Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor

P. O. Box 200901 Helena, MT 59620-0901 (406) 444-2544 Website: www.deq.mt.gov

May 14, 2012

Joe O'Rourke
F. H. Stoltze Land & Lumber Co.
P.O Box 1429
600 Half Moon Road
Columbia Falls, MT 59912

Mr. O'Rourke

Montana Air Quality Permit #2934-01 is deemed final as of May 4, 2012, by the Department of Environmental Quality (Department). This permit is for the F.H. Stoltze Land & Lumber Co, lumber mill located in Columbia Falls, MT. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Vickie Walsh
Air Permitting Program Supervisor
Air Resources Management Bureau
(406) 444-9741

Stephen Coe P.E.
Environmental Engineer
Air Resources Management Bureau
(406) 782-2689 Ext 209

VW:SC
Enclosures

Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #2934-01

F. H. Stoltze Land & Lumber Co.
600 Half Moon Road
Columbia Falls, MT 59912

May 4, 2012

MONTANA AIR QUALITY PERMIT

Issued To: F. H. Stoltze Land & Lumber Co.
P.O Box 1429
600 Half Moon Road
Columbia Falls, MT 59912

MAQP: #2934-01
Application Complete: 02/03/2012
Preliminary Determination Issued: 03/14/2012
Department's Decision Issued: 4/19/2012
Permit Final: 05/04/2012
AFS #: 029-0010

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to F. H. Stoltze Land & Lumber Co. (Stoltze), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

Stoltze's lumber mill is located in the SE ¼ of Section 2, Township 30 North, Range 21 West, Flathead County, in Columbia Falls, Montana. The primary operation at the facility is production of lumber from raw logs.

B. Current Permit Action

On February 3, 2012, the Department received an application from Stoltze to replace the five (5) biomass boilers listed in MAQP # 2934-00 with a new 70 Million British Thermal Units (MMBtu/hr) wood-fired Wellons Inc. boiler (Wellons), associated control equipment and a cooling tower. In addition to the boiler replacement, Stoltze will be installing a new fuel handling system and a 2.5 megawatt (MW) steam turbine electrical generator. All other existing sources will remain unmodified. In addition, this permit action updates rule references, permit format, and the emissions inventory.

Section II: Conditions and Limitations

A. Emission Limitations (all operations including Startup and Shutdown Events and Ash-Pulling Periods).

1. Wellons Wood-Fired Boiler

a. Boiler capacity shall not exceed 70 MMBtu/hr heat input based on a 30-day rolling average (ARM 17.8.749).

b. Boiler must have a minimum stack exhaust height of at least 72.5 feet from ground level (ARM 17.8.749).

c. Particulate emissions from the boiler shall be controlled by multi-cyclone mechanical collector followed by an Electrostatic Precipitator (ESP) (ARM 17.8.752).

d. Boiler emissions of filterable particulate matter (PM) shall be limited to (ARM 17.8.749, 40 CFR 63 subpart JJJJJJ):
    i. 0.03 lb/MMBtu

e. Boiler emissions of combined filterable and condensable particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) shall be limited to (ARM 17.8.752):

i. 0.0385 lb/MMBtu; and

ii. 2.70 pounds per hour (lb/hr), based on 1-hour average.

f. Boiler emissions of combined filterable and condensable particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) shall be controlled by implementing best management practices and limited as follows (ARM 17.8.752):

i. 0.031 lb/MMBtu; and

ii.2.17 lb/hr (based on 1-hour average).

g. Boiler emissions of nitrogen oxides (NO_x) shall be controlled by using combustion controls of staged combustion and flue gas recirculation. NO_x emissions shall be limited to (ARM 17.8.752):

i. 0.26 lb/MMBtu; and

ii. 18.2 lb/hr (based on 1-hour average).

h. Boiler emissions of carbon monoxide (CO) shall be controlled by proper boiler design and operation, and using good combustion practices. CO emissions shall be limited to (ARM 17.8.752):

i. 0.3 lb/MMBtu.

ii. 21 lb/hr (based on 1-hour average).

i. Boiler emissions of volatile organic compounds (VOC) shall be controlled by proper boiler design and operation, and good combustion practices. VOC emissions shall be limited to (ARM 17.8.752):

i. 0.02 lb/MMBtu.

2. All new or modified conveyors associated with the Wellons boiler fuel handling system shall be covered or enclosed (ARM 17.8.752).

3. Stoltze shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

4. Stoltze shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes [ARM 17.8.304 (1)].

5. Stoltze shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

6. Stoltze shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749).

7. Stoltze shall limit the hours of operation of the diesel-fired, emergency generator with a rated design capacity of up to 800 brake horsepower (bhp) to no more than 500 hours per year during any rolling 12-month time period. Additionally the diesel engine driving the generator must meet Environmental Protection Agency (EPA) Tier 2 standards (ARM 17.8.749).

8. Stoltze shall comply with all applicable standards and limitations, and the applicable operating, reporting, recordkeeping, and notification requirements contained in 40 Code of Federal Regulations (CFR) 60, Subpart IIII (40 CFR 60, Subpart IIII and ARM 17.8.749).

9. Stoltze shall comply with all applicable standards and limitations, and the applicable operating, reporting, recordkeeping, and notification requirements contained in 40 CFR 63, Subpart JJJJJJ (40 CFR 63, Subpart JJJJJJ and ARM 17.8.749).

10. Stoltze shall comply with all applicable standards and limitations, and the applicable operating, reporting, recordkeeping, and notification requirements contained in 40 CFR 63, Subpart ZZZZ (40 CFR 60 Subpart Dc, 40 CFR 63, Subpart ZZZZ and ARM 17.8.749).

B. Testing Requirements

1. Stoltze shall test the Wood-Fired boiler for PM to monitor compliance with the emission limit contained in Section II.A.1 (d). The initial performance source test must be conducted within 60 days of achieving the maximum production rate, at which the affected facility will be operated, but not later than 180 days after initial startup of the boiler. After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).

2. Stoltze shall test the Wood-Fired boiler for filterable and condensable PM_{10} to monitor compliance with the emission limit contained in Section II.A.1 (e). The initial performance source test must be conducted within 60 days of achieving the maximum production rate, at which the affected facility will be operated, but not later than 180 days after initial startup of the boiler. After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).

3. Stoltze shall test the Wood-Fired boiler for filterable and condensable $PM_{2.5}$ to monitor compliance with the emission limit contained in Section II.A.1 (f). The initial performance source test must be conducted within 60 days of achieving the maximum production rate, at which the affected facility will be operated, but not later than 180 days after initial startup of the boiler. After the initial source test, testing shall take place upon request of the Department. (ARM 17.8.105 and ARM 17.8.749).

4. Stoltze shall test the Wood-Fired boiler using wood and/or bark, for CO and NO_x concurrently to monitor compliance with the emission limits and/or conditions contained in Section II.A.1(g) and Section II.A.1(h). The in-stack NO_2/NO ratio shall be determined during the initial stack testing. The initial performance source test must be conducted within 60 days of achieving the maximum production rate, at which the affected facility will be operated, but not later than 180 days after initial startup of the boiler. After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).

5. Stoltze shall install and operate a Continuous Opacity Monitor (COM) on the Wood-Fired Boiler to monitor compliance with the opacity limit contained in Section II.A.3 (ARM 17.8.749 and 40 CFR 60 Subpart Dc).

6. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

7. The Department may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Stoltze shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505). Stoltze shall submit the following information annually to the Department by March 1 of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).

Wellons	MMBtu of fuel fired and tones of fuel combusted.

2. Stoltze shall document, annually, the following information for the kilns, which shall be submitted along with the annual emission inventory:

   a) Combined wood species groupings and amount of lumber dried [in Thousand Board Feet (MBdFt)].

   b) HAP emissions shall be reported as lb HAP/MBdFt.

   c) Volatile Organic Compounds (VOC) emissions shall be reported as lb VOC/MBdFt.

   For the dry kilns, the calculation of annual VOC and HAP emissions shall be based on the amount of wood dried and the emission factors used in the most recent permit application, or site-specific kiln emission data (ARM 17.8.749).

3. Stoltze shall document, by month, the hours of operation of the diesel fired emergency generator. By the 25th day of each month, Stoltze shall total the hours of operation for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.7. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

4. Stoltze shall notify the Department of any construction or improvement project conducted, pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit***, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to startup or use of the

proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(l)(d) (ARM 17.8.745).

5. All records compiled in accordance with this permit must be maintained by Stoltze as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – Stoltze shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment COM or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if Stoltze fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Stoltze of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq*., MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 30 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Permit Fee – Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by Stoltze may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
F.H. Stoltze Land and Lumber Co.
MAQP #2934-01

I. Introduction/Process Description

A. Permitted Equipment

F.H. Stoltze Land and Lumber Co. (Stoltze) owns and operates a wood products facility. New equipment at Stoltze includes: a Wellons Inc. wood-fired boiler (Wellons), an up to 800 horsepower (HP) emergency generator/engine, 2.5 Mega Watt (MW) steam turbine, fuel handling conveyors and storage. Existing equipment includes: 4 wood drying kilns and grandfathered sawmill operations and planing and shaving operation.

B. Source Description

Stoltze is an existing wood product facility located in the SE ¼ of Section 2, Township 30 North, Range 21 West, Flathead County, in Columbia Falls, Montana. The primary operation at the facility is the production of dimension lumber from raw logs. Stoltze operates a sawmill that has kilns for drying lumber, a planer, and a new wood fuel-fired boiler to supply steam to the kilns and turn a generator to produce 2.5 megawatts (MW) of power. Logs are received and stored in the log yard. The process of cutting the logs into lumber includes debarking, sawing, chipping, kiln drying, planing, and packaging for shipping. The byproducts of lumber manufacturing are sawdust, wood chips, planer shavings, and hog fuel. These byproducts may be burned in the wood fuel boiler or stored in enclosed bins until the material is sold and transferred off-site. The wood fuel boiler is primarily used to provide steam for the drying of rough green lumber in the drying kilns. Sawdust and shavings are the main fuels for the boiler. The Wellons boiler has a nominal capacity of 40,000 pounds of steam per hour (lb/hr). The particulate matter (PM) from the boiler is controlled by a multi-cyclone mechanical separator, followed by an electrostatic precipitator (ESP). Nitrogen oxides (NO_x) are controlled by staged combustion and flue gas recirculation (FGR). Carbon monoxide (CO) and volatile organic compounds (VOC) are controlled by good combustion practices.

C. Permit History

On July 15, 1997 Stoltze requested a Montana Air Quality Permit (MAQP) for dry kilns which were replaced in 1971, 1972, 1974, and 1982. The rest of the facility remained unchanged and grandfathered at that time. **MAQP #2934-00** was issued final on September 3, 1997.

D. Current Permit Action

On February 3, 2012, Stoltze submitted an application to replace the existing four (4) grandfathered boilers with a single, 2012 Wellons Wood-fired boiler (Model 1DS1C9.0A) with a maximum rated steam production of 40,000 lb/hr (up to 70 million British thermal units per hour (MMBtu/hr)) that is equipped with multi-cyclones followed by an ESP. The installation of the Wellons will also include updating all the fuel handling equipment. A 2.5 MW steam turbine will also be installed. An up to 800 brake horsepower (bhp) Tier II emergency diesel generator/engine will be installed as part of this project. **MAQP # 2934-01** replaces MAQP # 2934-00.

E. Response to Public Comments

Person/Group Commenting	Permit Reference	Comment	Department Response
Flathead Electric Cooperative	All	Provided a letter of Support for the permit and changes to the facility.	
Ronald Buentemeier	All	Provided a letter of Support for the permit and changes to the facility.	
Remington Kohrt	All	Provided a letter of Support for the permit and changes to the facility.	
Montana Women in Timber	All	Provided a letter of Support for the permit and changes to the facility.	
Montana Wood Products Association	All	Provided a letter of Support for the permit and changes to the facility.	
Stoltze	Section II A.1(a)	The boiler steam output reflects the nominal capacity of the new wood-fired boiler system at a maximum heat input rate of 70 MMBtu/hr. The emission estimates and proposed emission limits were all based on the BACT analysis and manufacturer supplied emissions information. These data points are all based on heat input rate, not steam output rate. None of the emissions generated by the boiler is directly related to steam output rate, only heat input rate. The steam output rate is a function of heat input rate and boiler efficiency. The inclusion of a steam output rate limit potentially restricts any incentive for Stoltze to strive for more efficient boiler operations. Stoltze also believes that although the boiler was ordered to provide a nominal 40,000 lbs of steam per hour, the final steam output rate of the boiler will not be precisely known until it is installed and operating. It is possible the boiler could produce slightly more steam at full capacity than 40,000 lbs/hr. Since Stoltze believes that having both heat input and steam limits is redundant and potentially limiting to operations, Stoltze requests the steam output limit be removed from the permit. Stoltze also requests the heat input rate limit of 70 MMBtu/hr be based on a rolling 30-day limit. The variable nature of the mixture of biomass feeds and moisture content makes it hard to predict the overall Btu content of fuels going to the boiler. The boiler computer control system can accurately measure firing rate, but only while the	The department agrees to this change. The change does not increase or decrease emissions, but allows the facility to track production with a parameter that they have available.

		fuels are being fired. Therefore, a short-term firing rate slightly over 70 MMBtu/hr is remotely possible. Having the rolling limit ensures compliance with emission standards and BACT, yet allows Stoltze to have needed flexibility in boiler operations. Stoltze suggests the following language for the boiler heat input limit: *"The Wellons boiler shall not exceed a heat input capacity of 70 MMBtu/hr based on a 30-day rolling average. Stoltze will monitor the heat input rate (MMBtu/hr) of the boiler on a 30-day rolling average using the boiler computerized control system (CCS)."*	
Stoltze	Section II A.2	The applicant believes this condition should only be related to the proposed new or modified equipment at the facility, and should not be applicable to existing and un-modified equipment. Therefore, Stoltze requests the following change to this condition: *"All new or modified conveyors associated with the new Wellons boiler fuel handling system shall be covered or enclosed."*	The department agrees with this change only the modified/affected equipment should be noted.
Stoltze	Section II B.1	Stoltze finds no current basis in regulation for testing the boiler every three years for PM. Currently, the existing uncontrolled boiler bank is required to test every five years for particulates only. Stoltze believes that for the new boiler, with modern combustion designs and emission controls, testing every five years is consistent with the current permit requirements. If and until 40 CFR Part 63 Subpart JJJJJJ is finalized, we propose that the last sentence should include changes in permit conditions as follows: "*After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).*"	The Department is agreeable to this change.
Stoltze	Section II B.2	Similar to the above comment, Stoltze suggests that there is no current basis in regulation for testing the boiler every three years for PM_{10}, and proposes a	The Department is agreeable to this change.

		five-year testing frequency as sufficient. We request that the last sentence should include changes in permit conditions as follows: *"After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749)."*	
Stoltze	Section II B.4	Stoltze suggests that an initial and one-time confirmation of the NO_2/NOx ratio should be sufficient confirmation of assumptions used in the permit application. In addition, Stoltze finds no basis in regulation for testing the boiler every three years for these pollutants, and proposes a five-year testing frequency as sufficient. We propose language changes in permit conditions as follows: "*Stoltze shall test the wood-fired boiler using wood and/or bark for CO and NOx concurrently to monitor compliance with the emission limits and/or conditions contained in Section II.A.1(g) and Section II.A.1(h). The in-stack NO_2/NOx ratio shall be determined during the initial stack testing….. After the initial source test, testing shall continue on an every five-year basis or according to another testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749)."*	The Department is agreeable to this change. However the correct ratio is the NO2/NO ratio. The permit change reflects the correct ratio.
Stoltze	Section II C.1	Stoltze believes these permit conditions should be focused on the equipment added in this permit, rather than existing equipment at the facility. Planer shavings are pneumatically conveyed and controlled by a cyclone at the dry silo. Hog Tons of material hogged per year does not identify the smaller material that does not pass through the hog and could be better captured in the annual emission inventory. The boiler fuel will consist of several different woody fuel types. That includes planer shavings, sawdust, wood chips, hog fuel from sawmill production activities, and hog fuel from sources outside of the sawmill. Each of those fuel types also has value as raw	The Department is agreeable to this change.

		material for other uses including medium density fibreboard, newsprint paper, particleboard, decorative bark for landscaping, cover for children's playgrounds, and animal bedding. Stoltze has existing customers who purchase the various woody byproducts for these purposes. Therefore, any given fuel type can and will be used in variable quantities and in multiple applications. This makes it impossible to accurately measure the final volume of each source that will be consumed as fuel for the boiler. Total fuel burned in the boiler will be accurately recorded and reported, but Stoltze suggests that the total volume of each fuel type can only be indirectly related to the production volumes of the sawmill and planer and to fuel obtained from outside sources. In addition, related to comment #1 above, Stoltze believes it would be more appropriate to track MMBtu fired on an annual basis than tons of steam produced. Therefore, Stoltze suggests the following permit language: "*Stoltze shall submit the following information annually to the Department by March 1 of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).* *"Wellons MMBtu of fuel fired and tons of fuel combusted."*	
Stoltze	Section II C.2	Stoltze is surprised that this reporting condition has been included in this preliminary determination, and suggests that it is not required for ongoing NESHAP compliance. This permitting action did not include any changes to the existing kiln operations and the permit application included an adequate demonstration that the facility is an area source of HAPs. Annualized HAP emissions calculations were based on the worst case emission factors available for the tree species manufactured at Stoltze. The highest single HAP emitted was 6.51 tpy of methanol for kiln drying hemlock. Hemlock logs make up a very small	The permit has been changed to appropriately reflect this request.

		portion of Stoltze's wood supply, and it is mixed in with other species and not directly tracked. Any additional breakdown of wood volumes dried in the kilns would reduce the annual methanol emissions. Additionally, the inclusion of the language "most current emissions factors available" is an onerous and unnecessary condition as it could be taken to mean that an extensive search for HAP emission factors be undertaken at all times. If the Department is determined to include a condition for ongoing determination of HAP emissions, we propose that the condition reflect that HAPs and VOCs are calculated on an annual basis, and read as follows: *"Stoltze dries a number of wood species. These include Douglas fir, larch, Engelmann spruce, lodgepole pine, alpine fir, grand fir, hemlock, inland red cedar, Idaho white pine, and ponderosa pine. Often these species are mixed together in the kiln charges making it impossible to accurately identify the volume of each species that is being dried. Stoltze has the ability to report the following species and species combinations: Douglas fir; larch; Engelmann spruce and lodgepole pine; alpine fir, grand fir, and hemlock; western red cedar; and mixed whitewoods.* *Stoltze shall document, annually, the following information for the kilns, which shall be submitted along with the annual emission inventory:* *a) Combined wood species groupings and amount of lumber dried [in Thousand Board Feet (MBdFt)].* *b) HAP emissions shall be reported as lb HAP/MBdFt.* *c) Volatile Organic Compounds (VOC) emissions shall be reported as lb VOC/MBdFt.* *For the dry kilns, the calculation of annual VOC and HAP emissions shall be based on the amount of wood dried and the emission factors used in the most recent permit application, or site-specific kiln emission data (ARM 17.8.749)."*	

Stoltze	Page 1 MAQP Analysis	Stoltze proposes that this section reflect that the sawmill operations are also included as grandfathered equipment with the planing and shaving operations.	The Department is agreeable to this change.
Stoltze	Page 1 MAQP Analysis	Stoltze suggests that the description of the Wellons boiler include the following: *The Wellons boiler has a nominal capacity of 40,000 pounds of steam per hour (lb/hr).*	The Department is agreeable to this change.

F. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department of Environmental Quality (Department). Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   Stoltze shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}
11. ARM 17.8.230 Fluoride in Forage

Stoltze must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Stoltze shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.

6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). Stoltze is considered an NSPS affected facility under 40 CFR Part 60 and is subject to the requirements of the following subparts.

   a. 40 CFR 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:

   b. 40 CFR 60, Subpart Dc, Standard of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. This subpart applies to any boiler with a heat input capacity of less than 100 MMBtu/hr, but greater than 10 MMBtu/hr. The Wellons boiler has a heat input capacity of 70 MMBtu/hr and was constructed after June 9, 1989 and therefore, would be subject to this standard.

   c. 40 CFR 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006, and are not fire pump engines, and owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005, are subject to this subpart.

      Based on the information submitted by Stoltze, the CI ICE equipment to be used under MAQP #2934-01 may be applicable if a CI ICE were modified, constructed, or reconstructed after July 11, 2005. Depending on the age of unit installed, Stoltze may be subject to this subpart.

8. ARM 17.8.341 Emission Standards for Hazardous Air Pollutants. This section incorporates, by reference, 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP). Since the emission of Hazardous Air Pollutants (HAP) from the Stoltze facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAPs combined, the Stoltze facility is not subject to the provisions of 40 CFR Part 61.

9. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with the requirements of 40 CFR Part 63, as listed below:

   a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to an NESHAP Subpart as listed below:

   b. 40 CFR 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for area sources: Industrial, Commercial, and Institutional Boilers. An owner or operator of an industrial, commercial, or institutional boiler as defined in §63.11237 that is located at, or is part of, an area source of hazardous air pollutants and is subject to this subpart. The Wellons boiler is subject to this subpart upon startup of the new boiler.

   c. 40 CFR 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). An owner or operator of a stationary RICE at a major or area source of HAP emissions is subject to this rule except if the stationary RICE is being tested at a stationary RICE test cell/stand. An area source of HAP emissions is a source that is not a major source. Based on the information submitted by Stoltze, the RICE equipment to be used under MAQP #2934-01 may potentially be subject to this subpart because it operates a compression ignition RICE at an area source of HAP emissions. This subpart will become applicable if the installed RICE were modified, constructed, or reconstructed after June 12, 2005.

D. ARM 17.8, Subchapter 4 – Stack Height and Dispersion Techniques, including, but not limited to:

1. ARM 17.8.401 Definitions. This rule includes a list of definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.402 Requirements. Stoltze must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP). The proposed height of the new or modified boiler stack for Stoltze is below the allowable 65-meter GEP stack height.

E. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. Stoltze submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

F. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Stoltze has a PTE greater than 25 tons per year of particulate matter, particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), nitrogen oxide (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs); therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit Program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Stoltze submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Stoltze submitted an affidavit of publication of public notice for the January 27, 2012 issue of the *Daily Interlake*, a newspaper of general circulation in the Town of Columbia Falls in Flathead County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Stoltze of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

G. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source because this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

H. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

a. PTE > 100 tons/year of any pollutant;

b. PTE > 10 tons/year of any one hazardous air pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

c. PTE > 70 tons/year of PM_{10} in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #2934-01 for Stoltze, the following conclusions were made:

a. The facility's PTE is less than 100 tons/year for any pollutant.

b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.

c. This source is not located in a serious PM_{10} nonattainment area.

d. This facility is subject to NSPS (40 CFR 60, Subparts A, Dc and IIII).

e. This facility is subject to NESHAP standards (40 CFR 63 Subparts A, JJJJJJ and ZZZZ).

f. This source is not a Title IV affected source, or a solid waste combustion unit.

g. This source is not an EPA designated Title V source.

Based on these facts, the Department determined that Stoltze will be a minor source of emissions as defined under Title V. However, if minor sources subject to NSPS are required to obtain a Title V Operating Permit, Stoltze will be required to obtain a Title V Operating Permit.

The Department determined that the annual reporting requirements contained in the permit are sufficient to satisfy this requirement.

III. BACT Determination

A BACT determination is required for each new or modified source. Stoltze shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized.

A BACT analysis was submitted by Stoltze in permit application #2934-01, addressing some available methods of controlling PM, PM_{10}, $PM_{2.5}$, NO_x, CO, and VOC emissions from the Wellons boiler. The Department reviewed these methods, as well as previous BACT determinations. The following control options have been reviewed by the Department in order to make the following BACT determination. Emission limits are for all operations including Startup and Shutdown Events and Ash-Pulling Periods. The following was submitted by the applicant and summarized by the Department.

The control options selected have controls and control costs comparable to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

NO_X BACT for a 70 MMBtu/hr Wood-Fired Boiler

NO_X will be formed during the combustion of wood in the boiler. NOx comes from two sources in combustion, fuel NO_x and thermal NO_x. The fuel NO_x portion accounts for a major portion of the total NO_X emissions from the combustion of nitrogen containing fuels, such as wood biomass. A combination of factors, including combustion temperature, fuel-air stoichiometric ratio, and wood characteristics (moisture, volatile matter, and nitrogen content) are believed to contribute to the fuel NO_X formation mechanism.

Wellons expects that the majority of the NO_X generated by the boiler system will not be the result of thermal NO_X formation, but will be due to the fuel-bound nitrogen. The boiler furnace temperatures will generally not be high enough to develop thermal NO_X. There are several ways to control NO_X emissions from a boiler. Some methods utilize combustion modifications that reduce NOx formation in the boiler itself, while others utilize add-on control devices at various points in the exhaust path to remove NO_X after it is formed. Combinations of combustion controls and add-on controls may also be used to reduce NO_X. The identified applicable NO_X control technologies are described below.

Combustion Controls – Staged Combustion with Flue Gas Recirculation

Combustion controls are features of the boiler that reduce the formation of NO_X at the source. The combustion controls identified as potentially available are staged combustion and flue gas recirculation (FGR). Each is addressed separately below.

Staged Combustion

Staged combustion is a method to limit fuel box oxygen available to combine with nitrogen, thus avoiding formation of fuel NO_X. Staged combustion creates a fuel-rich primary combustion zone. Thermal NO_X is limited due to the lower firebox temperature caused by the lower oxygen concentration. The Wellons furnace cell design incorporates staged combustion as an integral feature of its design. The furnace is provided with three separately controlled zones, in which a controlled amount of air is delivered to each zone to support the gasification and combustion process.

FGR

FGR is a flame-quenching technique that involves recirculating a portion of the flue gas from the economizers or the air heater outlet and returning it to the furnace through the windbox. The FGR reduces the peak flame temperature through absorption of the combustion heat by relatively cooler flue gas. FGR also serves to reduce the O_2 concentration in the combustion zone.

Selective Catalytic Reduction (SCR)

SCR is a post-combustion gas treatment technique for reduction of NO and NO_2 in an exhaust stream to molecular nitrogen, water, and oxygen. Ammonia (NH_3) is used as the reducing agent. The basic reactions are:

$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O$

$8NH_3 + 6NO_2 \rightarrow 7N_2 + 12H_2O$

$2\ NO_2 + 4\ NH_3 + O_2 \rightarrow 3\ N_2 + 6\ H_2O$

Ammonia is injected into the flue gas upstream of a catalyst bed. NO_X and NH_3 combine at the catalyst surface, forming an ammonium salt intermediate which subsequently decomposes to elemental nitrogen and water. The function of the catalyst is to effectively lower the activation energy of the NO_X decomposition reaction. Typical catalyst materials include metal oxides (e.g., titanium oxide and vanadium), noble metals (e.g., platinum and rhodium), zeolite, and ceramics. The control technology works best for flue gas temperatures between 575 degrees Fahrenheit (°F) and 750°F. Excess air is injected at the boiler exhaust to reduce temperatures to the optimum range, or the SCR is located in a section of the boiler exhaust ducting where the exhaust temperature has cooled to this temperature range. Technical factors that impact the effectiveness of this technology include inlet NO_X concentrations, the catalyst reactor design, operating temperatures and stability, type of fuel fired, sulfur content of the fuel, design of the ammonia injection system, catalyst age and reactivity, and the potential for catalyst poisoning.

SCR has been demonstrated to achieve high levels of NO_x reduction in the range of 70% to 90% (OAQPS Air Pollution Control Technology Fact Sheet) for a wide range of industrial combustion sources, including PC and stoker coal-fired boilers and natural gas-fired boilers. Typically, installation of the SCR is upstream of a particulate control device (e.g., baghouse or ESP).
One complicating factor is that SCR is not known to be installed on wood-fired boilers of this size.

Selective Noncatalytic Reduction (SNCR)

SNCR involves the noncatalytic decomposition of NO_X in the flue gas to nitrogen and water using a reducing agent (e.g., ammonia or urea). The reactions take place at much higher temperatures than in an SCR, typically between 1,650°F and 1,800°F, because a catalyst is not used to drive the reaction. The efficiency of the conversion process diminishes quickly when operated outside the optimum temperature band and additional ammonia slip or excess NO_X emissions may result. The process has been used in North America since the early 1980s. Removal efficiencies of NO_X vary considerably for this technology, depending on inlet NO_X concentrations, fluctuating flue gas temperatures, residence time, amount and type of nitrogenous reducing agent, mixing effectiveness, acceptable levels of ammonia slip, and the presence of interfering chemical substances in the gas stream. The estimated control efficiency for SNCR is 30%-50% (OAQPS Air Pollution Control Technology Fact Sheet).

Eliminate Technically Infeasible NO_X Control Options

The NSR Workshop Manual describes two key criteria for determining whether an alternative control technology is technically feasible. According to the NSR Workshop Manual, a technology must be "available" and "applicable" in order to be considered technically feasible. A technology is *available* "if it has reached the licensing and commercial sales stage of development." An identified alternative control technique may be considered *applicable* if "it has been or is soon to be deployed (e.g., is specified in a permit) on the same or similar source type."

Combustion Controls –Staged Combustion with Flue Gas Recirculation

These controls are now typically considered a standard part of a modern boiler package, and are readily available. This alternative is considered technically feasible and cannot be eliminated.

SCR

SCR systems require a minimum temperature of approximately 575°F for the destruction of NO_X . For applications where the process or equipment burns biomass fuels, a particulate control device is usually needed upstream of the SCR for it to function properly. However, by the time the flue gas passes through the particulate control device, its temperature is much less than required for the SCR to operate effectively. The traditional solution would be to install a natural-gas or oil fired burner between the SCR and particulate control device to re-heat the air to the appropriate temperatures.

Wellons stated they have never installed an SCR on a wood-fired boiler, and Wellons is not confident that the system could operate effectively as they have no operating experience. Stoltze, their engineering consultant and Wellons consider this alternative technically infeasible and the department agrees, SCR is eliminated from any further consideration.

SNCR

Wellons stated that they have never installed an SNCR on a wood-fired boiler this small. Stoltze believes, however, that there are no insurmountable technical problems with SNCR in this type of installation. This alternative is considered technically feasible and cannot be eliminated.

Rank Control Technologies by NO_X Control Effectiveness

Combustion controls consisting of staged combustion and FGR are standard equipment built into the base price of the boiler package. Therefore, combustion controls for NO_X are considered the baseline case, and NO_X reduction performance has not been calculated for this case.

Table 1 below lists the NO_X control technologies and emission rates for the remaining NO_X control options.

Table 1. Ranked NO_X Control Technology Effectiveness

Control Technology	NOx Reduction (% control)	NOx Emission Rate (lb/MMBtu)
Selective Non-Catalytic Reduction (SNCR)	30 to 50% (37.5% used for evaluation, as recommended by Wellons)	0.16
Baseline: Combustion Controls	0%	0.26

Evaluate Most Effective NO_X Controls and Document Results

Selective Non-Catalytic Reduction

The highest level of control that can be realized is accomplished by utilizing SNCR. The following paragraphs analyze the environmental, energy and economic impacts of an SNCR installation on the boiler.

Environmental Impacts

Although there are no prohibitive environmental issues that would preclude the use of an SNCR system, there are some areas of concern. SNCR presents several potential adverse environmental impacts. Unreacted ammonia in the flue gas (ammonia slip) and the products of secondary reactions between ammonia and other species present in the flue gas will be emitted to the atmosphere. Ammonia slip causes the formation of additional condensable particulate matter such as ammonium sulfate, $(NH_4)_2SO_4$. The ammonium sulfate can corrode downstream exhaust handling equipment, as well as increase the opacity or visibility of the exhaust plume. In this case, ammonia slip is expected to be low, approximately 10 part per million (ppm) or less. This would minimize these adverse effects.

Issues associated with SNCR equipment consumables (i.e., ammonia) have to be addressed. There are major considerations for the storage and use of large quantities of ammonia on the plant site. Ammonia is one of the regulated substances covered by Section 112(r) of the Clean Air Act, which deals with the prevention and detection of accidental releases of hazardous chemicals. This legislation is implemented through 40 CFR Part 68 – Chemical Accident Prevention Provisions. For safety reasons in a heavily populated area, the quantity and concentration of aqueous ammonia stored on site may be limited to below the threshold quantities of 40 CFR Part 68, Table 1.

Energy Impacts

An SNCR has a very small energy impact on the facility. Costs for this energy expenditure are included in the Economic Analysis section.

Economic Impacts

Economic impacts associated with the SNCR control option were derived from the methods outlined in EPA 453/B-96-001, *Office of Air Quality Planning and Standards Control Cost Manual*, 6th Edition (OAQPS). A vendor-specific cost estimate was provided by Wellons for this analysis. All cost data are referenced in the economic analysis spreadsheets of Appendix D. Table 2 below summarizes the economic impacts of the SNCR control option.

Table 2: SNCR Cost-Effectiveness for NO_X Control

Case	Estimated Total Annual Cost	Uncontrolled Emissions (tpy)	Control Efficiency (%)	Tons Removed (tpy)	Cost-Effectiveness ($/ton)
Wellons Boiler	$229,632	79.7	37.5	29.9	$7,683

Annual costs include operating labor and materials, maintenance, utilities, overhead, administrative charges, property taxes, and insurance. Capital costs were annualized over a 10-year period at an interest rate of 7 percent for the Wellons boiler.

Combustion Controls –Staged Combustion with Flue Gas Recirculation (Baseline Case)

The next highest level of control identified is accomplished by utilizing combustion controls consisting of Staged Combustion with FGR. The following paragraphs analyze the environmental, energy and economic impacts of combustion controls on the new boilers.

Environmental Impacts

The use of combustion controls for reducing NO_X formation can have a slightly adverse effect on CO formation. The levels of CO increase, but the impacts from that increase are small enough to disregard in this analysis.

Energy Impacts

The use of combustion controls has a small energy impact on the facility. The staged combustion may be slightly less efficient than standard combustion, increasing fuel consumption slightly. Increased electrical power is also needed to power the fans to operate the FGR system. These impacts are minor, and are considered part of standard boiler operations today.

Economic Impacts

Economic impacts associated with the combustion controls have not been estimated. Again, these controls are considered a standard part of a modern boiler package, and the costs of this equipment are built in to the base boiler price. Therefore, the costs of NO_X removal have not been calculated.

Select NO_x BACT

BACT for the Wellons boiler is staged combustion and FGR to reduce the formation of NO_X. The use of combustion controls on the new Wellons boiler has been demonstrated above to have acceptable environmental and energy impacts. Stoltze proposed a limit of 0.26 lbs/MMBtu for the new boiler, using combustion controls of staged combustion and FGR to achieve the proposed limit.

The proposed NO_X limit of 0.26 lbs/MMBtu is slightly higher than reported in EPA's AP-42 emission factor compilation for wet bark and wood combustion, at 0.22 lbs/MMBtu. However, the proposed value is substantially lower than the AP-42 value for dry wood combustion, at 0.49 lbs/MMBtu. Stoltze traditionally burns a wide variety of wood fuels with greatly varied moisture contents, from low moisture (under 20% for kiln dried fuels) to very high moisture (50+% for logs and hog fuel during the wettest times of year). The makeup of the fuel is often dependent on the time of year and the location where the logs are sourced. The proposed NO_X emission limit reflects a recognition of the varied fuels and moisture contents, where the fuel charge to the boiler could be all wet fuel, all dry, or likely a mixture somewhere in between. The proposed limit also considers the advanced NO_X reduction capabilities inherent to the modern boiler design provided by Wellons.

The Wellons boiler, with combustion controls, at 0.26 lb/MMBtu conforms to recent BACT determinations made by the Department and other states as shown by determinations found in the RACT-BACT-LAER Clearinghouse (RBLC). RBLC was searched for process type 13.120, Process Category: Commercial/Institutional-Size Boilers/Furnaces (<=100 MMBtu/hr), wood/biomass fired. The lowest reported NO_X emission rate in the RBLC is 0.23 lb/MMBtu. The highest NO_X emission rate is 0.50 lbs/MMBtu. All are reported to use good combustion practices, with some using over-fire air. In addition, the Department has recently permitted a 60 MMBtu/hr wood-fired boiler in Montana with a NO_X emission rate of 0.30 lbs/MMBtu, with no add-on controls.

Therefore, after evaluation of the previously discussed information, the Department determined that proper design and operation of the boiler, along with good combustion practices, staged combustion, FGR and a NOx emission limit of 0.26 lb/MMBtu (and 18.2 lb/hour) based on a 1-hour average constitutes BACT. This limit is appropriate for all operation of the boiler including startup and shutdown.

CO and VOC BACT for a 70 MMBtu/hr Wood-Fired Boiler

CO and VOC are formed from incomplete combustion of organic constituents. Because CO and VOC are generated and controlled by the same mechanisms, they will be addressed in this section together. In an ideal process, complete combustion, or oxidation, of organics results in the emission of water and CO_2. When organic compounds do not oxidize completely, the result is CO and various modified organic compounds (VOCs). Two general and nonexclusive approaches are available for reducing emissions of these compounds:

- Improve combustion conditions to facilitate complete combustion in the boiler burner, and
- Complete oxidation of the exhaust stream after it leaves the boiler burner.

Post-combustion CO/VOC control is accomplished via add-on equipment that creates an environment of high temperature and oxygen concentration to promote complete oxidation of the CO and organic compounds remaining in the exhaust. This can be facilitated at relatively lower temperatures by the use of certain catalyst materials.

Identify All Control Technologies

A review of EPA's RBLC database and AP-42 indicate three primary control technologies for CO and VOC, some of which are not used for control of boiler emissions:

- Proper system design and operation
- Thermal oxidation
- Catalytic oxidation

Proper System Design and Operation (base case)

Reduction of CO/VOC emissions can be accomplished by controlling the combination of system temperatures through operation at maximum loads, increasing oxygen concentrations, maximizing combustion residence time, and improving mixing of the fuel, exhaust gases, and combustion air (oxygen). Maximizing heating efficiency, and subsequently minimizing fuel usage, will also minimize CO formation.

Thermal Oxidation

Thermal oxidizers are essentially supplementary combustion chambers that complete the conversion of VOC to carbon dioxide (CO_2) and water by creating a high temperature environment with optimal oxygen concentration, mixing, and residence time. They require temperatures of approximately 1400°F to 1500°F. This high-temperature environment is produced by the combustion of supplemental fuel, generally natural gas. Thermal oxidizers are typically located downstream of a particulate control device, especially when the exhaust stream contains high concentrations of particulate material. Reduced particulate loading improves thermal efficiency since the particulate matter would act as a heat sink, and it reduces equipment maintenance requirements.

Several design variations address different inlet concentrations, air flow rates, fuel efficiency requirements, and other operational variables. All of them function using the basic principles described above. One commonly used design is called a regenerative thermal oxidizer (RTO), which is evaluated for this BACT analysis. This type of thermal oxidizer typically uses a bed of ceramic packing material to capture heat from the incineration process and preheat the incoming exhaust gas. This design improves thermal efficiency and reduces the amount of supplemental fuel that must be combusted. RTOs are capable of reducing VOC emissions by 90 to 99 percent.

Catalytic Oxidation

Catalytic oxidizers employ the same principles as thermal oxidizers, but they use catalysts to lower the temperature required to effect complete oxidation. One commonly used design for both CO and VOC control is called a regenerative catalytic oxidizer (RCO), which is evaluated for this BACT analysis. The optimum temperature range for catalytic oxidizers is generally about 600-800°F. Because catalysts are prone to plugging and poisoning, catalytic oxidizers must be located downstream of a particulate control device if the exhaust stream contains appreciable concentrations of particulate matter. Even so, contaminants that are not removed by the particulate control equipment, or those that are not removed in sufficient quantity, can potentially poison the catalyst and reduce or eliminate its effectiveness.

Like thermal oxidizers, catalytic oxidizer designs include many varieties to address specific operational conditions and requirements. They are generally capable of 90 to 99 percent destruction or removal efficiency at steady-state conditions.

Eliminate Technically Infeasible Control Options

The NSR Manual describes two key criteria for determining whether an alternative control technology is technically feasible. According to the NSR Manual, a technology must be "available" and "applicable" in order to be considered technically feasible. A technology is *available* "if it has reached the licensing and commercial sales stage of development." An identified alternative control technique may be considered *applicable* if "it has been or is soon to be deployed (e.g., is specified in a permit) on the same or similar source type."

All of the above control alternatives are considered technically feasible and cannot be eliminated.

Rank Remaining Control Technologies by Control Effectiveness

Thermal oxidizer and catalytic oxidizer units are expected to have VOC control efficiencies ranging from 90% to 99%. For purposes of simplifying this BACT analysis, the VOC efficiencies were all assumed to be in the middle of the specified ranges, at 95%. For CO control, the catalytic oxidizers have high efficiencies around 90-99%. Here, 95% was chosen for the catalytic oxidizer. Thermal oxidizers are generally not effective on CO.

Table 3 below summarizes the control efficiencies for this analysis.

Table 3: CO and VOC Control Technology Effectiveness

ControlTechnology	Percent Reduction	
	CO	VOC
Catalytic Oxidizer	95%	95%
Thermal Oxidizer	-	95%

Evaluate Most Effective Controls and Document Results

Catalytic Oxidizer

A catalytic oxidizer can reach the highest level of control that can be realized for CO and VOC. The following paragraphs analyze the environmental, energy and economic impacts of an RCO installation on the temporary and permanent boilers.

Environmental Impacts

A potential adverse environmental impact for a catalytic oxidizer results from the handling of the spent catalyst. Many of the catalyst formulations are potentially toxic and subject to hazardous waste disposal regulations under the Resource Conservation and Recovery Act (RCRA).

Energy Impacts

No significant energy impacts result from the installation of a catalytic oxidizer, as it is a passive control system.

Economic Evaluation

Economic impacts associated with the RCO control option were compared using estimated annualized capital, operating, and maintenance costs. Cost estimates for catalytic oxidizers were derived from the methods outlined in EPA 453/B-96-001, *Office of Air Quality Planning and Standards Control Cost Manual*, 6th Edition (OAQPS). Where appropriate, assumptions were made from suggested/typical data that were supplied in the manual and if data was not available from the manual, best engineering judgment was used. A heat recovery capability of 70% was used for this analysis.

The equipment costs estimated via OAQPS were adjusted by the latest Producers Price Index (PPI) multiplier in 2011 dollars. Tables 4 and 5 below summarize the economic impacts of the RCO control option.

Table 4: RCO Cost-Effectiveness for CO Control

Case	Estimated Total Annual Cost	Uncontrolled Emissions (tpy)	Control Efficiency (%)	Tons Removed (tpy)	Cost-Effectiveness ($/ton)
Wellons Boiler – CO	$596,844	92	95%	87.4	$6,829

Table 5: RCO Cost-Effectiveness for VOC Control

Case	Estimated Total Annual Cost	Uncontrolled Emissions (tpy)	Control Efficiency (%)	Tons Removed (tpy)	Cost-Effectiveness ($/ton)
Wellons Boiler - VOC	$596,844	6.1	95%	5.8	$102,993

Annual costs include operating labor and materials, maintenance, utilities, overhead, administrative charges, property taxes, and insurance. Capital costs were annualized over a 10-year period at an interest rate of 7 percent for the boiler.

Thermal Oxidizer

The regenerative thermal oxidizer (RTO) can reach high levels of control for VOC similar to the RCO. The following paragraphs analyze the environmental, energy and economic impacts of an RTO installation on the boiler.

Environmental Impacts

An RTO will require reheating of the exhaust stream to acceptable levels to facilitate the oxidation reaction. The combustion of the additional natural gas to raise the exhaust temperature will cause an increase in additional NO_X and CO emissions. Table 6 below establishes conservative estimates of uncontrolled emissions caused by the additional fuel combustion for RTO application. These estimates are based on emission factors from AP-42, Tables 1.4-1 and 1.4-2.

Table 6: Uncontrolled Additional Emissions from Fuel Combustion for RTO

Emitting Unit	NO_X (ton/yr)	CO (ton/yr)
RTO	10.5	6.3

Energy Impacts

An RTO would require the exhaust gas to be reheated to achieve the optimal operating temperature for VOC oxidation. Energy impacts are created with the combustion of additional natural gas or propane to reheat the exhaust. To reach the required reaction temperature, additional natural gas input into the exhaust stream is required. Costs for the additional energy required are included in the economic evaluation.

Economic Impacts

Economic impacts associated with the RTO control option were derived from the methods outlined in EPA 453/B-96-001, *Office of Air Quality Planning and Standards Control Cost Manual*, 6th Edition (OAQPS). A vendor-specific cost estimate was not available for this analysis. Assumptions for the OAQPS methodology were made from suggested/typical data that were supplied in the manual and if data was not available from the manual, best engineering judgment was used. A heat recovery capability of 50% was used for this analysis.

All cost data are provided in the economic analysis spreadsheets of Appendix D. The equipment costs calculated were adjusted by the latest Producers Price Index multiplier in 2011 dollars. Table 7 below summarizes the economic impacts of the RTO control option.

Table 7: RTO Cost-Effectiveness for VOC Control

Case	Estimated Total Annual Cost	Uncontrolled Emissions (tpy)	Control Efficiency (%)	Tons Removed (tpy)	Cost-Effectiveness ($/ton)
Wellons Boiler - VOC	$1,669,327	6.1	95%	5.8	$288,063

Annual costs include operating labor and materials, maintenance, utilities, overhead, administrative charges, property taxes, and insurance. Capital costs were annualized over a 10-year period at an interest rate of 7 percent for the boiler.

Select CO/VOCBACT

The first option analyzed is the use of RCO, the best performing CO and VOC control. The use of an RCO on the boiler was demonstrated above to have acceptable environmental and energy impacts. However, the economic impacts are unacceptable at $6,829/ton for CO and $102,993/ton for VOC. These costs are above industry norms, and are excessive for the small tonnage of CO and VOC removed. Therefore, the RCO control option as BACT is rejected.

The next best performing option analyzed is the use of RTO. The use of an RTO on the boiler has been demonstrated above to have acceptable environmental and energy impacts, even though the RTO adds NO_X and CO emissions. The economic impacts are unacceptable at $288,063/ton for VOC. This cost is above industry norms and is deemed excessive for the small tonnage of VOC removed. Therefore, the RTO control option as BACT is rejected.

Finally, the third best performing option, and the baseline case, is proper system design and operation. The use of proper system design and operation on the new boiler has been demonstrated above to have acceptable environmental and energy impacts. The economic impacts are acceptable, as they are a part of operating the boiler. After rejection of the other higher ranked control options, proper system design and operation for CO and VOC control on the boiler is considered BACT.

Stoltze proposes a CO emission rate of 0.3 lbs/MMBtu, and a VOC emission rate of 0.02 lbs/MMBtu for the new boiler.

To confirm the BACT decision, the RACT-BACT-LAER Clearinghouse (RBLC) was reviewed for other recent determinations for CO and VOC limits for process type 13.120, Process Category: Commercial/Institutional-Size Boilers/Furnaces (<=100 MMBtu/hr), wood/biomass fired. None of the boilers reports any CO or VOC add-on control devices.

Therefore, after evaluation of the previously discussed information, the Department determined that proper design and operation of the boiler, along with good combustion practices and a CO and VOC emission limit of 0.3 lbs/MMBtu and 0.02 lbs/MMBtu based on a 1-hour average constitutes BACT respectively.

PM_{10} and $PM_{2.5}$ BACT for a 70 MMBtu/hr Wood-Fired Boiler

Identify All Control Technologies

A variety of particulate control technologies are available for removing particulate from the wood-fired boiler exhaust. The following control technologies have been evaluated in this BACT analysis.

- Mechanical collectors (cyclone, multi-clones)
- Wet scrubber
- Fabric filter baghouse
- Dry electrostatic precipitator (ESP)
- Wet electrostatic precipitator (ESP)

Mechanical Collectors

The most prevalent types of mechanical collectors are single cyclones, or cyclones in a series, usually referred to as a multi-clone. Collection efficiency for high-efficiency cyclones has been found to be over 90% for particle sizes greater than 15 microns (*Handbook of Air Pollution Control Engineering and Technology*, 1995). Wet scrubbers, baghouses and ESPs are typically used in series with a mechanical collector, where the mechanical collector serves as the primary control, and the more-refined technology serves as the secondary control. In this configuration, the mechanical collector removes the bulk of the large particulate and reduces the loading on the secondary control equipment.

Wet Scrubbers

Wet collectors or wet scrubbers are devices that use a liquid for removing particles or polluted gases from an exhaust gas stream. The most common wet scrubber in use in industry is the venturi scrubber. The venturi scrubber accelerates the gas stream through a narrow passage or throat, which brings it into contact with water droplets and improves collection efficiency. The primary disadvantage to venturi scrubbers is the high energy consumption and creation of a contaminated water stream. Control efficiencies of wet scrubbers range from 70 to 99%, depending on the application.

Fabric Filter Baghouse

Fabric filter systems remove dust from a stream of gas by means of a porous fabric and a cake of dust as the filter media. The systems are commonly referred to as baghouses, since the fabric is usually configured in cylindrical bags installed within a housing. The type of fabric filter used depends on the temperature and acidity of the gas stream, the characteristics of the dust, the gas-to-cloth filtration ratio, and the type of bag cleaning used.

The filter bags are regularly cleaned to remove most of the collected particulate matter, while leaving the filtering cake in place. Cleaning mechanisms can be shaking, air pulsing, or reverse flow. The cleaning methods require energy and can be a source of noise. Because baghouses impose an extra pressure drop on the operating process, additional fan power is needed to move the gas stream through the baghouse.

Fabric filter baghouses provide high efficiency control of filterable particulate matter, but provide only limited control of condensable particulate matter. Because of the need to replace and dispose of filter bags, baghouses have fairly high maintenance costs. Fabric filter technology has limitations on combustion sources due to flue gas temperature and the high moisture content of combustion gases.

ESP, Dry

An ESP uses a high voltage electric current to separate dust, fume or mist from a gas stream. The precipitator consists of vertical parallel plates forming gas passages 12-16 inches apart. Discharge electrodes are electrically isolated from the plates and suspended in rows between the gas passages. A high voltage system provides power to the discharge electrode generating an electrical field. The electrical discharges from the precipitator discharge electrodes are termed corona discharges and are needed to electrostatically charge the particles.

The particulate entrained in the gas is charged while passing through the electrical field. The particulate receives a negative charge, is attracted to the grounded collector plate, and forms a dust layer on the plate. Periodic rapping separates the accumulated dust layer from both the collector plates and discharge electrodes. The dust layer released by the rapping collects in hoppers and is removed by an ash handling system.

ESPs provide control up to 99.9+% collection efficiency, even with fine particles. A dry ESP can withstand temperatures up to 800^{o}F, is a reliable, low-maintenance technology and creates low gas flow resistance. Disadvantages of the dry ESP technology are that the units can be quite large and rapping of the collecting plates can create noise.

Another disadvantage to ESP technology is the formation of small amounts of ozone in the exhaust stream. Negative corona precipitators generate very small quantities of ozone due to the characteristics of the corona discharge. Generally, the concentration of ozone is limited by the relatively low oxygen levels in the gas stream being treated.

ESP, Wet

A wet ESP uses essentially the same technology as a dry ESP, with the exception that the atmosphere inside the unit is wet. The gas stream is sprayed with water as it enters the unit, and water is used to clean the plates instead of rapping. The use of water in close proximity to high voltage insulators adds to the system complexity and increases the potential problems associated with corrosion. Most wet ESP units are used for small-to-moderately-sized industrial sources that produce particulate matter that is sticky or that is too carbonaceous for a dry ESP application. The wet ESP technology creates a contaminated water stream in addition to the wet ash discharge.

In applications with high concentrations of acid gas emissions, such as sulfuric acid, the wet ESP has an additional advantage of controlling acid gases. The proposed wood-fired boiler uses a lower-sulfur fuel and has very low emissions of acid gases compared to higher sulfur fuels, so this advantage is not gained by using a wet ESP in place of the proposed dry ESP.

A wet ESP does not provide emission control advantage over the dry ESP and would create a contaminated water stream for disposal, which is considered an unacceptable consequence at this location.

Eliminate Technically Infeasible Options

None of the technology presented is technically infeasible.

Rank Remaining Control Technologies by Effectiveness

Table 8 below ranks the particulate control efficiencies of the different devices.

Table 8: Summary of Estimated Particulate Control Efficiencies for Individual Technologies

Particulate Control Technology	Estimated Control Efficiency
Wet Electrostatic Precipitator (WESP)	99+%
Dry ESP (DESP)	99+%
Fabric Filter Baghouse (FFB)	99+%
Wet Scrubber	90%
Cyclonic Separators	67%

The dry and wet ESP technologies and the fabric filter baghouse all have very high control efficiencies for filterable particulate matter. The wet scrubber and cyclonic separators have reduced performance from the three other technologies.

Evaluate Most Effective Controls and Document Results

The three top performing devices all have essentially equal performance on filterable particulate.

Fabric Filter Baghouse

Although the FFB has equal performance to the other top ranked controls, it is rejected due to the potential fire danger posed by the system.

Wet ESP vs. Dry ESP

The PM_{10} particulate emissions from the Wellons unit consist of filterable and condensable fractions. $PM_{2.5}$ is a subset of PM_{10}. According to manufacturer data, approximately one-third of $PM_{2.5}$ emissions from the Wellons boiler are condensables. Thus, filterable emissions represent about two-thirds of $PM_{2.5}$ emissions, and a higher fraction of PM_{10} and total particulate.

Condensable particulate matter includes gaseous emissions or liquid droplets that condense to form particulates at ambient temperatures. These can include sulfate, nitrate, acid gases and trace metal emissions. The HAP emissions include acid gases such as hydrogen chloride and hydrogen fluoride, which are formed due to naturally-occurring chlorine and fluorine in wood. Wood combustion HAP emissions also include trace metals that are found in wood, including arsenic, cadmium, manganese, chromium, nickel and selenium.

A wet ESP would cool the exhaust gas stream from 350^{o}F to 160^{o}F, theoretically causing some of the condensable particulate to be collected within the ESP. The resulting exhaust stream would have higher moisture content and less buoyancy than the exhaust stream from a dry ESP. The wet ESP may have an advantage for controlling condensable particulate matter due to the presence of water. On the other hand, the emission inventory shows that the condensable portion of the particulate emissions only amounts to approximately three tons per year. Thus, the wet ESP could only collect some fraction of those three tons of condensable emissions. The wet ESP could provide a slight reduction in hydrogen chloride and hydrogen fluoride removal, but this technology has numerous disadvantages. Wellons and Stoltze believe that the collection of this small amount of condensables is not a benefit that outweighs the adverse impacts of a wet system. The addition of the wet ESP system would create a contaminated water stream, along with a required water treatment system, and a wet ash product. It would increase the water content and lower the temperature of the ESP exhaust, reducing exhaust plume buoyancy.

The disadvantages of the wet ESP system make the dry ESP the preferred system.

Select PM_{10}/$PM_{2.5}$ BACT

Pursuant to the permit application, Stoltze selected one of the top ranked systems, the dry ESP, to control particulate emissions from the Wellons boiler. There are no adverse environmental, energy or economic impacts to prevent this selection. Stoltze has proposed a PM_{10} emission limit of 0.0385 lbs/MMBtu and a $PM_{2.5}$ emission limit of 0.031 lbs/MMBtu. These two proposed limits include condensables. 40 CFR 63 Subpart JJJJJJ requires a filterable only PM limit of 0.03 lbs/MMBtu on new biomass boilers over 30 MMBtu/hr.

The RBLC includes BACT limits designated as filterable PM_{10} (FPM), indicating that the limit only applies to filterable PM_{10} and not to condensable PM_{10}. The PM_{10} control technology is indicated where the information was available. There are no BACT determinations for $PM_{2.5}$ emissions from wood-fired boilers on the RBLC. The RBLC data shows the proposed particulate limits on the Wellons boiler conform with recent determinations on other similarly sized wood-fired boilers.

Therefore, after evaluation of the previously discussed information, the Department determined that installation of a Dry ESP following a multiple-cyclone mechanical filter and limits for combined filterable and condensable PM_{10} of 0.0385 lbs/MMBtu for combined filterable and condensable $PM_{2.5}$ of 0.031 lbs/MMBtu based on 1-hour average constitutes BACT. Additionally the fuel handling system consists of pneumatic and mechanical conveyors. All these systems will be enclosed or covered, which constitutes BACT for the fuel handling system.

SO_2 BACT for a 70 MMBtu/hr Wood-Fired Boiler

SO_2 controls are rarely if ever applied wood-fired boilers, as the sulfur content of wood-based fuel is very small. As a result, a BACT analysis for SO_2 is not presented here. Annual SO_2 emissions are predicted to be 7.67 tons per year. No add-on control is proposed as BACT. This proposed SO_2 BACT conforms to previous BACT determinations made by the Department and other states for wood-fired boilers. The Department has determined that no-controls constitute BACT for SO_2.

IV. Emission Inventory

Source ID Number	Source	PM	PM10	PM2.5	SO2	NOx	VOC	CO	HAPs	CO_2E
		Pollutant Emissions (tons/year)								
EU1 (new)	Wellons Boiler	12.26	11.80	9.50	7.67	79.72	6.13	91.98	5.52	1,332
EU2	Lumber Drying Kilns	--	--	--			55.8		10.7	
EU3	Fugitives Emissions: Raw Materials Handling includes: Bark, Chips, Shavings, Hog Fuel and Sawdust Handling Fugitives, Chips Storage Pile and Hog Fuel Storage Pile	65.5	28.6	4.8	--	--	--	--	--	--
EU4	Fugitive Emissions: Vehicle Traffic	96.0	28.3	2.8	--	--	--	--	--	
EU5	#2 Planer Shavings Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU6	Dry Silo Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU7	Planer: Chipper Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU8	Sawmill Chips: Truck Bin Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU9	Planer Chips: Truck Bin Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU10	Shavings: Truck Bin Cyclone	8.8	3.5	0.5	--	--	--	--	--	
EU11	Sawmill and Planer Process includes: Hog, Debarkers, Sawmill Chippers Cut Off Saws, Sawmill Building Vents	12.7	9.6	6.9	--	--	--	--	--	
EU12	Fugitive Emissions: Plantwide Fuel Combustion	2.1	2.1	2.1	2.0	29.9	2.9	6.6	1.28	
EU13	Fugitive Emissions: Wood Waste Open Burning	4.6	4.6	4.6	0.03	1.1	5.1	37.8	--	
EU14(new)	Emergency Generatorr	0.1	0.1	0.1	0.4	2.2	2.2	1.1	5.33E-03	
IEU01	12,000 Gallon Diesel Storage Tank Fugitives	--	--	--	--	--	2.00E-03	--	5.36E-04	
IEU02	2,000 Gallon Gasoline Tank Fugitives	--	--	--	--	--	5.08E-01	--	7.57E-02	
IEU03 (new)	Cooling Tower	0.9	0.9	0.9						
Total Emissions - Including Fugitives		**245.8**	**106.1**	**34.0**	**10.1**	**112.9**	**72.7**	**137.5**	**17.6**	**1,332**
Total Emissions - Not Including fugitives		**78.6**	**43.5**	**20.6**	**8.1**	**81.9**	**64.6**	**93.1**	**16.3**	**1,332**

Wellons Boiler (EU1)

Source: EU1 (new) Wellons Boiler	**70.00**	MMBtu/hr Heat input (Wellons boilers)
	8760	Hours of Operation
		Condensable

Sample Calculation:

(70 mmBtu/hr)(0.04 lb/mmBtu Particulate)= 2.8 lb/hr
(2.8 lb/hr)*(8760 hr/yr)/(2000 lb/ton)= 12.26 ton/yr

Pollutant	Emission Factor	Units	Emission Factor Controlled Reference	TOTAL lbs/hr	TOTAL lbs/day	TOTAL tons/year	CO_2E factor	CO_2E (tpy)
PM	0.04	lb/MMBtu	Wellons Supplied Emissions (includes condensables)	2.80	67.20	12.26		
PM-10	0.0385	lb/MMBtu	Wellons Supplied Emissions Estimated 95% of Total PM (includes condensables)	2.70	64.68	11.80		
PM-2.5	0.031	lb/MMBtu	Wellons Supplied Emissions Estimated 70% of Total PM (inlcudes condensables)	2.17	52.08	9.50		
PM Condensable	0.01	lb/MMBtu	Wellons Supplied Emissions (included in all PM Factors)	0.70	16.80	3.07		
NOx	0.26	lb/MMBtu	Wellons Supplied Emissions	18.20	436.80	79.72		
CO	0.3	lb/MMBtu	Wellons Supplied Emissions	21.00	504.00	91.98		
SOx	0.025	lb/MMBtu	Wellons Supplied Emissions	1.75	42.00	7.67		
VOC	0.02	lb/MMBtu	Wellons Supplied Emissions	1.40	33.60	6.13		
CO_2	93.8	kg CO2/MMBtu	Table C-1, 40 CFR 98.3 Subpart C General Stationary Fuel Combustion Sources	14445	346685	63270	1	63,270
CH_4	0.032	kg CH4/MMBtu	Table C-2, 40 CFR 98.3 Subpart C General Stationary Fuel Combustion Sources	4.93	118.27	21.58	21	453
N_20	0.0042	kg N2O/MMBtu	Table C-2, 40 CFR 98.3 Subpart C General Stationary Fuel Combustion Sources	0.65	15.52	2.83	310	878
CO_2E - Total (does not include CO2 per tailoring rule deferral and reporting rule)						1,332		

Wellons Boiler (EU1) HAPs

Source: EU1	**60,000**	**lb-steam/hr**
Wellons Boiler	**70**	**MMBtu/hr**

Sample Calculation:

Acetaldehyde (Using AP-42 Emission Factor):
(70 MMBtu/hr)*(8.30E-04 lb/MMBtu)= 0.0581 lb/hr
(0.0581 lb/hr)*(8760 hr/yr)/(2000 lb/ton) = 0..254 ton/yr

Benzene (Using OSU Emission Factor):
(5.58 lb/MMlbSteam)*(0.04 MMlbSteam/hr) = 0.223 lb/hr
(0.223 lb/hr)*(8760 hr/yr)/(2000 lb/ton) = 0.978 ton/yr

Source: EU1					
Wood Waste Boiler Bank - HAPs:	**Emission Factors**		**Maximum PTE Using Updated Heat Input[1]**		
Pollutant	(lb/MMBtu)	(lb/MMlbSteam)	lb/hour	Tons/year	Reference
Acetaldehyde	8.30E-04	--	5.81E-02	2.54E-01	AP-42, Rev. 9/03 Table 1.6-3
Acetophenone	3.20E-09	--	2.24E-07	9.81E-07	AP-42, Rev. 9/03 Table 1.6-3
Acrolein	4.00E-03	--	2.80E-01	1.23E+00	AP-42, Rev. 9/03 Table 1.6-3
Benzene	--	5.58E+00	3.35E-01	1.47E+00	NCASI TB 858, 2/03
bis(2-Ethylhexyl)phthalate	4.70E-08	--	3.29E-06	1.44E-05	AP-42, Rev. 9/03 Table 1.6-3
Carbon Tetrachloride	4.50E-05	--	3.15E-03	1.38E-02	AP-42, Rev. 9/03 Table 1.6-3
Chlorine	7.90E-04	--	5.53E-02	2.42E-01	AP-42, Rev. 9/03 Table 1.6-3
Chlorobenzene	3.30E-05	--	2.31E-03	1.01E-02	AP-42, Rev. 9/03 Table 1.6-3
Chloroform	2.80E-05	--	1.96E-03	8.58E-03	AP-42, Rev. 9/03 Table 1.6-3
2,4-Dinitrophenol	1.80E-07	--	1.26E-05	5.52E-05	AP-42, Rev. 9/03 Table 1.6-3
Ethylbenzene	3.10E-05	--	2.17E-03	9.50E-03	AP-42, Rev. 9/03 Table 1.6-3
Formaldehyde	--	2.20E+00	1.32E-01	5.78E-01	NCASI TB 858, 2/03
Hydrogen Chloride	--	1.13E+00	6.80E-02	2.98E-01	NCASI TB 858, 2/03
Napthalene	9.70E-05	--	6.79E-03	2.97E-02	AP-42, Rev. 9/03 Table 1.6-3
4-Nitrophenol	1.10E-07	--	7.70E-06	3.37E-05	AP-42, Rev. 9/03 Table 1.6-3
Pentachlorophenol	5.10E-08	--	3.57E-06	1.56E-05	AP-42, Rev. 9/03 Table 1.6-3
Phenol	5.10E-05	--	3.57E-03	1.56E-02	AP-42, Rev. 9/03 Table 1.6-3
Propionaldehyde	6.10E-05	--	4.27E-03	1.87E-02	AP-42, Rev. 9/03 Table 1.6-3
Styrene	1.90E-03	--	1.33E-01	5.83E-01	AP-42, Rev. 9/03 Table 1.6-3
2,3,7,8-Tetrachlorodibenzo-p-dioxin	8.60E-12	--	6.02E-10	2.64E-09	AP-42, Rev. 9/03 Table 1.6-3
Toluene	9.20E-04	--	6.44E-02	2.82E-01	AP-42, Rev. 9/03 Table 1.6-3
1,1,1-Trichloroethane	3.10E-05	--	2.17E-03	9.50E-03	AP-42, Rev. 9/03 Table 1.6-3

2,4,6-Trichlorophenol	2.20E-08	--	1.54E-06	6.75E-06	AP-42, Rev. 9/03 Table 1.6-3
Vinyl Chloride	1.80E-05	--	1.26E-03	5.52E-03	AP-42, Rev. 9/03 Table 1.6-3
o-Xylene	2.50E-05	--	1.75E-03	7.67E-03	AP-42, Rev. 9/03 Table 1.6-3
Antimony	7.90E-06	--	5.53E-04	2.42E-03	AP-42, Rev. 9/03 Table 1.6-4
Arsenic	--	1.70E-03	1.02E-04	4.47E-04	NCASI TB 858, 2/03
Beryllium	1.10E-06	--	7.70E-05	3.37E-04	AP-42, Rev. 9/03 Table 1.6-4
Cadmium	4.10E-06	--	2.87E-04	1.26E-03	AP-42, Rev. 9/03 Table 1.6-4
Chromium, total	--	1.00E-03	6.00E-05	2.63E-04	NCASI TB 858, 2/03
Cobalt	--	3.20E-04	1.92E-05	8.41E-05	NCASI TB 858, 2/03
Lead	--	9.81E-03	5.89E-04	2.58E-03	NCASI TB 858, 2/03
Manganese	--	2.54E-01	1.52E-02	6.68E-02	NCASI TB 858, 2/03
Mercury	--	1.68E-03	1.01E-04	4.42E-04	NCASI TB 858, 2/03
Methanol	--	1.40E+00	8.42E-02	3.69E-01	NCASI TB 858, 2/03
Nickel	3.30E-05	--	2.31E-03	1.01E-02	AP-42, Rev. 9/03 Table 1.6-4
Selenium	--	5.08E-03	3.05E-04	1.34E-03	NCASI TB 858, 2/03
Polycyclic Organic Matter (POM)					
Acenaphthylene	5.00E-06	--	3.50E-04	1.53E-03	AP-42, Rev. 9/03 Table 1.6-3
Anthacene	3.00E-06	--	2.10E-04	9.20E-04	AP-42, Rev. 9/03 Table 1.6-3
Benzo(a)anthracene	6.50E-08	--	4.55E-06	1.99E-05	AP-42, Rev. 9/03 Table 1.6-3
Benzo(a)pyrene	2.60E-06	--	1.82E-04	7.97E-04	AP-42, Rev. 9/03 Table 1.6-3
Benzo(b)fluoranthene	1.00E-07	--	7.00E-06	3.07E-05	AP-42, Rev. 9/03 Table 1.6-3
Benzo(g,h,i)perylene	9.30E-08	--	6.51E-06	2.85E-05	AP-42, Rev. 9/03 Table 1.6-3
Benzo(k)fluoranthene	3.60E-08	--	2.52E-06	1.10E-05	AP-42, Rev. 9/03 Table 1.6-3
Chysene	3.80E-08	--	2.66E-06	1.17E-05	AP-42, Rev. 9/03 Table 1.6-3
Dibenzon(a,h)anthracene	9.10E-09	--	6.37E-07	2.79E-06	AP-42, Rev. 9/03 Table 1.6-3
Fluoranthene	1.60E-06	--	1.12E-04	4.91E-04	AP-42, Rev. 9/03 Table 1.6-3
Fluorene	3.40E-06	--	2.38E-04	1.04E-03	AP-42, Rev. 9/03 Table 1.6-3
Indeno(1,2,3,c,d)pyrene	8.70E-08	--	6.09E-06	2.67E-05	AP-42, Rev. 9/03 Table 1.6-3
Phenanthrene	7.00E-06	--	4.90E-04	2.15E-03	AP-42, Rev. 9/03 Table 1.6-3
			lb/hr	**ton/yr**	
		Total HAPS:	**1.26**	**5.52**	

Source Test Data, OSU Data (5/8/07). The recalculated heat input was used to calculate the PTE using the AP-42 (lb/MMBTu) EF's.

Lumber Drying Kilns (EU2)

Source:
EU2 **Three double track at 66' long**

Lumber Drying Kilns: **One single track at 104' long**

8760 Hours of Operation

70 mmBdft/yr Production Rate

Reference

Sample Calculation: (70 mmbdft/yr)(65 **lb/mmbdft**)(1/2000 ton/lb) = 2.275 ton/yr

Pollutant

VOC:

Emission Factor:	1.86	lb/1000 bdft	NCASI Tech Bulletin #718
Production Rate:	70000000	bdft/yr	
Emissions:	55.8	ton/yr	
	12.74	lb/hr	

HAP	Maximum Potential Emissions Tons/year		
Methanol	6.51	Hemlock > 200 °F	
Formaldehyde	0.14	Lodgepole > 200 °F	
Acetaldehyde	3.96	Hemlock > 200 °F	
Propionaldehyde	0.035	Hemlock > 200 °F	
Acrolein	0.056	Hemlock > 200 °F	
Total Hap	**10.70**		

Note: Used the highest emission factors of all types of fuel @ kiln temperatures > 200 degrees F.

Lumber Drying Kiln Emissions Factors (lb/MSF):

Species of Wood	Methanol	Formaldehyde
Green Ponderosa Pine	0.07	0.003
Burnt Ponderosa Pine	No data	No data
Lodge Pole Pine	0.03	0.004
Douglas Fir	0.02	0.001
White Fir	0.12	0.003

HAP Emission Factors developed by Oregon State University and presented in: Department of Environmental Quality Eastern Region Air Quality Program, Standard AIR CONTAMINANT DISCHARGE PERMIT REVIEW REPORT for Interfor Pacific, Inc (Draft 3/23/06)

Raw Material Handling (EU3)

Source: EU3

Beauty Bark Handling Fugitives: Maximum Potential Emissions

Annual Throughput: 20,000 tons/yr
Hourly Throughput: 6 tons/hr
Hours Operated: 8760

Note: Approximately 20,000 tpy of bark is produced from the debarkers and transferred by front-end loader into trucks.

Due to the large size, high moisture content, and conveyor side protectors, an estimated 80% control is used.

Sample Calculation: (20,000 ton/yr)(1-80%)(1.0 lb/ton)(1/2000 ton/lb) = 2.0 ton/yr
(6 tons/hr)(1-80%)(1 lb/ton) = 1.2 lb/hr

Pollutant				Reference
TSP:				
	Emission Factor:	1	lb/ton	FIRE Version 4 July 1995
	Controlled Factor:	0.2	lb/ton	SCC 30700803
	Material Throughput	20000	ton/yr	80% Control
	Emissions:	2.00	ton/yr	
		1.20	lb/hr	
PM10:				
	Emission Factor:	0.36	lb/ton	FIRE Version 4 July 1995
	Controlled Factor:	0.072	lb/ton	SCC 30700803
	Material Throughput	20000	ton/yr	80% Control
	Emissions:	0.72	ton/yr	
		0.43	lb/hr	
PM2.5:				
	Emission Factor:	0.0545	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Controlled Factor:	0.0109	lb/ton	SCC 30700803
	Material Throughput	20000	ton/yr	80% Control
	Emissions:	0.11	ton/yr	
		0.07	lb/hr	

Source: EU3 **Chips Handling Fugitives: Maximum Potential Emissions**

Annual Throughput: 165,000 ton/yr
Hourly Throughput: 100 ton/hr
Hours Operated: 8760

Note: Chips are transferred from each chipper through a screen. Over sized pieces are sent back to be rechipped and unders are pneumatically conveyed to a chip bin. From the chip bin the chips are transferred into trucks.

An estimated 5,000 tons per year of chips are pneumatically conveyed to an outdoor storage pile.
Additional chips are brought to the facility via truck, unloaded, and piled by loader into the outdoor storage pile.

Sample Calculation: (165,000 ton/yr) (0.1 lb/ton)(1/2000 ton/lb) = 8.25 ton/yr
(100 ton/hr) (0.1 lb/ton) = 10.0 lb/hr

Pollutant				Reference
TSP:				
	Emission Factor:	0.1	lb/ton	MDEQ / STDR
	Material Throughput	165000	ton/yr	
	Emissions:	8.25	ton/yr	
		10.00	lb/hr	
PM10:				
	Emission Factor:	0.036	lb/ton	MDEQ / STDR
	Material Throughput	165000	ton/yr	
	Emissions:	2.97	ton/yr	
		3.60	lb/hr	
PM2.5:				

Emission Factor:	0.0055	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
Material Throughput	165000	ton/yr	
Emissions:	0.45	ton/yr	
	0.55	lb/hr	

Source: EU3 **Shavings Loadout Fugitives: Maximum Potential Emissions**

Annual Throughput: 15,000 ton/yr
Hourly Throughput: 5 ton/hr
Hours Operated: 8760 hr/yr

Note: Shavings are transferred from the shavings bins into trucks. Pneumatically

Pollutant				**Reference**
TSP:				
	Emission Factor:	2	lb/ton	Department / STDR
	Material Throughput	15000	ton/yr	
	Emissions:	15.00	ton/yr	
		10.00	lb/hr	
PM10:				
	Emission Factor:	1.2	lb/ton	Department / STDR
	Material Throughput	15000	ton/yr	
	Emissions:	9.00	ton/yr	
		6.00	lb/hr	
PM2.5:				
	Emission Factor:	0.1817	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Material Throughput	15000	ton/yr	
	Emissions:	1.36	ton/yr	
		0.91	lb/hr	

Source: EU3 **Hog Fuel Handling Fugitives: Maximum Potential Emissions**

Updated by Joe O'Rourke at Stoltze Jan 2012

Annual Throughput: 30,000 ton/yr
Hourly Throughput: 40 ton/hr
Hours Operated: 8760 hr/yr

Note: Hog fuel is conveyed from the hog into the hog fuel bin. From the bin, hog fuel is transferred into trucks. Hog fuel is also loaded into trucks from the storage pile and transported off-site.

Pollutant				**Reference**
TSP:				
	Emission Factor:	1	lb/ton	MDEQ / STDR
	Material Throughput	30000	ton/yr	
	Emissions:	15.00	ton/yr	
		40.00	lb/hr	
PM10:				

	Emission Factor:	0.36	lb/ton	MDEQ / STDR
	Material Throughput	30000	ton/yr	
	Emissions:	5.40	ton/yr	
		14.40	lb/hr	
PM2.5:				
	Emission Factor:	0.0545	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Material Throughput	30000	ton/yr	
	Emissions:	0.82	ton/yr	
		2.18	lb/hr	

Source: EU3 **Sawdust Handling Fugitives: Maximum Potential Emissions**

Updated by Joe O'Rourke at Stoltze Jan 2012

Annual Throughput: 30,000 ton/yr
Hourly Throughput: 10 ton/hr
Hours Operated: 8760 hr/yr

Note: Sawdust is conveyed from the sawmill to the boiler fuel bin and into the boiler bank. Sawdust is also chain conveyed into the sawdust bin and transferred into trucks.

Pollutant				**Reference**
TSP:				
	Emission Factor:	1	lb/ton	MDEQ / STDR
	Material Throughput	30000	ton/yr	
	Emissions:	15.00	ton/yr	
		10.00	lb/hr	
PM10:				
	Emission Factor:	0.36	lb/ton	MDEQ / STDR
	Material Throughput	30000	ton/yr	
	Emissions:	5.40	ton/yr	
		3.60	lb/hr	
PM2.5:				
	Emission Factor:	0.0545	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Material Throughput	30000	ton/yr	
	Emissions:	0.82	ton/yr	
		0.55	lb/hr	

TOTAL FUGITIVE EMISSIONS FROM RAW MATERIALS HANDLING

TSP	55.250	**ton/yr**
	71.200	**lb/hr**
PM10	23.490	**ton/yr**
	28.032	**lb/hr**
PM2.5	3.557	**ton/yr**
	4.245	**lb/hr**

STORAGE PILE FUGITIVES

TSP	**0.343**	tons/year	Chips Storage Pile

	9.903	tons/year	Hog Fuel Storage Pile
PM10	**0.172**	tons/year	Chips Storage Pile
	4.952	tons/year	Hog Fuel Storage Pile
PM2.5	**0.026**	tons/year	Chips Storage Pile
	1.238	tons/year	Hog Fuel Storage Pile

TOTAL EMISSIONS FOR EU3

TSP	65.497	tons/year
PM10	28.613	tons/year
PM2.5	4.821	tons/year

Storage Piles (EU3)

Reference: AP-42, Rev. 11/06 Sec. 13.2.5

Unit of Chips (ft^3) 200

Density (lbs/ft^3) 12

Pile Radius (r) = 100 ft

Pile Height (h) = 20 ft

pi = 3.1416

Volume = pi / 3 * r^2 * h

ft^3 = 209440

Pile Surface Area = pi * r * (sqrt (r^2 + h^2))

= 32038.15941 ft^2 = 2976.45 m^2

Tons Chips = 1256.64

Threshold Friction Velocity (U*t)AP42, Table 13.2.5-2 = 0.54 m/s

Number of Disturbances / Year (N) = 300

Area:	Us/Ur :	Surface%	Area (m^2)
A	0.9	12	357.2
B	0.6	48	1428.7
C1+C2	0.2	40	1190.5781
		Total Area:	2976.45

Assuming 3 three-day periods per month

with U+10(max) approximately = 25 mph = 11.18 m/s

	Us+ = Us/Ur * u			
Us/Ur :	0.2	0.6	0.9	
	2.24	6.71	10.06	m/s

	U* = Us+ * 0.10		(U* = Friction Velocity)	
Us+ :	2.2	6.7	10.1	
	0.22	0.67	1.01	m/s

Erosion Potential (P) = 58(U* - U*t)^2 + 25(U* - U*t)

P =	24.23	g/m^2		

Particulate Emissions = P*affected Area*Number of Periods

TSP =	25965.37	g/month =	57.24	lbs/month
			686.93	lbs/year
			0.343	**tons/year**

PM10 Emissions = k*P*affected Area*Number of Periods

k =	0.5	(for PM10)		
PM10 =	12982.68	g/month =	28.62	lbs / month
			343.46	lbs / year
			0.172	**tons/year**

PM2.5 Emissions = k*P*affected Area*Number of Periods

k =	0.075	(for PM2.5)		
PM10 =	1947.40	g/month =	4.29	lbs / month
			51.52	lbs / year
			0.026	**tons/year**

Source: EU3 **Hog Fuel Storage Pile Fugitives**
Maximum Potential Emissions

Reference: AP-42, Rev. 11/06 Sec. 13.2.5

Pile Radius (r) =	700	ft
Pile Height (h) =	12	ft
pi =	3.1416	

Unit of Hog Fuel (ft^3)		200
Density (lbs/ft^3)		12
Volume =	pi / 3 * r^2 * h	
ft^3 =	6157536	
Tons Hog Fuel =	36945.216	

Pile Surface Area = pi * r * (sqrt (r^2 + h^2))
= 1539610.179 ft^2 = 143034.60 m^2

Threshold Friction Velocity (U*t)AP42, Table 13.2.5-2 = 0.54 m/s

Number of Disturbances / Year (N) = 300

Area:	Us/Ur :	Surface%	Area (m^2)
A	0.9	12	17164.2
B	0.6	48	68656.6
C1+C2	0.2	40	57213.8418
			143034.60

Assuming 3 three-day periods per month

with U+10(max) approximately =			25	mph =	11.18	m/s

	Us+ = Us/Ur * u			
Us/Ur :	0.2	0.6	0.9	
	2.24	6.71	10.06	m/s

	U* = Us+ * 0.10	(U* = Friction Velocity)		
Us+ :	2.2	6.7	10.1	
	0.22	0.67	1.01	m/s

Erosion Potential (P) = 58(U* - U*t)^2 + 25(U* - U*t)

P = 24.23 g/m^2

Particulate Emissions = P*affected Area*Number of Periods

TSP =	1247779	g/month =	2750.90	lbs/month
			33010.76	lbs/year
			16.5	tons/year
			9.903	**tons/year corrected**

PM10 Emissions = k*P*affected Area*Number of Periods

k = 0.5 (for PM10)

PM10 =	623890	g/month =	1375.45	lbs / month
			16505.38	lbs / year
			8.3	tons/year
			4.952	**tons/year corrected**

PM2.5 Emissions = k*P*affected Area*Number of Periods

k = 0.075 (for PM2.5)

PM2.5 =	93583.43	g/month =	206.32	lbs / month
			2475.81	lbs / year
			1.238	**tons/year**

* Emissions are corrected by a factor of 40% due to the pile being covered and frozen in snow 5 months a year.

Conveyors (EU3)

Source: EU3	New Conveyors: Maximum Potential Emissions
	New automated wood biomass handling consists of up to 30 conveyors to feed the boiler through the two storage silos. Also includes truck dump
45594	Max estimated boiler feed rate (tons per year)
7	Maximum number of conveyors and drop points for
90	aggregated % control assumed for convered conveyor, enclosed drop points and wood

Pollutant	Emission Factor:		Reference	Control %	Emissions (tons per year)	
TSP:	1	lb/ton	Hog Fuel - MDEQ / STDR			
PM10:	0.36	lb/ton	Hog Fuel - MDEQ / STDR	90	15.96	TSP:
PM2.5:	0.055	lb/ton	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3	90	5.74	PM10:
				90	0.87	PM2.5:

Maximum Anticipated Wood Fuel Tranfer Points

Transfer Poiint Number	From	To
1	Truck Dump	Truck Dump Reclaim Conveyor
2	Truck Dump Reclaim Conveyor	Wood Hog Infeed Conveyor
3	Wood Hog Infeed Conveyor	Wood Hog
4	Wood Hog	Wood Hog Outfeed Conveyor
5	Wood Hog Outfeed Conveyor	Green Silo Conveyor
6	Green Silo Conveyor	Green Silo
7	Green Silo	Boiler Bin Feed Conveyor

Fugitive Emissions: Vehicle Traffic

Source: EU4 **Fugitive Emissions: Vehicle Traffic**

Comments: These emissions are fugitive emissions which result from vehicular traffic inside the plant boundaries.
See following calculations.

Note: All roads at this facility are unpaved.

For Unpaved Roads
Using: Equation (1a): E = k (s/12)^a(W/3)^b

$$E = \left[k\left(\frac{s}{12}\right)^a\left(\frac{W}{3}\right)^b\right]\left(\frac{365-p}{365}\right)$$

Using: E = k * (s/12)*(W/3)^0.7*(w/4)^0.5*((365-p)/365) **(AP-42 13.2.2, 11/06)**

E = emission factor, (lb/vmt)
k = particle size multiplier (dimensionless) , TSP = 4.9, PM10 = 1.5, PM2.5 = 0.15
a = particle size multiplier (dimensionless), TSP = 0.7, PM10 = 0.9, PM2.5 = 0.9
b = particle size multiplier (dimensionless), TSP = 0.45, PM10 = 0.45, PM2.5 = 0.45
s = silt content of road surface material (%)
W = mean vehicle weight, (ton)
p = number of days of precipitation (120 days/yr 0.01 precip)

Source: EU4 E = k * 5.9 * (s/12)(S/30)(W/3)^0.7(w/4)^0.5(365-p/365) lb/VMT
Total Particulate From AP42, Rev. 1/95 Sec. 13.2.2, Unpaved Roads

Source	Number Trips Per Year	Distance per Trip (miles)	VMT	Emission Factor lb/VMT	Uncontrolle Emiss. tpy	Surface Silt Content % *s*	Mean Vehicle Speed mph *S*	Mean Vehicle Weight ton *W*	Mean # of Wheels *w*	# of days >0.01 in. Precip. *p**	Particle Size Multiplier *k*	Empirical Constant *a*	Empirical Constant *b*
Log Trucks	27000	0.1	2700	9.29	12.54	10	3	40	18	120	4.90	0.7	0.45
Lumber Trucks	2880	0.15	432	8.75	1.89	10	3	35	18	120	4.90	0.7	0.45
By-Product Vans	12600	0.25	3150	9.29	14.63	10	5	40	18	120	4.90	0.7	0.45
Misc. Pickups	7200	0.25	1800	2.41	2.17	10	10	2	4	120	4.90	0.7	0.45
Forklift	27000	0.15	4050	6.32	12.80	10	3	17	6	120	4.90	0.7	0.45
Forklift	14400	0.15	2160	5.60	6.05	10	3	13	6	120	4.90	0.7	0.45
Forklift	18000	0.15	2700	5.97	8.06	10	3	15	6	120	4.90	0.7	0.45
Forklift	42480	0.15	6372	6.32	20.13	10	3	17	6	120	4.90	0.7	0.45
Forklift	720	0.15	108	5.60	0.30	10	3	13	6	120	4.90	0.7	0.45
Loader	34560	0.37	12787.2	8.16	52.17	10	4	30	4	120	4.90	0.7	0.45
Loader	21600	0.3	6480	9.29	30.09	10	3	40	6	120	4.90	0.7	0.45
Loaders (2 each)	28800	0.15	4320	6.48	14.00	10	4	18	4	120	4.90	0.7	0.45
Emissions based on both loaders (2 each)	1440	0.45	648	7.65	2.48	10	1.5	26	4	120	4.90	0.7	0.45
Emissions based on both loaders	25200	0.12	3024	4.98	7.52	10	3	10	4	120	4.90	0.7	0.45
Loader	3600	0.3	1080	7.65	4.13	10	3	26	4	120	4.90	0.7	0.45
Grader	72	0.5	36	5.60	0.10	10	1	13	6	120	4.90	0.7	0.45
Dump Truck	360	1	360	3.64	0.66	10	5	5	6	120	4.90	0.7	0.45
Shop Truck	180	0.25	45	3.30	0.07	10	10	4	4	120	4.90	0.7	0.45
Water Truck	1080	1	1080	**3.95**	2.14	10	3	6	6	120	4.90	0.7	0.45

Total Particulate from UNPAVED Roads = 191.9 tons/year

Emissions are based on DRY roads, F.H. Stoltze Land & Lumber waters all surfaces on dry days; a CONTROL EFFICIENCY of 50% is assumed.

Corrected TSP Emissions = 96.0 tons/year

Mobile Sources unpaved

Source: EU4

Mobile Sources Fugitive Dust Emission Inventory - UNPAVED
F.H. Stoltze Land & Lumber Co.
Columbia Falls, MT

E =

$$E = \left[k \left(\frac{s}{12} \right)^a \left(\frac{W}{3} \right)^b \right] \left(\frac{365 - p}{365} \right)$$

PM10 From AP42, Rev. 11/06 Sec. 13.2.2, Unpaved Roads

Source	Number Trips Per Year	Distance per Trip (miles)	VMT	Emission Factor lb/VMT	Uncontrolled Emiss. tpy	Surface Silt Content % *s*	Mean Vehicle Speed mph *S*	Mean Vehicle Weight ton *W*	Mean # of Wheels *w*	# of days >0.01 in. Precip. *p**	Particle Size Multiplier *k*	Empirical Constant *a*	Empirical Constant *b*
Log Trucks	27000	0.1	2700	2.74	3.70	10	3	40	18	120	1.50	0.9	0.45
Lumber Trucks	2880	0.15	432	2.58	0.56	10	3	35	18	120	1.50	0.9	0.45
By-Product Vans	12600	0.25	3150	2.74	4.32	10	5	40	18	120	1.50	0.9	0.45
Misc. Pickups	7200	0.25	1800	0.71	0.64	10	10	2	4	120	1.50	0.9	0.45
Forklift	27000	0.15	4050	1.87	3.78	10	3	17	6	120	1.50	0.9	0.45
Forklift	14400	0.15	2160	1.65	1.79	10	3	13	6	120	1.50	0.9	0.45
Forklift	18000	0.15	2700	1.76	2.38	10	3	15	6	120	1.50	0.9	0.45
Forklift	42480	0.15	6372	1.87	5.94	10	3	17	6	120	1.50	0.9	0.45
Forklift	720	0.15	108	1.65	0.09	10	3	13	6	120	1.50	0.9	0.45
Loader	34560	0.37	12787.2	2.41	15.40	10	4	30	4	120	1.50	0.9	0.45
Loader	21600	0.3	6480	2.74	8.88	10	3	40	6	120	1.50	0.9	0.45
Loader (2 each)	28800	0.15	4320	1.91	4.13	10	4	18	4	120	1.50	0.9	0.45
Emissions based on both loaders (2 each)	1440	0.45	648	2.26	0.73	10	1.5	26	4	120	1.50	0.9	0.45
Emissions based on both loaders (2 each)	25200	0.12	3024	1.47	2.22	10	3	10	4	120	1.50	0.9	0.45
Loader	3600	0.3	1080	2.26	1.22	10	3	26	4	120	1.50	0.9	0.45
Grader	72	0.5	36	1.65	0.03	10	1	13	6	120	1.50	0.9	0.45
Dump Truck	360	1	360	1.08	0.19	10	5	5	6	120	1.50	0.9	0.45
Shop Truck	180	0.25	45	0.97	0.02	10	10	4	4	120	1.50	0.9	0.45
Water Truck	1080	1	1080	1.17	0.63	10	3	6	6	120	1.50	0.9	0.45
			53332.2										

Total PM10 from UNPAVED Roads = 56.65 tons/year

Emissions are based on DRY roads, F.H. Stoltze Land & Lumber waters all surfaces on dry days; a CONTROL EFFICIENCY of 50% is assumed.

Corrected PM10 Emissions = 28.32 tons/year

Total PM2.5 is simply a ratio of multipliers (k) in unpaved road equation. K=0.15 for PM2.5, 1.5 for PM10. Thus PM2.5 = 10% of PM10

Total PM2.5 from UNPAVED Roads = 5.66 tons/year

Emissions are based on DRY roads, F.H. Stoltze Land & Lumber waters all surfaces on dry days; a CONTROL EFFICIENCY of 50% is assumed.

Corrected PM2.5 Emissions = 2.83 tons/year

Facility Cyclones (EU5- EU10)

Source: EU5 — #2 Planer Shavings Cyclone: Maximum Potential Emissions

8760 Hours/year Operated

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	
		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35)
	Hours operated	8760	hrs	from AP-42 Section 13.2.4-3
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Source: EU6 — Dry Silo Cyclone: Maximum Potential Emissions

8760 Hours/year Operated

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	
		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35)
	Hours operated	8760	hrs	from AP-42 Section 13.2.4-3
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Source: EU7 **Planer Chipper Cyclone: Maximum Potential Emissions**

8760 **Hours/year Operated**

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	
		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35)
	Hours operated	8760	hrs	from AP-42 Section 13.2.4-3
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Source: EU8 **Sawmill Chips: Truck Bin Cyclone: Maximum Potential Emissions**

8760 **Hours/year Operated**

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	

		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35)
	Hours operated	8760	hrs	from AP-42 Section 13.2.4-3
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Source: EU9 **Planer Chips: Truck Bin Cyclone: Maximum Potential Emissions**

8760 **Hours/year Operated**

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	
		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Hours operated	8760	hrs	
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Source: EU10 **Shavings: Truck Bin Cyclone: Maximum Potential Emissions**

8760 **Hours/year Operated**

Sample Calculation: (8760 hrs/yr)(2.0 lbs/hr)(1/2000 ton/lb) = 8.76 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	2	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	8.76	ton/yr	
		2.00	lb/hr	
PM10:				
	Emission Factor:	0.8	lbs/hr	AP-42 5th Ed.
	Hours operated	8760	hrs	
	Emissions:	3.50	ton/yr	
		0.80	lb/hr	
PM2.5:				
	Emission Factor:	0.121	lbs/hr	PM10 factor above * (0.053/0.35) from AP-42 Section 13.2.4-3
	Hours operated	8760	hrs	
	Emissions:	0.53	ton/yr	
		0.12	lb/hr	

Sawmill Sources (EU11)

Source: EU11 — **Sawmill Chippers: Maximum Potential Emissions**
Annual Throughput: 40,000 ton/yr
Hourly Throughput: 10 ton/hr
Hours Operated: 8760

Note: The facility operates two 66" chippers.
These units are now located indoors in sawmill building.
Emissions assumed included in building vents below.

Source: EU11 — **Cut Off Saws: Maximum Potential Emissions**
Annual Throughput: 240,000 ton-logs/yr
Hourly Throughput: 70 ton/hr
Hours Operated: 8760

Note: The facility operates two cut off saws.

Sample Calculation: (240,000 ton-logs/yr)(0.02 lb/ton-logs)(1/2000 ton/lb) = 2.4 ton/yr
(70 ton-logs/hr)(0.02 lb/ton-logs) = 1.4 ton/yr

Pollutant				Reference
TSP:				
	Emission Factor:	0.02	lb/ton-logs	FIRE Ver. 6.23
	Material Throughput	240000	ton-logs/yr	SCC 30700801
	Emissions:	2.40	ton/yr	Log Debarking Factor
		1.40	lb/hr	
PM10:				
	Emission Factor:	0.011	lb/ton-logs	FIRE Ver. 6.23
	Material Throughput	240000	ton-logs/yr	SCC 30700801
	Emissions:	1.32	ton/yr	Log Debarking Factor
		0.77	lb/hr	
PM2.5:				

Emission Factor:	0.0017	lb/ton-logs	PM10 factor above * (0.053/0.35)
Material Throughput	240000	ton-logs/yr	from AP-42 Section 13.2.4-3
Emissions:	0.20	ton/yr	
	0.12	lb/hr	

Source: EU11 **Sawmill Building Vents: Maximum Potential Emissions**
Total Flow Rate: 78,560 dscfm
Hours Operated: 8760

Note: The sawmill operates 12 free-spinning roof vents and 4 wall vents (fans).
Each fan exhausts 19640 dscfm = 556 m^3/min
Sawmill air is lower than OSHA TWA Standard of 5 mg/m^3.

Sample Calculation: (2,224 dsm^3/min)(60 min/hr)(5 mg/m^3)(1/1000g/mg)(1/453.6 g/lb)(8760 hr/yr)/(2000 lb/ton)= 6.44 ton/yr
(6.5 ton/yr)(2000 lb/ton)/(8760 hr/yr)= 1.48 lb/hr

Pollutant				**Reference**
TSP:				
	Emission Factor:	5	mg/m^3	OSHA TWA Standard for
	Flow Rate:	2224	dsm^3/min	Particulate in Air (respirable)
	Emissions:	6.44	ton/yr	
		1.47	lb/hr	
PM10:				
	Emission Factor:	5	mg/m^3	OSHA TWA Standard for
	Flow Rate:	2224	dsm^3/min	Particulate in Air (respirable)
	Emissions:	6.44	ton/yr	
		1.47	lb/hr	
PM2.5:				
	Emission Factor:	5	mg/m^3	OSHA TWA Standard for
	Material Throughput	2224	dsm^3/min	Particulate in Air (respirable)
	Emissions:	6.44	ton/yr	
		1.47	lb/hr	

Source: EU11 **Debarkers: Maximum Potential Emissions**
Annual Throughput: 240,000 ton/year logs
Hourly Throughput: 65 tons/hr logs
Hours Operated: 8760

Note: This facility has a 25" and a 40" debarker.

Sample Calculation: (240,000 ton-logs/yr)(0.02 lb/ton-logs)(1/2000 ton/lb) = 2.4 ton/yr
(65 ton-logs/hr)(0.02 lb/ton-logs) = 1.3 lb/hr

Pollutant				**Reference**
TSP:				
	Emission Factor:	0.02	lb/ton-logs	FIRE Version 4 July 1995
	Material Throughput	240000	ton-logs/yr	SCC 30700801
	Emissions:	2.40	ton/yr	
		1.30	lb/hr	
PM10:				
	Emission Factor:	0.011	lb/ton-logs	FIRE Version 4 July 1995
	Material Throughput	240000	ton-logs/yr	SCC 30700801

	Emissions:	1.32	ton/yr	
		0.72	lb/hr	
PM2.5:				
	Emission Factor:	0.0017	lb/ton-logs	PM10 factor above * (0.053/0.35)
	Material Throughput	240000	ton-logs/yr	from AP-42 Section 13.2.4-3
	Emissions:	0.20	ton/yr	
		0.11	lb/hr	

Source: EU11 **Hog: Maximum Potential Emissions**
Annual Throughput: 15,000 ton/yr
Hourly Throughput: 5 ton/hr
Hours Operated: 8760

Note: Due to the high moisture content and large size of material handled, a control efficiency of 80% is used.

Sample Calculation:
(15,000 ton/yr) (1-80%)(1.0 lb/ton)(1/2000 ton/lb) = 1.5 ton/yr
(5 ton/hr)(1-80%)(1.0 lb/ton) = 1.0 lb/hr

Pollutant				**Reference**
TSP:				
	Emission Factor:	1	lb/ton	FIRE Version 4 July 1995
	Controlled Factor:	0.2	lb/ton	SCC 30700803
	Material Throughput	15000	ton/yr	80% Control
	Emissions:	1.50	ton/yr	
		1.00	lb/hr	
PM10:				
	Emission Factor:	0.36	lb/ton	FIRE Version 4 July 1995
	Controlled Factor:	0.072	lb/ton	SCC 30700803
	Material Throughput	15000	ton/yr	80% Control
	Emissions:	0.54	ton/yr	
		0.36	lb/hr	
PM2.5:				
	Emission Factor:	0.055	lb/ton-logs	PM10 factor above * (0.053/0.35)
	Controlled Factor:	0.011	lb/ton	from AP-42 Section 13.2.4-3
	Material Throughput	15000	ton-logs/yr	80% Control
	Emissions:	0.08	ton/yr	
		0.27	lb/hr	

EU11 TOTAL EMISSIONS

TSP	**12.74**	**ton/yr**
PM10	**9.62**	**ton/yr**
PM2.5	**6.92**	**ton/yr**

Diesel Combustion

Source: EU12	**Plantwide Diesel Combustion**			**No. 2 Diesel Fuel**	
	Maximum Potential Emissions				
Comments:	These emissions result from the combustion of diesel fuel in motorized vehicles.				
Consumption Data		No. 2 Diesel			
	Hour	25.00	gal		
	Daily	380.00	gal	95000	#2 Diesel gallons/yr burned
	Year	95000	gal	140600	#2 Diesel Btu/gal (maximum)
Hours of Operation		8760	hrs	13357	MMBtu/year burned
Estimated Emission Rate					
(0.0% Control Efficiency)					
Particulate (Uncontrolled):					
	Emission Factor		0.31	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		2.1	tons/year	Oct-96
PM 10 (Uncontrolled):					
	Emission Factor		0.31	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		2.1	tons/year	Oct-96
PM 2.5 (Uncontrolled):					
	Emission Factor		0.31	lbs/MMBtu	AP-42 Table 3.3-1 - Assume same as PM10
	Emissions:		2.1	tons/year	Oct-96
Sulfur Dioxide (Uncontrolled)					
	Emission Factor:		0.29	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		1.9	tons/year	Oct-96
Nitrogen Oxides (NOx), Uncontrolled					
	Emission Factor:		4.41	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		29.5	tons/year	Oct-96
Volatile Organic Compounds (VOC), (Uncontrolled)					
	Emission Factor:		0.36	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		2.4	tons/year	Oct-96
Carbon Monoxide (CO), (Uncontrolled)					
	Emission Factor:		0.95	lbs/MMBtu	AP-42 Table 3.3-1
	Emissions:		6.3	tons/year	Oct-96
Source: EU12	**Plantwide Diesel Combustion**				
	Maximum Potential Emissions				

HAPS:				
Maximum Potential Emissions				
Acetaldehyde (Uncontrolled)				
	Emission Factor:	7.67E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	5.12E-03	tons/year	SCC 20300101
Acrolein (Uncontrolled)				
	Emission Factor:	9.25E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	6.18E-04	tons/year	SCC 20300101
Benzene (Uncontrolled)				
	Emission Factor:	9.33E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	6.23E-03	tons/year	SCC 20300101
1,3 Butadiene (Uncontrolled)				
	Emission Factor:	3.91E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	2.61E-04	tons/year	SCC 20300101
Formaldehyde (Uncontrolled)				
	Emission Factor:	1.18E-03	lb/MMBtu	FIRE Version 6.25
	Emissions:	7.88E-03	tons/year	SCC 20300101
Naphthalene (Uncontrolled)				
	Emission Factor:	8.48E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	5.66E-04	tons/year	SCC 20300101
Toluene (Uncontrolled)				
	Emission Factor:	4.09E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	2.73E-03	tons/year	SCC 20300101
Xylenes (mixed isomers), (Uncontrolled)				
	Emission Factor:	2.85E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.90E-03	tons/year	SCC 20300101
Total HAPs from Diesel Fuel:		**0.025**	**tons/year**	

Emergency Generator (IEU14)

Source:	**IEU04**	**Emergency Generator**
	800	Up to rated HP
	500	Hours of Operation per year

Pollutant	Emission Factor	Units	Emission Factor Controlled Reference	TOTAL lbs/hr	TOTAL lbs/day	TOTAL tons/year
PM	0.15	grams/bhp-hr	Tier 2 specs	0.26	6.35	0.07
PM-10	0.15	grams/bhp-hr	Tier 2 specs	0.26	6.35	0.07
PM-2.5	0.15	grams/bhp-hr	Assume same as PM10	0.26	6.35	0.07
NOx	4.9	grams/bhp-hr	Tier 2 specs	8.64	207.41	2.16
CO	2.6	grams/bhp-hr	Tier 2 specs	4.59	110.05	1.15
SOx	0.00205	lbs/bhp-hr	AP-42 Table 3.3-1	1.64	39.36	0.41
VOC	4.9	grams/bhp-hr	Tier 2 specs	8.64	207.41	2.16

Source: EU14 **Emergency Generator** **No. 2 Diesel Fuel**
HAP Emissions

Consumption Data		No. 2 Diesel			
	Hour	40.00	gal	estimated from CAT 500 eKW spec sheet	
	Daily	960.00	gal	20000	#2 Diesel gallons/yr burned
	Year	20000	gal	140600	#2 Diesel Btu/gal (maximum)

Hours of Operation	500	hrs		2812	MMBtu/year burned

Estimated Emission Rate
(0.0% Control Efficiency)

HAPS:
Maximum Potential Emissions

Acetaldehyde (Uncontrolled)				
	Emission Factor:	7.67E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.08E-03	tons/year	SCC 20300101
Acrolein (Uncontrolled)				
	Emission Factor:	9.25E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.30E-04	tons/year	SCC 20300101
Benzene (Uncontrolled)				
	Emission Factor:	9.33E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.31E-03	tons/year	SCC 20300101
1,3 Butadiene (Uncontrolled)				
	Emission Factor:	3.91E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	5.50E-05	tons/year	SCC 20300101
Formaldehyde (Uncontrolled)				
	Emission Factor:	1.18E-03	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.66E-03	tons/year	SCC 20300101
Naphthalene (Uncontrolled)				
	Emission Factor:	8.48E-05	lb/MMBtu	FIRE Version 6.25
	Emissions:	1.19E-04	tons/year	SCC 20300101
Toluene (Uncontrolled)				
	Emission Factor:	4.09E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	5.75E-04	tons/year	SCC 20300101
Xylenes (mixed isomers), (Uncontrolled)				
	Emission Factor:	2.85E-04	lb/MMBtu	FIRE Version 6.25
	Emissions:	4.01E-04	tons/year	SCC 20300101
Total HAPs from Diesel Fuel:		**0.005**	**tons/year**	

Storage Tanks (IEU01 and IEU02)

Source: IEU01 — **Diesel Fuel Tank Fugitives**

Comments: These emissions result from the loading, unloading and storage of diesel fuel.

Emissions from the 12,000 gal diesel tank have been estimated using the TANKS 4.0.9d program. The total evaporative losses have been estimated to be 3.68 lbs/yr. The following breakdown has been determined from typical gasoline wt% of VOCs.

Annual VOC output from fuel storage (tpy): 0.0018

Pollutant	Emission Factor	Units	Source	Hourly Emiss. (lb/hr)	Daily Emiss. (lb/day)	Annual Emiss. (tpy)
Acetaldehyde	5.00E-03	Wt % of VOC	Speciate Profile 13	2.05E-06	4.93E-05	9.00E-06
Acrolein	6.00E-04	Wt % of VOC	Speciate Profile 13	2.47E-07	5.92E-06	1.08E-06
Benzene	4.10E-02	Wt % of VOC	Speciate Profile 13	1.68E-05	4.04E-04	7.38E-05
1,3 Butadiene	5.00E-03	Wt % of VOC	Speciate Profile 13	2.05E-06	4.93E-05	9.00E-06
Cumene	1.00E-04	Wt % of VOC	Speciate Profile 13	4.11E-08	9.86E-07	1.80E-07
Ethyl benzene	1.47E-02	Wt % of VOC	Speciate Profile 13	6.04E-06	1.45E-04	2.65E-05
Formaldehyde	1.10E-02	Wt % of VOC	Speciate Profile 13	4.52E-06	1.08E-04	1.98E-05
Hexane	7.00E-03	Wt % of VOC	Speciate Profile 13	2.88E-06	6.90E-05	1.26E-05
Methyl Ethyl Ketone	1.70E-03	Wt % of VOC	Speciate Profile 13	6.99E-07	1.68E-05	3.06E-06
M-Xylene	4.32E-02	Wt % of VOC	Speciate Profile 13	1.78E-05	4.26E-04	7.78E-05
Naphthalene	2.00E-03	Wt % of VOC	Speciate Profile 13	8.22E-07	1.97E-05	3.60E-06
O-Xylene	1.54E-02	Wt % of VOC	Speciate Profile 13	6.33E-06	1.52E-04	2.77E-05
Propionaldehyde	6.00E-04	Wt % of VOC	Speciate Profile 13	2.47E-07	5.92E-06	1.08E-06
Styrene	3.40E-03	Wt % of VOC	Speciate Profile 13	1.40E-06	3.35E-05	6.12E-06
Toluene	1.04E-01	Wt % of VOC	Speciate Profile 13	4.27E-05	1.03E-03	1.87E-04
2,2,4 - Trimethylpentane	4.32E-02	Wt % of VOC	Speciate Profile 13	1.78E-05	4.26E-04	7.78E-05
Total HAPs				**1.22E-04**	**2.94E-03**	**5.36E-04**

Source: IEU02 — **Gasoline Fuel Tank Fugitives**
Maximum Potential Emissions

Comments: These emissions result from the loading, unloading and storage of diesel fuel.

Emissions from the 2,000 gal gasoline tank have been estimated using the TANKS 4.0.9d program. The total evaporative losses have been estimated to be 507 lbs/yr. The following breakdown has been determined from typical gasoline wt% of VOCs.

Annual VOC output from fuel storage (tpy): 0.254

Pollutant	Emission Factor	Units	Source	Hourly Emiss. (lb/hr)	Daily Emiss. (lb/day)	Annual Emiss. (tpy)
Acetaldehyde	5.00E-03	Wt % of VOC	Speciate Profile 13	2.90E-04	6.96E-03	1.27E-03
Acrolein	6.00E-04	Wt % of VOC	Speciate Profile 13	3.48E-05	8.35E-04	1.52E-04
Benzene	4.10E-02	Wt % of VOC	Speciate Profile 13	2.38E-03	5.71E-02	1.04E-02
1,3 Butadiene	5.00E-03	Wt % of VOC	Speciate Profile 13	2.90E-04	6.96E-03	1.27E-03
Cumene	1.00E-04	Wt % of VOC	Speciate Profile 13	5.80E-06	1.39E-04	2.54E-05
Ethyl benzene	1.47E-02	Wt % of VOC	Speciate Profile 13	8.52E-04	2.05E-02	3.73E-03
Formaldehyde	1.10E-02	Wt % of VOC	Speciate Profile 13	6.38E-04	1.53E-02	2.79E-03
Hexane	7.00E-03	Wt % of VOC	Speciate Profile 13	4.06E-04	9.74E-03	1.78E-03
Methyl Ethyl Ketone	1.70E-03	Wt % of VOC	Speciate Profile 13	9.86E-05	2.37E-03	4.32E-04
M-Xylene	4.32E-02	Wt % of VOC	Speciate Profile 13	2.51E-03	6.01E-02	1.10E-02
Naphthalene	2.00E-03	Wt % of VOC	Speciate Profile 13	1.16E-04	2.78E-03	5.08E-04
O-Xylene	1.54E-02	Wt % of VOC	Speciate Profile 13	8.93E-04	2.14E-02	3.91E-03
Propionaldehyde	6.00E-04	Wt % of VOC	Speciate Profile 13	3.48E-05	8.35E-04	1.52E-04
Styrene	3.40E-03	Wt % of VOC	Speciate Profile 13	1.97E-04	4.73E-03	8.64E-04
Toluene	1.04E-01	Wt % of VOC	Speciate Profile 13	6.03E-03	1.45E-01	2.64E-02
2,2,4 - Trimethylpentane	4.32E-02	Wt % of VOC	Speciate Profile 13	2.51E-03	6.01E-02	1.10E-02
Total HAPs				**1.73E-02**	**4.15E-01**	**7.57E-02**

Cooling Tower (IEU03)

Source:	**IEU03**	**Cooling Tower**	
Calculation Inputs:			
Cooling Tower Type (wet or dry):	wet		
Draft Type (natural or induced):	induced		
Flow Type (Counter or Cross):	counter		
Drift Eliminators (yes or no):	yes - high efficiency		
Drift Eliminator Type [herringbone(blade-type), wave form, cellular (honeycomb)]:			
	herringbone		
Density of Water	8.34	lbs gallon	
Number of Cells:	1		
Circulation Rate:	2500	gpm	(Ref: Wellons)
Drift Factor:	0.02	lb/100 lb H_20	(Ref: AP-42 Table 13.4-1, 01/95)
Drift Factor (%):	0.0005	from Wellons	
Drift Rate	1.25	gpm	
Total Dissolved Solids (TDS):	20600	ppm	(Ref: Avg TDS, AP-42 Table 13.4-1, 01/95)
PM_{10} Emissions:	0.21	lb/hr	
PM_{10} Emissions:	0.94	ton/yr	

Assume PM and PM2.5 emissions are equal to PM10

V. Existing Air Quality

The air quality classification for the immediate area is "Unclassifiable or Better than National Standards" (40 CFR Part 81.327) for all pollutants. The closest nonattainment area is the Columbia Falls PM_{10} nonattainment area. The boundary is approximately 1.5 Kilometers from the proposed facility. Modeling conducted for the project demonstrates that operation of the facility will not adversely impact the Columbia Falls PM_{10} nonattainment area. The current permit action will not result in further impacts to the affected nonattainment area.

VI. Ambient Air Impact Analysis

The Department determined, based on modeling, that the impacts from this permitting action will be minor. The Department believes it will not cause or contribute to a violation of any ambient air quality standard.

The demonstration provided, supported an Air Quality Permit Application for Stationary Sources to obtain a Montana Air Quality Permit.

The facility is located between Whitefish (west) and Columbia Falls (east) in SE ½ of Section 2, Township 30N, and Range 21W, Flathead County near Half Moon, Montana. The total facility property is approximately 0.6 square kilometer (149 acres). The air quality classification of the area surrounding the facility is "Unclassifiable/Attainment" for all air quality criteria pollutants, 40 CFR 81.327. The facility boundary is approximately 4.5 kilometers (km) east and 1.5 km west, respectively, of the Whitefish and Columbia Falls PM_{10} (particulate matter less than or equal to 10 microns in aerodynamic diameter) nonattainment areas. The closest Class I area is the Glacier National Park, about 14.3 km northeast of the facility.

The table below lists the potential annual emissions associated with the new boiler and new auxiliary equipment for the following air pollutants: carbon monoxide (CO), particulate matter less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$), PM_{10}, nitrogen oxides (NO_x), sulfur dioxide (SO_2), and volatile organic compounds (VOC). Facility-wide emissions, including and excluding fugitives, are also listed in this table.

Stoltze New and Old Annual Facility Emissions.

Source	Pollutant (tons per year)					
	CO	$PM_{2.5}$	PM_{10}	NO_X	SO_2	VOC
New Boiler	91.98	9.50	11.80	79.72	7.67	6.13
Old Boiler Bank (5)	157.68	76.21[1]	76.21	93.29	6.57	4.47
Difference	-65.70	-66.71	-64.41	-13.57	1.10	1.66
Cooling Tower	NA[2]	0.94[3]	0.94	NA	NA	NA
New Emergency Generator	1.15	0.07[3]	0.07	2.16	0.41	2.16
Total New Emissions	93.13	10.51	12.81	81.88	8.08	8.29
Total Facility Excluding Fugitives	93.13	20.62	43.46	81.88	8.08	64.60
Total Facility With Fugitives	137.55	34.02	107.08	112.87	10.08	72.66

[1] Assumed the $PM_{2.5}$ emissions equaled the PM_{10} emissions due to lack of further information.
[2] NA = Not Applicable.
[3] Assumed $PM_{2.5}$ equaled PM_{10} as recommended by the Consultant.

As shown in the table above, the CO emissions from the new boiler were below 100 tons per year (tpy), below the Department modeling threshold; therefore, the only significant emission rates were the NO_x, excluding fugitive emissions. Since the emergency generator is considered an intermittent source, the associated NO_x emissions were excluded from the modeling analyses according to U.S. Environmental Protection Agency (USEPA) guidance (http://epa.gov/nsr/documents/20100629no2guidance.pdf) so only the new boiler NO_x emissions were modeled for comparison to the 1-hour and annual NO_2 (nitrogen dioxide) National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS).

RESULTS OF AERMOD MODELING

To determine compliance with the 1-hour NO_2 MAAQS, the high-second-high (H2H) concentration was selected, regardless of the met year. The corresponding met year is noted in parenthesis for the Kalispell Glacier Park International Airport (KAL). The Oris Solutions post-processing program, NO2Post, was used, to calculate the 98th percentile of the daily maximum 1-hour NO_2 concentrations at a receptor over the 5 years of Kalispell met data to determine NAAQS compliance. For the annual NO_2 averaging period, the high-first-high (H1H) was selected to determine compliance with the annual N/MAAQS with the corresponding met year noted in parenthesis for the Kalispell Glacier Park International Airport.

Stoltze Class II NAAQS/MAAQS Compliance Modeling Results.

Pollutant	Averaging Period	Modeled Concentration (µg/m³)[1]	Background Concentration (µg/m³)	Total Concentration (µg/m³)	NAAQS (µg/m³)	Percent of NAAQS (%)	MAAQS (µg/m³)	Percent of MAAQS (%)
NO_2	1-Hour	159.9[2] (KAL 2008)[3]	40	199.9	NA[4]	NA	564	35
	1-Hour	118.7[5]	40	158.7	188.679	84	NA	NA

Pollutant	Averaging Period	Modeled Concentration (μg/m³)[1]	Background Concentration (μg/m³)	Total Concentration (μg/m³)	NAAQS (μg/m³)	Percent of NAAQS (%)	MAAQS (μg/m³)	Percent of MAAQS (%)
	Annual	2.1[6] (KAL 2009)	6	8.1	100	8	94	9

1. μg/m³ = micrograms per cubic meter.
2. High-second-high (H2H) was selected.
3. "KAL" represents the Kalispell Glacier Park International Airport.
4. NA = Not Applicable.
5. Oris NO2Post AERMOD post-processor was used to calculate the 98th percentile of the daily maximum 1-hour NO_2 concentrations at a receptor over the 5 years of met data.
6. The high-first-high modeled value for a met year was selected.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
X		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	X	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued To: F. H. Stoltze Land & Lumber Co.
P.O. Box 1429
600 Half Moon Road
Columbia Falls, MT 59912

Montana Air Quality Permit Number (MAQP): 2934-01

Preliminary Determination Issued: March 14, 2012
Department Decision Issued: April 19, 2012
Permit Final: May 04, 2012

1. *Legal Description of Site*: Stoltze's lumber mill is located in the SE ¼ of Section 2, Township 30 North, Range 21 West, Flathead County, in Columbia Falls, Montana.

2. *Description of Project*: Stoltze proposed to replace the existing five (5) grandfathered boilers listed in MAQP # 2934-00 with a 2012, Wellons, wood-fired boiler (Model 1DS1C9.0A) with a maximum steam production of 40,000 pounds per hour (lb/hr) (or up to 70 million British thermal units per hour (MMBtu/hr)) that would be equipped with multi-cyclones followed by an electrostatic precipitator (ESP). The installation of the Wellons boiler would include updating all the fuel handling equipment, a cooling, and a 2.5 megawatt steam generator. An (up to) 800 horsepower (hp) Tier II emergency diesel generator would be installed as part of this project. The rest of the facility would remain unchanged with this boiler replacement.

3. *Objectives of Project*: Stoltze requested to construct, operate and maintain a new combined heat and power biomass fuel-fired boiler that will produce approximately 40,000 lb/hr of steam. The new boiler will replace 5 existing grandfathered boilers. The new boiler would generate steam, and power a 2.5 megawatt electric power generation turbine and provide steam to Stoltze's existing lumber manufacturing facility.

4. *Alternatives Considered*: In addition to the proposed action, the Department also considered the "no-action" alternative. The "no-action" alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no-action" alternative to be appropriate because Stoltze demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no-action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a BACT analysis, would be included in MAQP #2934-01.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. *The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.*

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats			X			Yes
B	Water Quality, Quantity, and Distribution			X			Yes
C	Geology and Soil Quality, Stability and Moisture			X			Yes
D	Vegetation Cover, Quantity, and Quality			X			Yes
E	Aesthetics			X			Yes
F	Air Quality			X			Yes
G	Unique Endangered, Fragile, or Limited Environmental Resources			X			Yes
H	Demands on Environmental Resource of Water, Air and Energy			X			Yes
I	Historical and Archaeological Sites			X			Yes
J	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats

This permitting action would have a minor effect on terrestrial and aquatic life and habitats in the project area. There would be a minor increase in SO_2 and VOC air emissions from the facility which could increase the deposition of pollutants within the terrestrial and aquatic life habitats. The Department has determined that any impacts would be minor due to the dispersion characteristics of the pollutants, the atmosphere, and conditions that would be placed in MAQP #2934-01.

B. Water Quality, Quantity and Distribution

This project would have a minor effect on the water quality, quantity, and distribution due to the use of water for fugitive dust suppression. Water would be required for fugitive dust suppression in the surface activities. Typical application of water spray for dust suppression results in the water being evaporated to the atmosphere shortly after its application. Therefore, any effects to the water quality, quantity, and distribution would be minor.

C. Geology and Soil Quality, Stability and Moisture

The project would have no effect on the geology and soil quality, stability, and moisture from the replacement of the boilers. The soil would be disturbed during the construction activities, but the impacts would be temporary. The impacts from emissions or deposition of pollutants would be minor due to dispersion characteristics of the pollutants, the atmosphere, and the conditions that would be placed in MAQP #2934-01.

D. Vegetation Cover, Quantity, and Quality

The project would have a minor affect on the local vegetation. The impacts from emissions or deposition of pollutants would be minor due to dispersion characteristics of the pollutants, the atmosphere, and the conditions that would be placed in MAQP #2934-01.

E. Aesthetics

The proposed project would have a minor effect on the local aesthetics. There will be additional equipment added, as well as removed, from the worksite. There would be potential visual emissions associated with the proposed boiler replacement. However, conditions would be placed in MAQP #2934-01 to limit visible emissions. Therefore, the Department determined there would be minor effects on aesthetics.

F. Air Quality

The air quality classification of the area surrounding the facility is “Unclassifiable/Attainment” for all air quality criteria pollutants, 40 CFR Part 81.327. The facility boundary is approximately 4.5 kilometers (km) east and 1.5 km west, respectively, of the Whitefish and Columbia Falls PM_{10} (particulate matter less than or equal to 10 microns in aerodynamic diameter) nonattainment areas. The closest Class I area is the Glacier National Park, about 14.3 km northeast of the facility. Stoltze demonstrated with ambient air modeling that the proposed new equipment would not cause or contribute to violations of the NO_2 NAAQS and MAAQS. MAQP #2934-01 would contain conditions limiting opacity and diesel generator operations and require, as necessary, the use of water, chemical dust suppressants, or water spray bars to control dust from vehicle traffic and process equipment. Compliance with all applicable permit requirements would ensure that the effects would be minor. Therefore, the Department determined there will be minor impacts associated with this project.

G. Unique Endangered, Fragile, or Limited Environmental Resources

The proposed permitting action would have a minor impact on the unique endangered, fragile, or limited environmental resources because emissions of PM_{10}, Nitrogen Oxides ($NO_{x)}$, Carbon Monoxide (CO), would decrease, whiles SO_2 and VOC would slightly increase in the area from the operation of the new equipment. However, the Department believes that any impacts would be minor due to the relatively small amount of the above listed pollutants emitted, dispersion characteristics of the pollutants and the atmosphere, and conditions placed in MAQP #2934-01, including, but not limited to, BACT requirements discussed in Section V of the permit analysis for this permit.

Previously, during the initial permit application for the Stoltze project, the Montana Natural Heritage Program (MNHP) identified occurrences of seven (7) plant and animal species of concern within the vicinity of the proposed project location. Because most of the emissions at the facility are decreasing and the project would be to replace existing boilers at an existing industrial facility. Minor, if any, impacts would be expected.

H. Demands on Environmental Resource of Water, Air and Energy

The current permitting action would have a minor impact on the environmental resources of water, air, and energy. Water would be required for fugitive dust suppression. Line power is available at the site. The facility would be producing power for sale on the open market. Therefore, the Department determined there will be minor impacts associated with this project.

I. Historical and Archaeological Sites

The proposed project would involve the disturbance of 76 acres. The Department contacted the Montana Historical Society, State Historical Preservation Office (SHPO) in an effort to identify any historical and archaeological sites that may be present in the area of operation. Search results concluded that there is one previously recorded sites near the designated project area. The proposed site is within the existing facility boundary and no new areas will be developed, thus no disturbance of Historical or Archaeological sites would be expected.

J. Cumulative and Secondary Impacts

Overall, the cumulative and secondary impacts from this project on the physical and biological environment in the immediate area would be minor because this permitting action would replace equipment at an existing facility. The Department believes that this facility would be expected to operate in compliance with all applicable rules and regulations as outlined in MAQP #2934-01. Stoltze demonstrated through an ambient air modeling analysis that the potential emissions expected from operating the facility at its maximum throughput on a continuous basis would not violate ambient air quality standards. Therefore, the MAQP is written to reflect the expected emissions from operating continuously at the maximum rate.

8. *The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.*

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores				X		Yes
B	Cultural Uniqueness and Diversity				X		Yes
C	Local and State Tax Base and Tax Revenue			X			Yes
D	Agricultural or Industrial Production				X		Yes
E	Human Health				X		Yes
F	Access to and Quality of Recreational and Wilderness Activities				X		Yes
G	Quantity and Distribution of Employment				X		Yes
H	Distribution of Population				X		Yes
I	Demands for Government Services			X			Yes
J	Industrial and Commercial Activity			X			Yes
K	Locally Adopted Environmental Plans and Goals			X			Yes
L	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The following comments have been prepared by the Department.

A. Social Structures and Mores
B. Cultural Uniqueness and Diversity

The current permitting action would have no impact on the social structures and mores and cultural diversity and uniqueness because the action replaces equipment at an existing facility. There would be no change to the nature of the operations due to this permitting action.

C. Local and State Tax Base and Tax Revenue

The project would have a minor effect on the local and state tax base and revenue due to the taxes generated from the sale of electricity. There are no planned increases in employees associated with this project.

D. Agricultural or Industrial Production

Industrial production would remain the same for the proposed project. This is an existing facility and will not use any agricultural land for the project. Therefore, the Department determined there will be minor impacts associated with this project.

E. Human Health

There would be minor if any effects on human health due to the slight increase in emissions of air pollutants. However, MAQP #2934-01 would incorporate conditions to ensure that the facility would be operated in compliance with all applicable rules and standards. These rules and standards are designed to be protective of human health. Stoltze has demonstrated with ambient air modeling that emissions from the proposed project would not violate any ambient air quality standards which are protective of human health.

F. Access to and Quality of Recreational and Wilderness Activities

The project would not have an impact to the access to recreational and wilderness activities because no road closures would occur and the site would be located on private property.

G. Quantity and Distribution of Employment
H. Distribution of Population

The project would not have an impact on the quantity and distribution of employment or population because no new employees are expected to be hired and there are no plans to house workers onsite. Therefore, the Department determined there will be minor impacts associated with this project.

I. Demands for Government Services

Government services would be required for acquiring the appropriate permits from government agencies. In addition, the permitted source of emissions would be subject to periodic inspections by government personnel. The project would use existing roads to access the site. Demands for government services would be minor.

J. Industrial and Commercial Activity

The project would have a minor impact on industrial and commercial activity from the increase in production at the facility.

K. Locally Adopted Environmental Plans and Goals

The Department is not aware of any locally adopted environmental plans or goals. The state standards would protect the proposed site and the environment surrounding the site. The proposed project location is outside of the Columbia Falls PM_{10} nonattainment area and no effects to the nonattainment area are expected from this project.

L. Cumulative and Secondary Impacts

Overall, cumulative and secondary impacts from this project would result in minor impacts to the economic and social environment in the immediate area. As previously stated, the proposed project would result in no increase in industrial process in the area. The Department believes that Stoltze would be expected to operate in compliance with all applicable rules and regulations as outlined in MAQP #2934-01.

Recommendation: No Environmental Impact Statement (EIS) is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: MAQP #2934-01 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

EA prepared by: Stephen Coe
Date: 04/19/2012