PERMIT APPLICATION REVIEW
Covered Source Permit (CSP) No. 0625-01-N
Application No. 0625-01

Applicant: Tradewinds Forest Products, LLC

Facility Name: O'okala Veneer Mill

Location: O'okala on the island of Hawaii

SIC Code: 2435 (hardwood veneer and plywood)

UTM Coordinates: 261,146 m East and 2,214,966 m North

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I. Background

Tradewinds Forest Products, LLC (Tradewinds) proposes to construct and operate a veneer mill and cogeneration plant at O'okala on the island of Hawaii. Eucalyptus logs, obtained from nearby plantations and other sources, will be graded, cut, debarked, steam-conditioned, peeled, processed into eucalyptus wood veneer sheets, and packaged for shipping for use in offsite production of plywood and laminated veneer lumber. Depending on future business conditions, plywood manufacturing capability may be added to the facility at a later time.

A cogeneration boiler, fired mainly on wood fuel, will provide steam for the mill's veneer dryer, as well as power for the facility. The cogeneration plant will have a maximum power capacity of about 6 MW, and excess power not used by mill operations will be sold to Hawaii Electric Light Company.

Proposed Limits
Tradewinds proposes the following operational and emission limits:

1. The boiler will be fired mainly on untreated, uncontaminated wood fuel, with biodiesel used during start-up and maintenance operations. If an adequate supply of biodiesel is not available for purchase, fuel oil no. 2 (FO2) will be used instead.

2. FO2 usage will be limited to a maximum of 68,854 gallons per rolling 12-month period. Both the sulfur and nitrogen contents of the FO2 used shall not exceed a maximum 0.3% by weight.

3. Emissions of hydrogen chloride (HCl) from the wood-fired boiler shall not exceed a maximum of 0.01 lb/MMBTU (or 1.32 lb/hr based on a maximum heat input capacity of 132.4 MMBTU/hr). Source performance testing will be conducted to demonstrate compliance with this limit.

Submittals

Table 1 lists Tradewinds' air permit submittals received by the Department of Health (DOH).

Table 1: Tradewind Submittals

Document Date	Receipt Date	Document	Comments
05/30/06	06/01/06	Initial Application	Deemed incomplete on 7/18/06. Equipment specifications, BACT analysis, and revised HAP analysis requested.
11/10/06	11/14/06	Revised Application	Supersedes initial application. Deemed complete on 1/10/07. HAP emission factors & maximum power capacity questioned.
07/11/07	07/13/07	Addendum to Initial Application	Biodiesel use proposed, operational limits revised, health risk assessment provided.
08/22/07	08/24/07	Addendum	Supersedes previous Addedum. Operating limits, emission limits, and modeling analysis revised.
09/12/07	09/17/07	Letter	Proposed HCl limit revised from 0.0117 to 0.010 lb/MMBTU.

II. Equipment Description

Table 2 lists facility equipment.

Table 2: Facility Equipment

Description	Capacity	Manufacturer	Model No.	Serial No.	Manuf. Date
Boiler fired on wood	132.4 MMBTU/hr	Factory, Sales, & Engineering, Inc.	PDDC-835C	92-152	2007
Dry ESP for boiler	55,000 acfm	PPC Industries	11R-1230-2712S		2007
Veneer dryer	12,122 ft2/hr	Raute			2007
Wet ESP for dryer	20,000 acfm	PPC Industries	12R-49-240		2007
Cooling tower	7,300 gpm	Marley	F122 - preliminary		2008

The boiler and veneer dryer are the two main pollutant emission sources, with the boiler being the largest emission source.

Cogeneration Boiler

The boiler will be fired mainly on wood fuel consisting of uncontaminated, unprocessed tree bark and waste wood resulting from mill operations, including whole tree chips of virgin wood from stumps, branches, bark, and sawdust incidental to chipping operations. Uncontaminated wood used for fuel may also be obtained from other off-site sources.

The single-pass boiler will have a stoker vibrating air-cooled grate, combustion air pre-heater, and economizer. Table 3 provides other boiler parameters.

Table 3: Boiler Parameters

Parameter		Ref: 11/10/06 Applic.
Steam Output (lb/hr)	Peak = 95,000 Continuous = 82,000	App. B, pg 18.
Steam Pressure (psig)	Design = 725 Operating = 625	App. B, pg 18.
Steam Temp. (F)	755	App. B, pg 18.
	Wood Fuel	**FO2**
Max Fuel Feed Rate	31,674 lb/hr = 15.8 tph	5,740 lb/hr = 814 gph
Heat Input (MMBTU/hr)	132.4	110.8

Notes:

1. Values for wood fuel based on 46% H2O by wt, per 11/10/06 Application, App. B, page 9.
2. Values for FO2 per 11/10/06 Application, Appendix B, page 13.
3. FO2 gph feed rate based on density of 7.05 lb/gal per AP-42 App. A., page A-7, 1/95.

Veneer Dryer

The veneer dryer will be housed in the main mill building and use indirect heating to dry the wood veneer sheets, so no combustion occurs within the dryer. Heat from the boiler's steam will be directed to the dryer via a closed-loop heat transfer system, and fans will blow the heated air onto the wood sheets, reducing their moisture content from about 55% to 6%.

The veneer sheets will pass through a 320°F heating zone for about 12 minutes and then through a 90°F cooling zone for about 2.25 minutes. The estimated batch time is 14 minutes, although 22 minutes or more may be required if the wood is very wet.

The dryer's maximum capacity is 12,122 square feet (12.1 Msf) per hour. This capacity is based on the size of the dryer, size of the sheets fed into the dryer, and the sheet loading rate. The capacity is stated in terms of thousand square feet dried per hour (Msf per hour) based on a sheet thickness of 3/8", in accordance with industry convention. Since the O'okala Mill will be producing 1/8" thick veneer sheets, the production rate of 1/8" thick sheets can be determined by multiplying the rate based on a 3/8" thickness by three.

Based on continuous operation of 8,760 hours per year, the maximum annual production rate is 106,000 Msf per year, although actual production is estimated at 83,000 Msf per year.

III. Air Pollution Controls

Table 4 lists the two devices used to control air pollutants from the boiler and dryer. PM emissions will be controlled using a dry electrostatic precipitator (ESP) for the boiler and a wet ESP for the dryer.

Table 4: Air Pollution Controls				
Emission Source	**Control Device**	**Pollutant Controlled**	**Approximate Ctrl Efficiency**	**Normal Operating Range for ESP voltage**
Boiler	ESP - dry	PM	95%	30 - 40 kV (first stage) 40 - 55 kV (second stage)
Dryer	ESP - wet	PM	80%	30 - 55 kV
Note: Normal voltage ranges per 8/30/07 letter from G. Graham of PPC Industries.				

IV. Applicable Requirements

1. Hawaii Administrative Rules (HAR), Title 11
   - Chapter 59, Ambient Air Quality Standards
   - Chapter 60.1, Air Pollution Control
     - Subchapter 1 - General Requirements
     - Subchapter 2 - General Prohibitions
       - 11-60.1-31 Applicability
       - 11-60.1-32 Visible Emissions
       - 11-60.1-33 Fugitive Dust
       - 11-60.1-36 Biomass Fuel Burning Boilers
       - 11-60.1-38 Sulfur Oxides from Fuel Combustion
     - Subchapter 5 - Covered Sources
     - Subchapter 6 - Fees for Covered Sources, Noncovered Sources, & Agricultural Burning
       - 11-60.1-111 Definitions
       - 11-60.1-112 General Fee Provisions for Covered Sources
       - 11-60.1-113 Application Fees for Covered Sources
       - 11-60.1-114 Annual Fees for Covered Sources
       - 11-60.1-115 Basis of Annual Fees for Covered Sources
     - Subchapter 8 - Standards of Performance for Stationary Sources
       - 11-60.1-161 New Source Performance Standards
     - Subchapter 9 - Hazardous Air Pollutant Sources
       - 11-60.1-179 Ambient Air Concentrations of Hazardous Air Pollutants
     - Subchapter 10 - Field Citations

2. Prevention of Significant Deterioration (PSD)

These requirements do not apply because the facility is not a major stationary source and is not proposing any modifications to trigger a major modification as defined in 40 CFR 52.21 and HAR Title 11, Chapter 60.1, Subchapter 7.

3. 40 CFR 60 - Standards of Performance for New Stationary Sources (NSPS)

The boiler is subject to the requirements of *Subpart A - General Provisions* and *Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* because the boiler was manufactured after June 19, 1984, and has a heat input capacity greater than 100 MMBTU/hr. Table 5 lists applicable emission limits from Subpart Db.

Table 5: Subpart Db Emission Limits								
Pol.	**Emission Limit**		**Compliance Test**		**Compliance Basis**		**Compliance Time**	
	(lb/MMBTU)	**40 CFR Ref.**	**Method**	**40 CFR Ref.**	**Average**	**40 CFR Ref.**	**Note:**	**40 CFR Ref.**
NOx	none	60.44b(k)	n/a	n/a	n/a	n/a	n/a	n/a
PM	0.030	60.43b(h)(1)	1, 3B, 5	60.46b(d)	n/a	n/a	2	60.43b(g)
SO2	none	60.42b(k)(1)	n/a	60.45b(j)	n/a	n/a	n/a	n/a
opacity	20%[1]	60.43b(f)	9	60.46(d)(7)	six-minute	60.43b(f)	1, 2	60.43b(g)

Notes:

1. One 6-minute period per hour of <= 27% opacity is allowed.
2. Compliance at all times, *except* during startup, shutdown, or malfunction.
3. HAR §11-60.1-36 limits PM emissions from biomass boilers to 0.4 lbs per 100 lbs biomass, or 127 lb/hr, based on the Table 3 fuel feed rate. This limit is not shown since the Subpart Db limit is more stringent.

The boiler is <u>not subject to a Subpart Db NOx emission limit</u> because it:

(1) has a heat input capacity less than 250 MMBTU/hr;
(2) combusts only FO2 with N<= 0.3% weight percent or less;
(3) has an annual capacity factor of 10% or less for FO2; and
(4) is subject to a federally enforceable requirement limiting operation to combustion of FO2 with N <= 0.3 weight percent and limiting the FO2 annual capacity factor to <= 10%.

The boiler is <u>not subject to a Subpart Db SO2 emission limit</u> because the boiler will fire only oil with <=0.3 weight percent sulfur or wood with a potential SO2 emission rate of 0.32 lb/MMBTU heat input or less. Per 11/10/06 application, Appendix B, paragraph E9(b) the wood fuel emission rate for SO2 is 0.025 lb/MMBTU.

4. <u>40 CFR 61 - National Emission Standards for HAPs</u>

These requirements <u>do not apply</u> because no standard covering the facility's operation has been promulgated under 40 CFR 61.

5. <u>40 CFR 63 - National Emission Standards for HAPs for Source Categories</u>

The facility is <u>not subject</u> to the following subparts because the facility emissions are below the HAP major source threshold:

Subpart DDDD - National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products

Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters

6. <u>Best Available Control Technology (BACT)</u>

A BACT review is required for new or modified sources that will result in a significant net emissions increase as defined in HAR 11-60.1-1 and shown in Table 6. Since emissions meet or exceed the significant level, a <u>BACT review is required</u>.

Table 6: Emissions & Triggering Levels (tpy)			
Pollutant	**Emissions**	**Significant Level**	**Consolidated Emissions Reporting**
CO	176.9	100	1000
NOx	133.4	40	100
PM	29.1	25	-
PM-10	25.3	15	100
PM-2.5	20.4	-	100
SOx	14.5	40	100
VOC	24.5	40	100
Pb	2.78E-02	0.6	5

Table 7 shows the applicant's proposed BACT determination, which is accepted by the DOH.

Table 7: BACT		
Pollutant	**BACT**	**Emission Limits**
CO	Good combustion practices.	0.305 lb/MMBTU heat input
NOx	Staged combustion and overfire air injection.	0.23 lb/MMBTU heat input
PM-10	Dry ESP on boiler.	0.025 lb/MMBTU heat input
PM-10	Wet ESP on dryer.	0.111 lb/Msf 3/8"
Ref: 11/10/06 Application, Section 4.		

7. CAM Requirements (40 CFR 64)

The purpose of Compliance Assurance Monitoring (CAM) is to provide reasonable assurance that compliance is being achieved with large emission units that rely on air pollution controls to meet an emissions limit or standard. Table 8 shows the five criteria that must be satisfied for CAM to apply.

Table 8: CAM Criteria			
No.	**Criteria - Emissions unit is:**	**T/F**	**Reason**
1	located at a major source.	T	Facililty is a major source.
2	subject to an emission limit or standard.	T	Subject to NSPS, Subpart Db.
3	uses a control device to achieve compliance.	T	Uses ESP to meet PM emissions limit.
4	has potential pre-control emission that are 100 % of the major source level.	T	ESP controls 95% of PM emissions.
5	is not otherwise exempt from CAM.	T	Not exempt.

Since all five criteria are met, CAM applies. As part of the facility's CSP renewal application, a CAM submittal in accordance with 40 CFR §64.4 is required.

8. CER Requirements

Consolidated Emissions Reporting (CER) requirements apply if facility emissions equal or exceed levels specified in 40 CFR §51.45 shown in Table 6. CER requirements apply because NOx facility emissions equal or exceed the CER Type B threshold level.

9. Major Source

A major source is a stationary source that emits or has the potential to emit 10 tpy or more of a single HAP, 25 tpy or more of a combination of HAPs, or 100 tpy or more of any other pollutant. Fugitive emissions are not considered in determining whether the source is major because this source does not belong to any of the listed source categories. This facility is a major source of CO and NOx because emissions of each of these two pollutants exceed 100 tpy. However, the facility is not a major HAP source.

V. Insignificant Activities

Table 9 lists insignificant activities for this facility.

Table 9: Insignificant Activities	
Description	**HAR Section Ref.**
1 - 30,000 gallon biodiesel storage tank. 1- 20,000 fuel oil storage tank.	11-60.1-82(f)(1)
Fire water pump diesel engine, ~ 400 HP. Operation estimated at one hour per month (12 hr/yr).	11-60.1-82(g)(6)
Ref: 11/14/06 Application, page 3-7 and 9/18/07 email from G. Retzlaff.	

VI. Alternative Operating Scenarios

None proposed.

VII. Project Emissions

The four point sources of emissions are the boiler, dryer, and two cooling towers. The boiler is the largest emission source of criteria and HAP pollutants. The dryer emits PM, VOCs, and HAPs, while the cooling tower emits only PM.

Boiler Criteria Pollutant Emissions

The boiler will be fired mainly on wood fuel with relatively small amounts of biodiesel and FO2 used for start-up and maintenance periods. Combined usage of biodiesel and FO2 is estimated to account for about 3% of the total fuel usage.

Of the three boiler fuels, wood results in the highest pollutant emission rates, and with the exception of SO2, results in higher criteria pollutant and HAP emissions than those of FO2. Using very low sulfur oil with no more than 0.3% sulfur by weight will help minimize SO2 emissions from FO2.

Biodiesel is considered the cleanest of the three fuels, with lower CO, PM, SO2, and VOC emissions than FO2. Although biodiesel NOx emissions can be up to 15% higher than FO2 NOx emissions, biodiesel is still considered the cleaner fuel.

In determining potential boiler emissions, a worst-case, conservative analysis was provided by assuming continuous use of wood fuel. Criteria pollutant emissions from boiler combustion of wood were based on the manufacturer's guaranteed emission factors and a maximum heat input capacity of 132.4 MMBTU/hr.

Table 10 shows potential boiler criteria pollutant emissions based on wood fuel combustion and continuous operation of 8,760 hours per year. For comparison, Table 11 shows criteria pollutant emissions resulting from FO2 combustion.

Table 10: Boiler Criteria Pollutant Emissions - Wood Fuel

Pol.	Emis. Factor (lb/MMBTU)	Reference	Emissions		Emissions at 8,760 hr/yr
			(lb/hr)	(g/sec)	(tpy)
CO	0.305	manufacturer	40.4	5.088	176.9
NOx	0.230	manufacturer	30.5	3.837	133.4
PM	0.029	AP-42, App B	3.8	0.480	16.7
PM-10	0.025	manufacturer	3.3	0.417	14.5
PM-2.5	0.020	AP-42, App B	2.7	0.336	11.7
SO2	0.025	manufacturer	3.3	0.417	14.5
VOC	0.017	manufacturer	2.3	0.284	9.9

Notes:

1. Max heat input capacity = 132.4 MMBTU/hr for wood per 11/10/06 Application App. B, p. 9.
2. Manufacturer guaranteed emission factors per 11/10/06 Application, Appendix B, section following page 43, labeled "Appendix E," paragraph E9(b).
3. PM = 1.15 * PM-10, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.
4. PM-2.5 = 0.7 * PM, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.

Table 11: Boiler Criteria Pollutant Emissions - Fuel Oil No. 2						
	Emission Factor		Emissions		Emissions (tpy)	
Pollutant	(lb/MMBTU)	Reference	(lb/hr)	(g/sec)	at 8,760 hr/yr	at 68,854 gal/yr
CO	0.0400	manufacturer	4.43	0.558	19.41	0.19
NOx	0.1700	manufacturer	18.84	2.373	21.66	0.22
PM	0.0161	AP-42, App B	1.78	0.225	2.05	0.02
PM-10	0.0140	manufacturer	1.55	0.195	1.78	0.02
PM-2.5	0.0113	AP-42, App B	1.25	0.157	1.44	0.01
SO2		Note 5	34.40	4.334	39.56	0.39
VOC	0.0014	manufacturer	0.16	0.020	0.18	1.77E-03

Notes:

1. Max heat input capacity = 110.8 MMBTU/hr for FO2 per 11/10/06 Application, Appendix B, page 13.
2. Manufacturer guaranteed emission factors per 11/10/06 Application, Appendix B, §E9(b).
3. PM = 1.15 * PM-10, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.
4. PM-2.5 = 0.7 * PM, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.
5. For SO2 emissions, use mass balance equation S + O2 -> SO2 with S = 0.3% by wt.
   EF(SO2) = (7.05 lb/gal) * (814 gal/hr) * (0.3 lb S / 100 lb fuel) * (64.06 wt of SO2 / 32.06 wt of S) = 34.4 lb/hr.

Boiler HAP Emissions

Since no manufacturer data on HAP emissions were available, boiler HAP emissions from wood fuel combustion were based on EPA emission factors from AP-42, Section 1.6, *Wood Residue Combustion in Boilers*.

Tradewinds initially based HAP emissions on factors provided by the National Council for Air and Stream Improvement (NCASI), an independent research organization supported by the forest products industry. In general, AP-42 factors tend to be higher than NCASI factors for most HAP pollutants. In particular, as shown below in Table 12, the HCl emission factor from AP-42 is 28 times greater than the NCASI factor.

Table 12: Comparison of HCl Emission Factors (lb/MMBTU)	
AP-42	0.01900
NCASI	0.00067
Tradewinds' proposed limit	0.01000

In the interest of providing the most conservative analysis, the DOH requested that HAP calculations be based on AP-42 factors. All HAP emission calculations were based on the AP-42 emission factors with the exception of HCl.

Tradewinds believes that the AP-42 emission factor for HCl is overly conservative and therefore proposed a limit of 0.01 lb/MMBTU, as stated in its 9/12/07 letter that includes discussion and data supporting its belief. To ensure compliance, the DOH has established a permit limit and is requiring Tradewinds to conduct annual performance testing for HCl emissions.

Table 13 shows HAP emissions for the boiler continuously fired on wood, with and without the proposed HCl limit.

Table 13: Boiler HAP Emissions - Wood Fuel						
HAP	**Emis. Fac.**	**Potential Emis.**		**Prop. Limit**	**Emissions**	
(Italics indicate metals.)	**(lb/MMBTU)**	**(lb/hr)**	**(tpy)**	**(lb/MMBTU)**	**(lb/hr)**	**(tpy)**
Acetaldehyde	8.30E-04	1.10E-01	0.48133		1.10E-01	0.48133
Acrolein	4.00E-03	5.30E-01	2.31965		5.30E-01	2.31965
Antimony Compounds	7.90E-06	1.05E-03	0.00458		1.05E-03	0.00458
Arsenic Compounds	2.20E-05	2.91E-03	0.01276		2.91E-03	0.01276
Benzene	4.20E-03	5.56E-01	2.43563		5.56E-01	2.43563
Beryllium Compounds	1.10E-06	1.46E-04	0.00064		1.46E-04	0.00064
Bis(2-ethylhexyl)phthalate (DEHP)	4.70E-08	6.22E-06	0.00003		6.22E-06	0.00003
Cadmium Compounds	4.10E-06	5.43E-04	0.00238		5.43E-04	0.00238
Carbon tetrachloride	4.50E-05	5.96E-03	0.02610		5.96E-03	0.02610
Chlorine	7.90E-04	1.05E-01	0.45813		1.05E-01	0.45813
Chlorobenzene	3.30E-05	4.37E-03	0.01914		4.37E-03	0.01914
Chloroform	2.80E-05	3.71E-03	0.01624		3.71E-03	0.01624
Chromium Compounds	2.10E-05	2.78E-03	0.01218		2.78E-03	0.01218
Cobalt	6.50E-06	8.61E-04	0.00377		8.61E-04	0.00377
2,4-Dinitrophenol	1.80E-07	2.38E-05	0.00010		2.38E-05	0.00010
Ethyl benzene	3.10E-05	4.10E-03	0.01798		4.10E-03	0.01798
Formaldehyde	4.40E-03	5.83E-01	2.55161		5.83E-01	2.55161
Hydrogen Chloride	1.90E-02	2.52E+00	***11.01833***	***0.01000***	1.32E+00	***5.79912***
Lead Compounds	4.80E-05	6.36E-03	0.02784		6.36E-03	0.02784
Manganese Compounds	1.60E-03	2.12E-01	0.92786		2.12E-01	0.92786
Mercury Compounds	3.50E-06	4.63E-04	0.00203		4.63E-04	0.00203
Naphthalene	9.70E-05	1.28E-02	0.05625		1.28E-02	0.05625
Nickel Compounds	3.30E-05	4.37E-03	0.01914		4.37E-03	0.01914
4-Nitrophenol	1.10E-07	1.46E-05	0.00006		1.46E-05	0.00006
Pentachlorophenol	5.10E-08	6.75E-06	0.00003		6.75E-06	0.00003
Phenol	5.10E-05	6.75E-03	0.02958		6.75E-03	0.02958
Phosphorus	2.70E-05	3.57E-03	0.01566		3.57E-03	0.01566
Propionaldehyde	6.10E-05	8.08E-03	0.03537		8.08E-03	0.03537
Selenium Compounds	2.80E-06	3.71E-04	0.00162		3.71E-04	0.00162
Styrene	1.90E-03	2.52E-01	1.10183		2.52E-01	1.10183
2,3,7,8-Tetrachlorodibenzo-p-dioxins	8.60E-12	1.14E-09	0.00000		1.14E-09	0.00000
Toluene	9.20E-04	1.22E-01	0.53352		1.22E-01	0.53352
2,4,6-Trichlorophenol	2.20E-08	2.91E-06	0.00001		2.91E-06	0.00001
Vinyl choloride	1.80E-05	2.38E-03	0.01044		2.38E-03	0.01044
o-Xylene	2.20E-05	2.91E-03	0.01276		2.91E-03	0.01276
		Total (tpy)	22.2		Total (tpy)	16.9

Notes:
1. Max heat input capacity = 132.4 MMBTU/hr for wood per 11/10/06 Application, Appendix B, page 9.
2. Emission factors based on AP-42, Section 1.6, Tables 1.6-3 & 1.6-4, 9/03.

Table 14 shows HAP emissions from boiler combustion of FO2 for comparison purposes. Since wood combustion emits HAPs at a greater rate, worst-case potential HAP emissions are based on the combustion of wood.

Table 14: Boiler HAP Emissions - Fuel Oil No. 2

Hazardous Air Pollutant	AP-42 Table Reference	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy)	
					8,760 hr/yr	68,854 gal/yr
Formaldehyde	1.3-8	6.10E-02	lb/1000 gal	4.97E-02	2.17E-01	2.16E-03
POM	1.3-8	3.30E-03	lb/1000 gal	2.69E-03	1.18E-02	1.17E-04
Benzene	1.3-9	2.14E-04	lb/1000 gal	1.74E-04	7.63E-04	7.58E-06
Ethylbenzene	1.3-9	6.36E-05	lb/1000 gal	5.18E-05	2.27E-04	2.25E-06
Naphthalene	1.3-9	1.13E-03	lb/1000 gal	9.20E-04	4.03E-03	4.00E-05
1,1,1-Tricholorethane	1.3-9	2.36E-04	lb/1000 gal	1.92E-04	8.41E-04	8.36E-06
Toluene	1.3-9	6.20E-03	lb/1000 gal	5.05E-03	2.21E-02	2.20E-04
o-Xylene	1.3-9	1.09E-04	lb/1000 gal	8.87E-05	3.89E-04	3.86E-06
Arsenic	1.3-10	4.00E-06	lb/MMBTU	4.43E-04	1.94E-03	1.93E-05
Beryllium	1.3-10	3.00E-06	lb/MMBTU	3.32E-04	1.46E-03	1.45E-05
Cadmium	1.3-10	3.00E-06	lb/MMBTU	3.32E-04	1.46E-03	1.45E-05
Chromium	1.3-10	3.00E-06	lb/MMBTU	3.32E-04	1.46E-03	1.45E-05
Lead	1.3-10	9.00E-06	lb/MMBTU	9.97E-04	4.37E-03	4.34E-05
Manganese	1.3-10	6.00E-06	lb/MMBTU	6.65E-04	2.91E-03	2.89E-05
Mercury	1.3-10	3.00E-06	lb/MMBTU	3.32E-04	1.46E-03	1.45E-05
Nickel	1.3-10	3.00E-06	lb/MMBTU	3.32E-04	1.46E-03	1.45E-05
Selenium	1.3-10	1.50E-05	lb/MMBTU	1.66E-03	7.28E-03	7.23E-05
				Total	0.28	0.00279

Notes:
1. Ref: AP-42, Section 1.3 Fuel Oil Combustion, Tables 1.3-8, 1.3-9, 1.3-10, 9/98.
2. Fuel feed rate of 814 gal/hr from Table 3.
3. Heat capacity of 110.8 MMBTU/hr, per 11/14/06 Application, Appendix B, page 13.
5. Compounds listed in Table 1.3-9, such as acenaphthene are classifed as a POM, and accounted for by the Table 1.3-8 POM emission factor.

Dryer Emissions

Emissions from the dryer result from VOCs emitted from the surface of the veneer wood sheet as it is exposed to high temperatures, from PM in the air circulating in the dryer, or from PM condensing during the cooling of certain VOCs.

Table 15 and 16 show dryer criteria pollutant emissions and HAP emissions, respectively, based on continuous operation at maximum dryer capacity of 12,122 square feet (12.122 Msf) per hour, 3/8" basis.

Table 15: Veneer Dryer Criteria Pollutant Emissions			
Pollutant	Emissions		
	(lb/Msf)	(lb/hr)	(tpy)
PM	0.128	1.55	6.78
PM-10	0.111	1.35	5.89
PM-2.5	0.089	1.08	4.74
VOC	0.276	3.35	14.65

Notes:
1. Dryer maximum capacity = 12.122 Msf/hr.
2. PM-10 and VOC emission factors based on 11/14/06 Application, Section 3.
3. PM = 1.15 * PM-10, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.
4. PM-2.5 = 0.7 * PM, based on AP-42 Appendix B, Table B.2.2, Category 2, 1/95.

Table 16: Veneer Dryer HAP Emissions				
HAP	HAP Emission Factor (lb/Msf)			Emissions
	Heating section	Cooling section	Both sections	(tpy)
Acetaldehyde	4.30E-03	3.20E-02	0.03630	1.93
Formaldehyde	1.10E-03	6.50E-03	0.00760	0.40
Methanol	4.10E-02	2.10E-02	0.06200	3.29
Methyl isobutyl ketone	2.20E-03	2.90E-02	0.03120	1.66
Phenol	3.00E-03	-	0.00300	0.16
			Total	**7.44**

Notes:
1. Emission factors based on AP-42, Table 10.5-3, pages 10.5-13 and 10.5-14, for indirect heating of a hardwood, 1/02.
2. Maximum annual production in Msf = 12.122 Msf/hr * 8,760 hr/yr = 106,189 Msf/yr.

Cooling Tower Emissions

The cooling towers will result in a small amount of PM emissions, occurring in the form of drift salts which are particles contained in the liquid water droplets that escape into the atmosphere with evaporated water. A high-efficiency drift eliminator system will limit drift to about 0.055% of the circulating water (about four gallons per minute). The total dissolved solids content of the water is estimated at 112 ppm by weight. Annual PM-10 emissions are estimated at 4.91 tpy according to Tradewinds' application dated 11/14/06, page 3-12. Estimates for PM and PM-2.5 are based on the Category 2 particle distribution data of AP-42, Appendix B, Table B.2.2. Cooling tower emissions are included in Table 17.

Total Facility Emissions

Table 17 shows total facility emissions.

Table 17: Total Facility Emissions (tpy)				
Pollutant	**Boiler**	**Dryer**	**Cooling Towers**	**Total**
CO	176.87			176.9
NOx	133.38			133.4
PM	16.67	6.78	5.65	29.1
PM-10	14.50	5.89	4.91	25.3
PM-2.5	11.67	4.74	3.95	20.4
SO2	14.50			14.5
VOC/TOC	9.86	14.65		24.5
Lead	0.03			2.78E-02
Total HAPs	16.94	7.44		24.37

VIII. Air Quality Assessment

An Ambient Air Quality Impact Assessment (assessment) is generally performed for new or modified emission sources to determine the maximum potential pollutant concentrations generated by the emission sources and to determine whether federal and state air quality standards are met. An assessment was performed based on the following:

- AERMOD model, version 07026.
- Stack parameters and emission rates as shown in Table 18, except for stack diameter which was modeled as 6.5 feet (1.98 meters).

  The modeling analysis used the diameter value initially provided by the manufacturer. That value has since been changed to 4.5 feet (1.37 meters), as indicated in Tradewinds' 9/12/07 letter. For a given volumetric flow rate, a smaller diameter increases the exhaust velocity which leads to better pollutant dispersion. Since results with the larger diameter value indicated compliance with air quality standards, it was unnecessary to redo the modeling analysis with the smaller stack diameter.
- Simple and complex terrain.
- Rural area and dispersion parameters.
- Wake effects from on-site buildings.

  Emission point source location with respect to nearby structures was evaluated to determine whether stack effluents are affected by downwash in the turbulent wake of the structures. Building parameters obtained using the BPIPPRIME program which calculates the building parameters for 36 wind directions based on the physical dimensions of the structures surrounding the emission source.

- Meteorological data from Haina and the National Weather Service.
- Background air concentrations for CO, NO2, PM-10 and SO2 based on 2002 data from the Hamakua Energy Partners program in Haina, Hawaii.

Table 18: Stack Parameters & Modeled Pollutant Emission Rates

Parameter	Boiler	Dryer ESP	CT 1	CT 2	Fire Pump
Stack Height (m)	33.53 (110 ft)	15.24 (50 ft)	9.14 (30 ft)	9.14 (30 ft)	7.62 (25 ft)
Stack Diameter (m)	1.37 (4.5 ft)[2]	0.76 (2.5 ft)	5.49 (18 ft)	5.49 (18 ft)	0.08 (3 in)
Stack Temperature (K)	394 (250 F)	339 (151 F)	311 (100 F)	311 (100 F)	622 (660 F)
Stack Velocity (m/s)	7.57	15.24	6.88	6.88	53.19
UTM East (m)	261,117	261,095	261,218	261,225	260,994
UTM North (m)	2,214,954	2,214,915	2,214,909	2,214,906	2,214,858
Base Elevation (m)	104.80	108.90	110.80	110.80	119.80
Emis. Rate (lb/hr)					
CO - 1 hour	40.37				6.68E-01
CO - 8 hour	40.37				8.35E-02
NOx - annual	30.28				4.25E-03
PM10 - 24 hour	3.31	1.35	0.56	0.56	9.17E-03
PM10 - annual	3.26	1.35	0.56	0.56	3.01E-04
SO2 - 3 hour	33.47				7.08E-02
SO2 - 24 hour	33.47				8.84E-03
SO2 - annual	4.22				2.91E-04

Notes:
1. Ref: Tradewinds' 8/22/07 Addendum, Section 6, Tables 7 & 8.
2. Stack diameter used in the modeling analysis was 6.5 feet (1.98 m).
3. CT = cooling tower cells.

Results shown in Table 19 indicate compliance with federal and state air quality standards.

Table 19: Ambient Air Quality Assessment Results									
Pol.	Avg. Time	Max. Conc. (ug/m3)	Bkgrd. Conc. (ug/m3)	Total Impact (ug/m3)	NAAQS (ug/m3)	SAAQS (ug/m3)	Percent SAAQS	UTM Location	
								East (m)	North (m)
CO	1 hr	613.69	1022	1636	40000	10000	16%	261,150	2,214,300
CO	8 hr	109.63	455	565	10000	5000	11%	261,150	2,214,250
NO2	annual	4.16	2	6	100	70	9%	260,825	2,214,975
PM10	24 hr	10.45	36	46	150	150	31%	261,023	2,215,012
PM10	annual	3.69	12	16	50	50	31%	260,997	2,214,955
SO2	3 hr	249.74	91	341	1300	1300	26%	260,900	2,214,300
SO2	24 hr	31.40	34	65	365	365	18%	260,900	2,214,300
SO2	annual	0.58	3	4	80	80	4%	260,825	2,214,975

Notes:

1. Ref: Tradewind's' 8/22/07 Addendum, Section 6, Table 9.
2. NO2 concentration based on Tier 2 conversion rate of 75%.
3. Background concentration levels from 2002 Haina data.
4. NAAQS = National Ambient Air Quality Standards.
5. SAAQS = State Ambient Air Quality Standards.

Risk Assessment

In order to evaluate HAP concentration levels, the DOH requested that a HAP screening assessment be performed in accordance with HAR §60.1-179 to determine whether any HAP concentration is at or near a significant level.

Tradewinds submitted a screening risk assessment in Section 7 of its 8/22/07 Addendum. The assessment was based on continuous operation of the boiler and dryer which provides a conservative analysis since the facility will not actually operate under these conditions. Modeling and calculations indicate that all HAP concentrations will be below significant concentration levels.

IX. Significant Permit Conditions

1. The proposed facility is subject to the requirements of NSPS, Subparts A and Db.

   Purpose: This federal standard applies to a boiler with a heat input capacity greater than 100 MMBTU/hr that is manufactured after June 19, 1984.

2. The boiler shall be fired on uncontaminated wood fuel, biodiesel, or FO2.

   Purpose: Boiler emissions based on combustion of these fuels, as proposed by the applicant.

3. FO2 usage shall be limited to a maximum of 68,854 gallons per rolling 12-month period. Both the sulfur and nitrogen contents of the FO2 used shall not exceed a maximum 0.3% by

weight. The FO2 annual capacity factor, as defined in 40 CFR 60, Subpart Db, shall not exceed 10%.

Purpose: Boiler emissions based on these limit, as proposed by the applicant.

4. HCl emissions from the wood-fired boiler shall not exceed a maximum of 0.010 lb/MMBTU (or 1.3 lb/hr based on a maximum heat input capacity of 132.4 MMBTU/hr).

Purpose: HCl and total HAP emission calculations are based on this emission rate, as proposed by the applicant.

5. Initial and annual boiler stack performance tests shall be conducted to determine compliance with the emission limits shown in Table 20.

Table 20: Source Performance Testing

Pollutant	Emission Limit		Reference
	(lb/MMBTU)	(lb/hr)	
CO	0.305	40.4	manufacturer guarantee
NOx	0.23	30.5	manufacturer guarantee
PM	0.029	3.8	40 CFR 60, Subpart Db
HCl	0.01	1.3	applicant proposed
Opacity	20%	20%	40 CFR 60, Subpart Db

Purpose: Verify compliance with the Subpart Db, BACT, and proposed emission limits for the boiler.

X. Conclusion

Tradewinds proposes to construct a veneer mill and cogeneration plant, resulting in pollutant emissions from the boiler (fired on wood, biodiesel, and FO2), a veneer dryer, and one two-cell cooling tower. The facility will use ESPs on the boiler and dryer to control PM emissions and will limit both the sulfur and nitrogen contents of the fuel oil no. 2 used during start-up and maintenance periods. Initial and annual source performance testing will be conducted once the facility is operational to ensure emission limits are met.

Actual facility emissions should be somewhat less than shown in this review for the following reasons:

1. Boiler emissions, including HCl emissions, are based on continuous operation using wood fuel. In actuality, wood is not the only fuel that will be used since biodiesel and FO2 will be used during start-up and maintenance periods.

2. Boiler emissions are based on 100% load, rather than 89%, which is the average load that the facility expects to operate at.

3. HAP emissions are based on AP-42 emission factors that provide a conservative analysis, compared with NCASI factors.

4. Dryer emissions are based on continuous operation of the dryer at its maximum capacity of 106,000 Msf per year, which is an overestimate of actual operating conditions. Mill production is estimated at 83,000 Msf per year, or approximately 78% of the dryer's maximum capacity.

Issuance of a covered source permit is recommended based on review of information provided by the applicant and subject to the significant permit conditions and EPA review.

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