (Sulfur Dioxide)	0.2300000				0.75221500	0.75221500	1.31400018
VOC	VOC (Volatile Organic Compounds)	0.1564000				0.51150620	0.51150620	0.89352012

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
COMB0000000004 012	Wood-Fired Boiler #2 (EU12) Wickes Model 61004 Capacity: 10.00 MMBtu/hr Fuel: Wood Waste	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	46.00	2.60		4767.00	14.96	450.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 012

Process ID:	**Process Description:**
1	Tons Wood Burned

SCC Code and Description:

10300903 External Combustion Boilers, Commercial/Institutional (1-03), Wood/Bark Waste (1-03-009), Wood-fired Boiler (1-03-009-03)

Number of Boilers: 1

Boiler Number and Capacity (mmBTU/hr):

ID#1: 10

SCC Units:

Tons Wood Burned

Applicable Regulation

59:015; 40 CFR 60, Subpart Dc; 40 CFR 63, Subpart 6J

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
05/29/1991	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.086957	1115.000000	8760.00	9521.00	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
71-43-2	Benzene	0.0386400				0.02154180	0.02154180	0.18396008
124-38-9	Carbon Dioxide	1794.0000000				1000.15500000	1000.15500000	8541.00375804
630-08-0	CO (Carbon Monoxide)	5.5200000				3.07740000	3.07740000	26.28001156
50-00-0	Formaldehyde	0.0404800				0.02256760	0.02256760	0.19272008
7647-01-0	Hydrochloric Acid	0.1748000				0.09745100	0.09745100	0.83220037
74-82-8	Methane	0.1932000				0.10770900	0.10770900	0.91980040
10024-97-2	Nitrous Oxide	0.1196000				0.06667700	0.06667700	0.56940025
10102-44-0	NO2 (Nitrogen Dioxide)	2.0240000				1.12838000	1.12838000	9.63600424
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	1.6928000				0.94373600	0.94373600	8.05920355
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	1.6928000				0.94373600	0.94373600	8.05920355
PM-FIL	PT (Particulate Matter)	1.6928000				0.94373600	0.94373600	8.05920355
7446-09-5	SO2 (Sulfur Dioxide)	0.2300000				0.12822500	0.12822500	1.09500048
VOC	VOC (Volatile Organic Compounds)	0.1564000				0.08719300	0.08719300	0.74460033

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
COMB0000000006 015	Wood-Fired Boiler #3 (EU15) Hurst Capacity: 28.7 MMBtu/hr Fuel: Wood Waste	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	40.80	2.60		4500.00	14.13	424.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 015

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Tons Wood Burned	10300903	External Combustion Boilers, Commercial/Institutional (1-03), Wood/Bark Waste (1-03-009), Wood-fired Boiler (1-03-009-03)

Number of Boilers: 1

Boiler Number and Capacity (mmBTU/hr):

ID#1: 28.7

SCC Units:

Tons Wood Burned

Applicable Regulation

59:015; 40 CFR 60, Subpart Dc; 40 CFR 63, Subpart 6J

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
08/31/1996	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
3.119565	8648.000000	8760.00	27327.39	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
71-43-2	Benzene	0.0386400				0.16707936	0.16707936	0.52796516
124-38-9	Carbon Dioxide	1794.0000000				7757.25600000	7757.25600000	24512.66829180
630-08-0	CO (Carbon Monoxide)	5.5200000				23.86848000	23.86848000	75.42359474
50-00-0	Formaldehyde	0.0404800				0.17503552	0.17503552	0.55310636
7647-01-0	Hydrochloric Acid	0.1748000				0.75583520	0.75583520	2.38841383
74-82-8	Methane	0.1932000				0.83539680	0.83539680	2.63982582
10024-97-2	Nitrous Oxide	0.1196000				0.51715040	0.51715040	1.63417789
10102-44-0	NO2 (Nitrogen Dioxide)	2.0240000				8.75177600	8.75177600	27.65531807
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	3.1004000				13.40612960	13.40612960	42.36291905
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	3.1004000				13.40612960	13.40612960	42.36291905
PM-FIL	PT (Particulate Matter)	3.1004000				13.40612960	13.40612960	42.36291905
7446-09-5	SO2 (Sulfur Dioxide)	0.2300000				0.99452000	0.99452000	3.14264978
VOC	VOC (Volatile Organic Compounds)	0.1564000				0.67627360	0.67627360	2.13700185

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000001 007	Clipping Chipper (EU07) RFR Side Clippers Capital End Clipper Cremona Side Clipper Cremona End Clippers Infeed Tables Under Floor Conveyor Belt Capital Hog/Chipper	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	46.00	6.67		7400.00	3.53	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 007

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Clipping Chipper	39999999	Industrial Processes, Miscellaneous Manufacturing Industries (3-99), Miscellaneous Industrial Processes (3-99-999), See Comment ** (3-99-999-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:	**Applicable Regulation**
Tons Material Processed	59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
07/30/1979	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.301500	342.000000	8760.00	2641.14	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	2.0000000				0.34200000	0.34200000	2.64114000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.9000000				0.15390000	0.15390000	1.18851300
PM-FIL	PT (Particulate Matter)	2.0000000				0.34200000	0.34200000	2.64114000

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000003 010	Haul Roads and Log Yard (EU10)	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
			16.00			77.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 010

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Haul Road & Log Yard	30300519	Industrial Processes, Primary Metal Production (3-03), Primary Copper Smelting (3-03-005), Unpaved Road Traffic: Fugitive Emissions (3-03-005-19)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Miles Vehicle Travelled

Applicable Regulation 63:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
01/01/1967	Y	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.766900	710.000000	8760.00	6718.04	VMT/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	1.5580000	Dust Suppression	70.00	70.00	0.16592700	0.55309000	1.57000688
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	1.5580000	Dust Suppression	70.00	70.00	0.16592700	0.55309000	1.57000688
PM-FIL	PT (Particulate Matter)	7.5220000	Dust Suppression	70.00	70.00	0.80109300	2.67031000	7.57996905

Facility ID:	2104900004	**AI ID:**	811	**YEAR OF INVENTORY:**	2023	Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	 Days/Week	 Weeks/Year	% Annual Throughput Dec-Feb	 Mar-May	 Jun-Aug	 Sep-Nov
EQPT0000000004	Debarker, Fletch Mill (EU14a,14b)							
14a,b	EU14a: NTF Butt-End Reducer and Nicholson A-5 Debarker EU14b:Cremona SAT Model 5200	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	60.00	14.00		34200.00	3.70	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 14a,b

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Flitch Mill	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
07/31/1990	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
2.080000	1992.000000	8760.00	18220.80	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0199000				0.01982040	0.01982040	0.18129696
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0029850				0.00297306	0.00297306	0.02719454
PM-FIL	PT (Particulate Matter)	0.0199000				0.01982040	0.01982040	0.18129696

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 14a,b

Process ID:	**Process Description:**	**SCC Code and Description:**	
2	Debarker	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
07/31/1990	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
4.950000	124.000000	8760.00	43362.00	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0004000				0.00002480	0.00002480	0.00867240
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0000600				0.00000372	0.00000372	0.00130086
PM-FIL	PT (Particulate Matter)	0.0004000				0.00002480	0.00002480	0.00867240

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule			% Annual Throughput			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000005 027	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Weber	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	41.00	1.50		5000.00	47.16	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 027

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Weber Dryer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:	**Applicable Regulation**
Tons Material Processed	59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
03/31/1990	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.030000	1728.000000	8760.00	9022.80	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
VOC	VOC (Volatile Organic Compounds)	0.0706000				0.06099840	0.06099840	0.31850484

Equipment ID (SI):	**Equipment Description:**	Operating Schedule			% Annual Throughput			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000006 028	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Babcock	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	41.00	1.50		5000.00	47.16	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 028

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Babcock Dryer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:	**Applicable Regulation**
Tons Material Processed	59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
07/25/1995	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.060000	1672.000000	8760.00	9285.60	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
VOC	VOC (Volatile Organic Compounds)	0.0706000				0.05902160	0.05902160	0.32778168

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule** Hours/Day	Days/Week	Weeks/Year	**% Annual Throughput** Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000007 29a	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Omeco	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	41.00	1.50		5000.00	47.16	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 29a

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Omeco Dryer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
12/31/2000	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.060000	506.000000	8760.00	9285.60	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
VOC	VOC (Volatile Organic Compounds)	0.0706000				0.01786180	0.01786180	0.32778168

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule** Hours/Day	Days/Week	Weeks/Year	**% Annual Throughput** Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000008 030	Bolt Cut-Off Saw (EU30)	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	32.00	4.00		35000.00	46.42	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 030

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Bolt Cut Off Saw	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
06/30/1991	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
7.214000	1160.000000	8760.00	63194.64	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	2.0000000	Process Enclosed			1.16000000	1.16000000	63.19464000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.3000000	Process Enclosed			0.17400000	0.17400000	9.47919600
PM-FIL	PT (Particulate Matter)	2.0000000	Process Enclosed			1.16000000	1.16000000	63.19464000

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule** Hours/Day	Days/Week	Weeks/Year	**% Annual Throughput** Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000009 031	Round-Up Lather (EU31)	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	32.00	4.00		35000.00	46.42	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 031

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Round-Up Lathe	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
12/31/2000	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
5.178000	174.000000	8760.00	45359.28	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0200000	Process Enclosed			0.00174000	0.00174000	0.45359280
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0038000	Process Enclosed			0.00033060	0.00033060	0.08618263
PM-FIL	PT (Particulate Matter)	0.0200000	Process Enclosed			0.00174000	0.00174000	0.45359280

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	Equipment Description:	Hours/Day	Days/Week	Weeks/Year	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000010 323334	Rotary Peeler, Clipping Line, Veneer Chipper (EU32,33,34)	24	7	52	25	25	25	25

Operating Schedule: Hours/Day, Days/Week, Weeks/Year; % Annual Throughput: Dec-Feb, Mar-May, Jun-Aug, Sep-Nov

EU32: Coe M249 66" Lathe with XY Charger
EU33: Rotary Clipping Line
EU34: Black Clawson Chipper and Infeed Conveyor System

Stack Information:

Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
63.00	12.67		27000.00	3.57	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 323334

Process ID:	Process Description:	SCC Code and Description:	
1	Rotary Line	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation: 59:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
07/30/1979	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
5.470000	535.000000	8760.00	47917.20	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0921000				0.02463675	0.02463675	2.20658706
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0138150				0.00369551	0.00369551	0.33098806
PM-FIL	PT (Particulate Matter)	0.0921000				0.02463675	0.02463675	2.20658706

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000011 035	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Cremona	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
	35.00	1.50		10000.00	94.31	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 035

Process ID:	Process Description:	SCC Code and Description:	
1	Cremona Dryer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:	Applicable Regulation
Tons Material Processed	59:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
01/31/1991	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
0.350000	4562.000000	8760.00	3066.00	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
VOC	VOC (Volatile Organic Compounds)	0.0706000				0.16103860	0.16103860	0.10822980

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000012 036	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Coe M62	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
	35.00	1.50		10000.00	94.31	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 036

Process ID:	Process Description:	SCC Code and Description:	
1	Coe M62 Dryer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:	Applicable Regulation
Tons Material Processed	59:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
08/26/2004	N	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
0.520000	0	8760.00	4555.52	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
VOC	VOC (Volatile Organic Compounds)	0.0706000				0	0	0.16079856

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	Equipment Description:	Operating Schedule Hours/Day	Operating Schedule Days/Week	Operating Schedule Weeks/Year	% Annual Throughput Dec-Feb	% Annual Throughput Mar-May	% Annual Throughput Jun-Aug	% Annual Throughput Sep-Nov
EQPT0000000013 040	Sawdust Unloading into Silos (EU40)	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
			10.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 040

Process ID:	Process Description:	SCC Code and Description:	
1	Sawdust Unloading to Silo	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 63:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
08/04/1997	Y	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
7.417000	1299.000000	8760.00	64972.92	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0280000				0.01818600	0.01818600	0.90962088
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0042000				0.00272790	0.00272790	0.13644313
PM-FIL	PT (Particulate Matter)	0.0280000				0.01818600	0.01818600	0.90962088

KENTUCKY DIVISION FOR AIR QUALITY
KENTUCKY EMISSIONS INVENTORY SYSTEM
DETAILED PLANT INFORMATION

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000014 041	Sawdust Unloading from Silos (EU41)	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
			10.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 041

Process ID:	Process Description:	SCC Code and Description:	
1	Sawdust Unloading from Silo	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 63:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
08/08/1997	Y	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
7.417000	1299.000000	8760.00	64972.92	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0670000				0.04351650	0.04351650	2.17659282
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0100500				0.00652748	0.00652748	0.32648892
PM-FIL	PT (Particulate Matter)	0.0670000				0.04351650	0.04351650	2.17659282

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000015 18	Skinning Line 1 (EU18) Air Angle Grinders with Knotter Heads	24	7	52	25	25	25	25

Stack Information:

Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
60.00	14.00		34200.00	3.70	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 18

Process ID:	Process Description:	SCC Code and Description:	
1	Skinning Line	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 61:020

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
04/30/1967	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
1.890000	368.000000	8760.00	16556.40	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0304750				0.00560740	0.00560740	0.25227815
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0045750				0.00084180	0.00084180	0.03787277
PM-FIL	PT (Particulate Matter)	0.0304750				0.00560740	0.00560740	0.25227815

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Hours/Day	Days/Week	Weeks/Year	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000016 19	Flitch Cutoff Saw (EU19) 48" Diam. Saw	24	7	52	25	25	25	25

Operating Schedule: Hours/Day, Days/Week, Weeks/Year; % Annual Throughput: Dec-Feb, Mar-May, Jun-Aug, Sep-Nov

Stack Information:

Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
60.00	14.00		34200.00	3.70	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 19

Process ID:	Process Description:	SCC Code and Description:	
1	Flitch Cut-Off Saw	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
03/31/1991	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
1.830000	27.000000	8760.00	16030.80	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0042750				0.00005771	0.00005771	0.03426584
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0006450				0.00000871	0.00000871	0.00516993
PM-FIL	PT (Particulate Matter)	0.0042750				0.00005771	0.00005771	0.03426584

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000017 20	Planer and Groover (EU20) 48" Diam. Saw	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	60.00	14.00		34200.00	3.70	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 20

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Flitch Planing & Grooving	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
07/16/1991	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.750000	508.000000	8760.00	15330.00	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0811750				0.02061845	0.02061845	0.62220638
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0121800				0.00309372	0.00309372	0.09335970
PM-FIL	PT (Particulate Matter)	0.0811750				0.02061845	0.02061845	0.62220638

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000018 042	Chip Unloading from Storage to Boilers (EU42)	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
			10.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 042

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Chip Unloading to Boilers	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation: 63:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
08/04/1997	Y	Y	F		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
2.210000	1299.000000	8760.00	19359.60	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.5800000				0.37671000	0.37671000	5.61428400
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0870000				0.05650650	0.05650650	0.84214260
PM-FIL	PT (Particulate Matter)	0.5800000				0.37671000	0.37671000	5.61428400

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule** Hours/Day	Days/Week	Weeks/Year	**% Annual Throughput** Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000019 21	Veneer Mill Hog (EU21) Lamb Hog/ Chipper	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
	63.00	12.67		27000.00	3.57	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 21

Process ID: 21

Process Description: Veneer Mill Hog

SCC Code and Description: 30700820 Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Chipping and Screening (3-07-008-20)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Wood Processed

Applicable Regulation 59:010

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
04/15/2008	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
0.105000	787.000000	8760.00	919.80	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	1.8150000				0.71420250	0.71420250	0.83471850
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.2730000				0.10742550	0.10742550	0.12555270
PM-FIL	PT (Particulate Matter)	1.8150000				0.71420250	0.71420250	0.83471850

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000020 26	Flitch Ripsaw (EU26) Rap Saw and Underground Conveyor	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	63.00	12.67		27000.00	3.57	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 26

Process ID:	**Process Description:**	**SCC Code and Description:**	
26	Flitch Rip Saw	30700802	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Log Sawing (3-07-008-02)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Logs Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
01/01/2000	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.440000	408.000000	8760.00	3854.40	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0652500	Cyclone / Centrifugal Collector			0.01331100	0.01331100	0.12574980
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0124070	Cyclone / Centrifugal Collector			0.00253103	0.00253103	0.02391077
PM-FIL	PT (Particulate Matter)	0.0652500	Cyclone / Centrifugal Collector			0.01331100	0.01331100	0.12574980

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule **Hours/Day**	 **Days/Week**	 **Weeks/Year**	% Annual Throughput **Dec-Feb**	 **Mar-May**	 **Jun-Aug**	 **Sep-Nov**
EQPT0000000023 37	Joiner/ Splicer/ Gluer (IA7) Insignificant Activity	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
			15.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 37

Process ID:	**Process Description:**	**SCC Code and Description:**	
37	Splicers w/ Glue	30702021	Industrial Processes, Pulp and Paper and Wood Products (3-07), Furniture Manufacture (3-07-020), Veneer Hot Press, Urea Formaldehyde Resin (3-07-020-21)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: 1000 Square Feet Particleboard Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
11/30/2001	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
4.167000	0	8760.00	36502.92	1000 Sq Ft/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.0192000				0	0	0.35042803
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0192000				0	0	0.35042803
PM-FIL	PT (Particulate Matter)	0.0192000				0	0	0.35042803
VOC	VOC (Volatile Organic Compounds)	0.2500000				0	0	4.56286500

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000024 39	Cutting Kiln Dried Lumber (EU39)	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
			15.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 39

Process ID:	**Process Description:**	**SCC Code and Description:**	
39	Cutting Kiln Dried Lumber	39999999	Industrial Processes, Miscellaneous Manufacturing Industries (3-99), Miscellaneous Industrial Processes (3-99-999), See Comment ** (3-99-999-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
04/30/1988	Y	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.730000	2492.000000	8760.00	6394.80	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.2340000				0.29156400	0.29156400	0.74819160
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1053000				0.13120380	0.13120380	0.33668622
PM-FIL	PT (Particulate Matter)	0.2340000				0.29156400	0.29156400	0.74819160

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000025 47	Rotary Core Chipper (EU47) Morebark "Chip-Pack" 46" Disk Chipper	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	69.00	7.33		9000.00	3.55	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 47

Process ID:	**Process Description:**	**SCC Code and Description:**	
47	Rotary Core Chipper	30700802	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Log Sawing (3-07-008-02)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units:
Tons Logs Processed

Applicable Regulation
59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
09/15/2006	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.670000	535.000000	8760.00	5869.20	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.5000000				0.13375000	0.13375000	1.46730000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0950000				0.02541250	0.02541250	0.27878700
PM-FIL	PT (Particulate Matter)	0.5000000				0.13375000	0.13375000	1.46730000

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000026 48	Nicholson Chipper (EU48)	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
			15.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 48

Process ID: 48

Process Description: Nicholson Chipper

SCC Code and Description: 30700802 Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Log Sawing (3-07-008-02)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Logs Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
04/30/1988	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.380000	625.000000	8760.00	12088.80	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	2.0000000				0.62500000	0.62500000	12.08880000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.3800000				0.11875000	0.11875000	2.29687200
PM-FIL	PT (Particulate Matter)	2.0000000				0.62500000	0.62500000	12.08880000

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule**			**% Annual Throughput**			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000027 29b	Indirect Heated Veneer Dryer (IA2) Insignificant Activity Fezer	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	35.00	1.50		10000.00	94.31	320.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 29b

Process ID: 1

Process Description: Fezer Dryer

SCC Code and Description: 30700899 Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
04/15/2004	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
1.060000	970.000000	8760.00	9285.60	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
VOC	VOC (Volatile Organic Compounds)	0.0706000				0.03424100	0.03424100	0.32778168

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule			% Annual Throughput			
		Hours/Day	**Days/Week**	**Weeks/Year**	**Dec-Feb**	**Mar-May**	**Jun-Aug**	**Sep-Nov**
EQPT0000000028 22-25b	Slicing Machines 1-5 (EU22-25b) EU22: Capital Half Round 154" Slicer EU23: Capital Slicer 165" EU24: Capital Slicer 165" EU25a: Fezer Slicer 192" EU25b: Fezer Half Round FV54	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
	63.00	12.67		27000.00	3.57	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 22-25b

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Slicers	39999999	Industrial Processes, Miscellaneous Manufacturing Industries (3-99), Miscellaneous Industrial Processes (3-99-999), See Comment ** (3-99-999-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010; 61:020

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
03/30/1967	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
0.302500	9347.000000	8760.00	2649.90	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	2.0000000				9.34700000	9.34700000	2.64990000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.9000000				4.20615000	4.20615000	1.19245500
PM-FIL	PT (Particulate Matter)	2.0000000				9.34700000	9.34700000	2.64990000

KENTUCKY DIVISION FOR AIR QUALITY
KENTUCKY EMISSIONS INVENTORY SYSTEM
DETAILED PLANT INFORMATION

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	Operating Schedule Hours/Day	Days/Week	Weeks/Year	% Annual Throughput Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000032 55-60	Veneer Clipping Machines (EU55-60)	24	7	52	25	25	25	25

Stack Information:	Stack Height (ft)	Stack Diameter (ft)	Height of Release (ft)	Stack Flow Rate (acfm)	Stack Velocity (ft/sec)	Exit Temperature (F)
	63.00	12.67		27000.00	3.57	70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 55-60

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Veneer Clip Machines Wood Wast	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation

Construction Date:	Fugitive Emissions	Count Emission For PTE	Confidential Information	Sulfur Content % Sulfur	Use % Sulfur in emission calc	Ash Content % Ash	Use % Ash in emission calc
02/25/2015	N	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	Annual Throughput (SCC Units/yr)	Maximum Operating Limitation (hrs/yr)	Maximum Operating Limitation	Maximum Operating Description
6.900000	116.000000	8760.00	60444.00	Tons/Yr

Pollutant ID and Description		Emission Factor	Control Equipment Description	Actual Ctrl.	PTE Ctrl. Eff.	Actual Emissions	Unctrl Act Emissions (tons/yr)	PTE Emissions (tons/yr)
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.5000000				0.02900000	0.02900000	15.11100000
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.0750000				0.00435000	0.00435000	2.26665000
PM-FIL	PT (Particulate Matter)	0.5000000				0.02900000	0.02900000	15.11100000

KENTUCKY DIVISION FOR AIR QUALITY
KENTUCKY EMISSIONS INVENTORY SYSTEM
DETAILED PLANT INFORMATION

Facility ID: 2104900004 **AI ID:** 811 **YEAR OF INVENTORY:** 2023 Clark County

Equipment ID (SI):	**Equipment Description:**	**Operating Schedule** Hours/Day	Days/Week	Weeks/Year	**% Annual Throughput** Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
EQPT0000000033 62	Butt End Reducer (EU62) TS Butt-End Reducer and Bark Bin	24	7	52	25	25	25	25

Stack Information:	**Stack Height (ft)**	**Stack Diameter (ft)**	**Height of Release (ft)**	**Stack Flow Rate (acfm)**	**Stack Velocity (ft/sec)**	**Exit Temperature (F)**
			15.00			70.00

Equipment ID (SI) Detail Information: **Equipment ID (SI):** 62

Process ID:	**Process Description:**	**SCC Code and Description:**	
1	Butt-End Reducer	30700899	Industrial Processes, Pulp and Paper and Wood Products (3-07), Sawmill Operations (3-07-008), Other Not Classified (3-07-008-99)

Number of Boilers:

Boiler Number and Capacity (mmBTU/hr):

SCC Units: Tons Material Processed

Applicable Regulation 59:010

Construction Date:	**Fugitive Emissions**	**Count Emission For PTE**	**Confidential Information**	**Sulfur Content % Sulfur**	**Use % Sulfur in emission calc**	**Ash Content % Ash**	**Use % Ash in emission calc**
01/01/2014	Y	Y	N		N		N

Operating Information:

Maximum Hourly Operating Rate (SCC Units/hr)	**Annual Throughput (SCC Units/yr)**	**Maximum Operating Limitation (hrs/yr)**	**Maximum Operating Limitation**	**Maximum Operating Description**
2.080000	750.000000	8760.00	18221.00	Tons/Yr

Pollutant ID and Description		**Emission Factor**	**Control Equipment Description**	**Actual Ctrl.**	**PTE Ctrl. Eff.**	**Actual Emissions**	**Unctrl Act Emissions (tons/yr)**	**PTE Emissions (tons/yr)**
PM10-FIL	PM10 (Particulate Matter - 10 Microns Or Less)	0.7945000				0.29793750	0.29793750	7.23821280
PM25-FIL	PM2.5 (Particulate Matter - 2.5 Microns Or Less)	0.1191750				0.04469063	0.04469063	1.08573192
PM-FIL	PT (Particulate Matter)	0.7945000				0.29793750	0.29793750	7.23821280

From: Scott Hisle
To: Daniels, Stacie (EEC); paul.rodgers@cedarcreekengineering.com; Ateyeh, Ossama (EEC)
Cc: Bittner, Zachary P (EEC)
Subject: RE: Freeman air permit application
Date: Wednesday, June 4, 2025 11:42:11 AM
Attachments: image001.png
image002.png
image003.jpg
Hurst Boiler Spec Sheet.pdf
Wickes Boiler No. 1 Nameplate Photo.jpeg
Hurst Boiler Nameplate Photo.jpeg

As requested below, I am attaching photos of the nameplate from our Wickes Boiler 1 and our Hurst Boiler. Also including a spec sheet for the Hurst boiler. We have not been able to find a visible nameplate on our Wickes Boiler No.2 yet.

Sincerely,

Scott Hisle
CFO

From: Daniels, Stacie (EEC) <stacie.daniels@ky.gov>
Sent: Wednesday, June 04, 2025 8:18 AM
To: paul.rodgers@cedarcreekengineering.com; Ateyeh, Ossama (EEC) <ossama.ateyeh@ky.gov>
Cc: 'Scott Hisle' <shisle@freemancorp.com>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Re: Freeman air permit application

Hey Paul,

I worded this wrong: "...compliance with emission limitations should not rely on AP-42 emission factors unless they result in emissions which are orders of magnitude less than potential emissions calculated." It should have said "...compliance with emission limitations should not rely on AP-42 emission factors unless they result in potential emissions which are orders of magnitude less than the calculated allowable emissions from the emission standard."

Please let me know if you need any further clarity or have other questions which need addressed.

Kind Regards,
Stacie

From: Daniels, Stacie (EEC) <stacie.daniels@ky.gov>
Sent: Tuesday, June 3, 2025 10:10 AM
To: paul.rodgers@cedarcreekengineering.com <paul.rodgers@cedarcreekengineering.com>; Ateyeh, Ossama (EEC) <ossama.ateyeh@ky.gov>
Cc: 'Scott Hisle' <shisle@freemancorp.com>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Re: Freeman air permit application

Hi Paul,

After reviewing the history of Freeman, I calculated the emission standards for each boiler as follows:

The **Sourcewide Rating** is the total heat input capacity for all *affected facilities* at the source at the time of construction, where *affected facility,* as defined in 401 KAR 59:015, Section 1(1), is any "indirect heat exchanger having a heat input capacity greater than 1 MMBtu/hr."

The **Emission Standard** is calculated using 0.9634 x **Sourcewide Rating** ^ -0.2356 for EUs 11, 12, and 15, as required by 401 KAR 59:015, Section 4(1)(c).

As you stated, there's a PM standard for *each* boiler that is different for each boiler based on installation date.
For example, if the facility were to add another 2 MMBtu/hr boiler this year, the total heat input capacity at the source would be 52.7 MMBtu/hr (12+10+28.7+2), as EU09 and EU05 are no longer at the source. The emission limit on the new boiler would be 0.38 lb/MMBtu, more than the emission limit on EU15. I'm not sure what the "general intent" of the regulation was, but I know how the KY Division for Air Quality interprets the regulation, and this is how it is supposed to be calculated for every *affected facility* regulated by 401 KAR 59:015 in the Commonwealth.

The current Emission Standards listed for each boiler in permit V-14-007 are less than what I have calculated, which leads me to believe they might have included the indirect heat exchangers that were listed under **Section C - Insignificant Activities**. However, if they were listed as 401 KAR 59:010 insignificant activities, then they were less than 1 MMBtu/hr; therefore, they are not *affected facilities* and should not be included in the **Sourcewide Rating** utilized to calculate the **Emission Standard**. There might be another explanation, so I'm I would be hesitant to change the emission limitation established in the permit.

AP-42 emission factors utilize an *average* of emissions from boilers, so some boilers emit more and some emit less. Therefore, AP-42 emission factors are not the most conservative and compliance with emission limitations should not rely on AP-42 emission factors unless they result in emissions which are orders of magnitude less than potential emissions calculated. PM testing gives a snapshot of the boilers' performance and helps us to ensure the boilers are still meeting the standards as they get older. After looking over the most recent performance tests conducted using U.S. EPA Reference Method 5 on the three wood-fired boilers, I see that EU11 tested at 0.4277 lb/MMBtu, whereas the other two boilers tested under the AP-42 emission factors.

I also noticed a few tests performed on the boilers at a higher process rate than what is identified as their maximum rating in the permit. Could you send me the boiler specs or a picture of the boiler nameplate with the rating for each boiler?

Thanks,

Stacie Daniels, P.E.

Environmental Engineer I

Combustion Section

Permit Review Branch

(502) 782-1121

Division for Air Quality

300 Sower Blvd

Frankfort, KY 40601

From: paul.rodgers@cedarcreekengineering.com <paul.rodgers@cedarcreekengineering.com>
Sent: Monday, June 2, 2025 12:01 PM
To: Ateyeh, Ossama (EEC) <ossama.ateyeh@ky.gov>
Cc: Daniels, Stacie (EEC) <stacie.daniels@ky.gov>; 'Scott Hisle' <shisle@freemancorp.com>
Subject: Freeman air permit application

Ossama,

Thank you for talking with me today about the Freeman Corp air permit.

One issue we discussed is represented by the table below, modified to include the combined BTUs of all boilers:

I was unaware that the boiler ratings were to be added together to create a single source-wide limit for PM (and likewise for SO2).

It is important to recognize that this method creates a number, 0.38 LB/MMBTU, that is lower than would be found for any individual boiler. That is, each boiler is required to meet more stringent standards than would be calculated for that boiler alone. This would not seem to comport with the general intent of the regulation, which is to allow higher emission limits for smaller units.

As we discussed, in the context of the regulation, “source,” means the entire Freeman plant in Winchester, while “facility” means Boiler #1, Boiler #2, etc. It would appear that the regulation is written to define the PM standard for each boiler. I note that 401 KAR 59:015, Section 4 reads (bold underline is mine):

Section 4. Standard for Particulate Matter. Except as established in Sections 3(3) and 7 of this administrative regulation, an affected **facility** subject to this administrative regulation shall not cause emissions of particulate matter in excess of:

(1)

(a) 0.56 lb/MMBTU actual heat input for sources with total heat input capacity totaling ten (10) MMBTU/hr or less for all affected facilities at the source;

(b) 0.10 lb/MMBTU actual heat input for sources with total heat input capacity totaling 250 MMBTU/hr or more for all affected facilities at the source; and

(c) 0.9634 multiplied by the quantity obtained by raising the total heat input capacity (in MMBTU/hr) to the -0.2356 power for sources with heat input values totaling greater than ten (10) MMBTU/hr and less than 250 MMBTU/hr for all affected facilities at the source; and

(2) Twenty (20) percent opacity, except:

I would offer that a more reasonable approach (assuming each boiler cannot have its own standard) would be to create a source-wide standard based on a weighted average:

(12*.54 + 10*.56 + 28.7*.44)/(12 + 10 + 28.7) = 0.48

In practice, this may be of no consequemce because, in either case, 0.38 or 0.48, the standard found is greater than the value found according to the *Compliance Demonstration* method, Table 1.6-1:

Here, too, because the wood Freeman burns is part wet wood/part dry wood, (no bark), a weighted average could be used to find a value between the two shown. But again, this would be moot, since limits are met for both types.

Again, thank you for your time. We will make final edits to the draft you sent, and return it to you as soon as we can, hopefully by the end of the day today.

Thanks very much,

Paul

Paul Rodgers, PE

CEDAR CREEK ENGINEERING, INC.

3245 Athens-Boonesboro Road

Winchester, KY 40391

Cell Phone: 859-227-7061