



1600 South Second Street
 Mount Vernon, WA 98273-5202
 ph 360.428.1617
 fax 360.428.1620
 www.nwcleanair.org

Notice of Construction Worksheet

NOC No. 1283	Source: Teal Jones Lumber Services, Inc.
Permit Engineer: Crystal Rau	530 Front Street Sumas, WA 98295
NOC Received: 2nd Rev Rec'd July 19, 2018; 1st Rev Rec'd May 4, 2018; Orig Appl Rec'd June 16, 2017	NOC Contact: Bob Lindstrom NWCAA No.: 1911-EMO1-W

A. Project Description

Construct and operate (3) new natural gas-fired boilers totaling 47.3 MMBtu/hr to supply steam heat to eight (8) new lumber drying kilns on land adjacent to the lumber manufacturing facility at 530 W Front Street in Sumas, WA.

The steam generation units will consist of (3) 15.753 MMBtu/hr natural gas-fired Clayton model SE404 steam generator boilers with low NOx burners combusting pipeline quality natural gas, exclusively. The facility will operate one boiler at a time, with one boiler in hot standby, with the third boiler available as a non-operational, redundant boiler. For purposes of evaluating this project, assumptions about potential emissions include operation of all three boilers concurrently, 8760 hours per year.

Steam from the natural gas boilers will dry rough-cut lumber in (8) kilns. The kilns will be installed in (2) phases. In the first phase, (4) used Wellons double-track kilns will be installed with drying capacity rated at 131 Mbf of lumber per charge. The tracks are ~ 83 meters long, with the center 21 meters inside the kilns. Two rows of (14) 28" x 28" vents with dampers line either side of the kiln roof peak (28 vents total per kiln) with an exhaust height of ~ 24 ft. Volatile and toxic emissions from lumber drying are emitted through these vents. In the second phase of installation, (4) more functionally equivalent (from an operational standpoint) kilns will be installed with similar capacity. Phase two is expected to be initiated within 18 months of phase one.

A computerized steam management system will be used with a program that receives monitored kiln temperatures and lumber moisture to adjust steam demand and air flow to control temperatures within the kiln according to a pre-determined drying program based on wood species, lumber dimensions and season. Each kiln will have temperature sensors lining either side of the kiln and the program will adjust fans and vent dampers within each kiln, reading temperatures from sensors based on the direction the internal fans are blowing and the position of the kiln vents, to evenly dry lumber and prevent temperatures within the kiln from exceeding 200 °F.

After completion of both phases of kiln construction, Teal Jones will have a combined maximum drying capacity throughput of 114 MMBf per year based on charge rates for hemlock, fir and cedar. Drying time varies by species, dimensions of lumber and season. Maximum annual throughput for each species is based on 80.3 hrs/charge for hemlock, 76.8 hrs/charge for fir, and 73.8 hrs/charge for cedar. Teal Jones expects the majority of the wood species they dry will be hemlock, but calculated emissions based on the throughput for drying fir (most conservative).

The (8) kilns will also heat treat up to 3% of the total capacity of lumber processed at the facility. When the kilns are heat-treating lumber, operating temperatures are much lower than normal drying temperatures and all kiln vents remain closed. Heat-treating to ~133 °F takes ~30 minutes within the kiln. Any time the kilns spend heat-treating is time the kilns will not spend drying, so the calculation of kiln drying time for 8,760 hours is overly conservative.

The original project proposed (4) lumber drying kilns with steam provided by a 58.5 MMBtu/hr used Wellons fuel cell wood-fired boiler controlled by multiclone and dry ESP and associated woodwaste handling, conveying and storage system. On May 4, 2018, the project was revised with the addition of (4) more lumber drying kilns, including increased associated VOC and TAP emissions, as well as a request for higher wood-fired boiler BACT emission rates for NO_x, CO and PM₁₀ based on manufacturer recommendations.

NWCAA received formal notice of the current project under review – (8) kilns and (3) natural gas-fired boilers with low NO_x burners rated at 47.3 MMBtu/hr – July 19, 2018.

B. New Source Review (NSR) Fees

NWCAA NSR fees have been assessed in accordance with the fee schedule effective [January 1, 2017](#). The NSR fees assessed and amount paid are listed in the NSR Fee Worksheet posted on the OAC Whiteboard for this project.

C. Public Notice

In accordance with NWCAA Section 305.1, an internet notice that the NWCAA received this NOC application was posted on the NWCAA website for a minimum of 15 consecutive days ending on July 3, 2017.

Formal public involvement and notification (i.e., comment period) is required for this project because the project review includes TAPs that exceed the ASIL.

On Friday August 31, 2018, a notice was posted to NWCAA's website announcing the opening of a formal comment period that runs through October 5, 2018 at 4:30 pm. On Sunday, September 2, 2018, a public comment period was initiated with publication of a legal notice in the Bellingham Herald announcing a public comment period running through October 5, 2018 and a public hearing scheduled for October 4, 2018 at 5:30pm at Sumas City Hall, 433 Cherry Street in Sumas, Washington.

D. SEPA Review

State Environmental Policy Act (SEPA) review under NWCAA Section 155 is addressed as follows.

The City of Sumas is the SEPA lead agency for this project and issued a DNS for the original project on March 31, 2017. A copy of this DNS is included in the OAC file.

A new SEPA checklist was submitted to the City of Sumas to account for the additional four kilns and natural gas- versus wood-fired boiler because the original project did not begin construction within one year of issuance. The City of Sumas anticipates issuing a new DNS on September 10, 2018. The OAC will not be issued before the DNS is finalized and a final copy is provided for the review file.

E. Permit History

In OAC 882 issued 1/20/05, Teal Jones proposed installation of a new planer line, controlled by a new used baghouse. This OAC was revised 5/28/14 to replace the used baghouse with a Donaldson Torit 484 RF-10 baghouse. This equipment will not be affected by this project.

F. Basis for New Source Review Applicability

The following analysis is provided as a basis for reviewing each emission unit proposed under this project under Section 300 of the NWCAA Regulation.

New source review (NSR) is required for the (3) natural gas-fired boilers with low NO_x burners because they each have a heat input rating above 10 MMBtu/hr and trigger NSR due to emissions of formaldehyde and 7,12-dimethylbenz(a)anthracene. In addition, NSR is also required for the natural gas-fired boilers through applicability of Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS, 40 CFR 60 Subpart Dc).

Potential to emit (PTE) for each lumber dry kiln is based on continuous kiln operation for the wood species with the highest emissions of each pollutant. NSR applicability is triggered for the kilns for VOC, acetaldehyde, acrolein and formaldehyde.

Emission factor sources are discussed for the boilers and kilns in section G.

Table 1: Emission Unit-Specific Emissions Analysis for NSR

Each Natural Gas-Fired Boiler					
Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hour)	Emissions (ton/yr)	NWCAA 300.5 de minimis (ton/yr)	Above NSR Threshold?
PM _{Total}	0.0075	0.118	0.52	1.25	No, but >10 MMBtu/hr
PM ₁₀	0.0075	0.118	0.52	0.75	No, but >10 MMBtu/hr
SO ₂	0.0073	0.115	0.50	2.0	No, but >10 MMBtu/hr
NOx	0.011 (9 ppm @ 3% O ₂)	0.173	0.76	2.0	No, but >10 MMBtu/hr
VOC	0.005 (4ppm @ 3% O ₂)	0.079	0.34	2.0	No, but >10 MMBtu/hr
CO	0.037 (50 ppm @ 3% O ₂)	0.583	2.55	5.0	No, but >10 MMBtu/hr
Formaldehyde	7.35E-05	1.16E-03	10.2 lb/yr	1.60 lb/yr	Yes
7,12-Dimethylbenz(a)anthracene	1.57E-08	2.47E-07	2.2E-03 lb/yr	1.35E-04 lb/yr	Yes
Each Drying Kiln					
Pollutant	Emission Factor (lb/Mbf)	Emissions (lb/hour)	Emissions (ton/yr, unless specified)	NWCAA 300.5 de minimis (ton/yr)	Above NSR Threshold?
PM _{Total}	Varies by species	0.065	0.28	1.25	No
PM ₁₀	Varies by species	0.065	0.28	0.75	No
SO ₂	0	0	0	2.0	No
NOx	0	0	0	2.0	No
VOC	Varies by species	0.977	4.3	2.0	Yes
CO	0	0	0	5.0	No
Acetaldehyde	Varies by species	0.184	1609.4 lb/yr	3.55 lb/yr	Yes
Formaldehyde	Varies by species	0.0021	18.5 lb/yr	1.6 lb/yr	Yes
MEK	0.001	0.0016	14.3 lb/yr	32.9 lb/24-hr	No
Methanol	0.082	0.134	1169.1 lb/yr	26.3 lb/24-hr	No
Phenol	Varies by species	0.0065	57.0 lb/yr	1.31 lb/24-hr	No
Acrolein	Varies by species	0.0026	22.8 lb/yr	3.9E-04 lb/24-hr	Yes

G. Criteria Air Pollutant Emissions and Impacts

New sources of emissions associated with the project include the (3) natural gas-fired boilers with low NOx burners and (8) lumber dry kilns.

The project PTE calculations described in Table 2 are based on:

For the boilers - operating all (3) boilers 8,760 hours per year.

For the kilns - maximum annual lumber drying throughput of 114 MMbf/yr, operating at 100% rated capacity and 8,760 hour per year, assuming no downtime between

charges and 100% of the lumber dried is wood species with the highest emission factor for each pollutant.

Table 2: Project Criteria Air Pollutant Emissions – Controlled PTE

Pollutant	Natural Gas-fired Boiler Emissions (3)	Lumber Drying Kiln Emissions (8)	Emissions (ton/yr)	PSD SER ^a (ton/yr)	Minor NSR Modeling Thresholds ^c (ton/yr)
PM ₁₀	1.6	2.3	3.9	15	7.5
PM _{2.5}	1.6	2.3	3.9	10 ^b	5
NO _x	2.3	0.0	2.3	40	40
CO	7.7	0.0	7.7	100	100
SO ₂	1.5	0.0	1.5	40	40
VOC	1.0	34.2	35.2	40	No ambient std

a. Prevention of Significant Deterioration (PSD) Significant Emission Rates for major sources in attainment or unclassified areas (40 CFR 52.21(b)(23)).
 b. The SER for PM_{10/2.5} is based on the combined filterable and condensable portions.
 c. Ambient impacts of a criteria pollutant are modeled under minor NSR if they exceed the minor NSR modeling threshold. Emission impacts may be modeled when a pollutant is below this threshold if there are reasonable concerns regarding ambient impacts (e.g., horizontal or downward ventilating stacks, close property boundary, projects that include non-emergency internal combustion engines, stacks less than six feet above roofline, sensitive or high population density nearby).

Boiler emission factors are based on:

- Clayton boiler manufacturer guaranteed emission sheet;
- EPA AP-42 Table 1.4-2 July 1998;

Kiln emission factors are based on:

- Oregon Department of Environmental Quality (ODEQ), from OSU/Willamette Study;
- OSU study for kiln dry-bulb temperatures of 200 F or less "Emission from western hemlock lumber drying", 2006;
- OSU report to Intermountain Forest Association "Small-scale kiln study utilizing Ponderosa Pine, White Fir and Douglas-fir", September 2000;
- Cowlitz Stud Company/Horizon Engineering study;
- Per Jim Wilson of ORCAA, for Cedar PM10, Formaldehyde, Methanol and Phenol emission factors, use Hemlock emission factors;
- NCASI study August 2004, ODEQ OSU study using OR method 7;

Emissions of criteria pollutants from the proposed project were modeled to demonstrate that emissions from the project do not exceed any ambient air quality standard for criteria air pollutants (e.g., NAAQS). The modeling results listed in Table 3 demonstrate that the impact of allowable emissions from the project do not contribute to a violation of any ambient air quality standard.

Table 3: Project Criteria Air Pollutant Ambient Impacts

Pollutant	Averaging Period	Modeled Ambient Impact of the Project ($\mu\text{g}/\text{m}^3$)	Background ^c	Total	Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b
PM ₁₀ ¹	24-hr	30.7	33	63.7	150
PM _{2.5} ¹	24-hr	21.7	12	33.7	35
PM _{2.5} ¹	Annual	6.4	4.5	10.9	12
SO ₂ ²	1-hr	22.3	12.8	35.1	196
SO ₂ ²	3-hr	19.5	10.5	30.0	1,310
SO ₂ ²	24-hr	16.0	3.9	19.9	367
SO ₂ ²	Annual	1.2	1.0	2.2	52
NO ₂ ^{a,3}	1-hr	32.1	18.4	50.5	188
NO ₂ ^{a,3}	Annual	3.7	3.6	7.3	100

Notes:

a. NO₂ concentrations are assumed to be 100 percent of NO_x.

b. The ambient air quality standards shown are the most stringent primary standards under federal, state or NWCAA regulation. Many of these standards have allowances for periodic values to exceed the listed standard. Modeled impacts are considered to be higher than actual ambient impacts. For these reasons, this ambient impact analysis is considered to be a conservative approach.

c. Background design data is from NW-AIRQUEST 2009-2011: <http://lar.wsu.edu/nw-airquest/lookup.html> Latitude = 48.99373, Longitude = -122.2614.

1. Design concentrations are the highest 6th-high 24-hr average PM₁₀ concentration over five modeled years, the highest 5-year average of the 98th percentile 24-hour average PM_{2.5} concentration at each receptor, and the highest 5-year average of the annual average PM_{2.5} concentrations at each receptor, (based on guidance in the "Modeling Procedures for Demonstrating compliance with the PM2.5 NAAQS" memorandum issued on March 23, 2010 by Stephen Page, Director of OAQPS).

2. Design concentrations are the highest annual average SO₂ concentration over five modeled years, the second highest 3-hour and 24-hour average SO₂ concentrations over five modeled years, and the 4th highest daily maximum concentration averaged over 5 years at each receptor.

3. Design concentrations are the highest annual average NO₂ concentration over five modeled years, the 8th highest daily maximum concentration averaged over 5 years at each receptor.

H. Toxic Air Pollutant Emissions and Impacts

The PTE toxic air pollutants (TAP) calculated from this project are described in Table 4 and are based on operating at 100% rated capacity and 8,760 hours per year. For the kilns, this includes maximum annual kiln lumber drying throughput of 114 MMbf per year, which assumes 100% of the lumber dried is the wood species with the highest emission factor for each pollutant.

The table includes all TAPs that are estimated to be emitted over the Small Quantity Emission Rates (SQER) in Chapter 173-460 WAC. Estimated emissions of any TAP that exceeded the SQER have been modeled using AERMOD to evaluate ambient impacts. Modeling of emissions of acetaldehyde, acrolein and formaldehyde from Teal Jones exceed the corresponding Ambient Source Impact Levels (ASILs) in WAC 173-460-150. Therefore, Teal Jones submitted a request to Ecology to perform a second tier review to demonstrate compliance with the ambient impact standard.

Other TAP increases from this project can be approved in accordance with NWCAA Section 300 and WAC 173-460-070 using AERMOD modeling and a Tier 2 analysis conducted by Ecology. The modeling files were evaluated by NWCAA and copies are stored in J:NOC/AA NON Title 5/1250-1299/1283 – Teal Jones/Nat_Gas_Boilers_Plus_8_Kilns/modeling files.

Table 4: Project Toxic Air Pollutant Emissions and Ambient Impacts

Toxic Air Pollutant	Aver period	Emissions (lb/aver period)	SQER (lb/aver period)	Ambient Impact if > SQER ($\mu\text{g}/\text{m}^3$)	ASIL ($\mu\text{g}/\text{m}^3$)
Acetaldehyde	Yr	12,900	71	19.7	0.37
Acrolein	24-hr	0.5	0.00789	1.4	0.06
Formaldehyde	Yr	180	32	0.23	0.17
7, 12-dimethylbenz(a)anthracene	Yr	0.0068	2.71E-03	5.24E-06	0.0385

Emission factors for each TAP for both the natural gas-fired boilers (3) and lumber dry kilns (8) are listed individually in the spreadsheet found in J:NOC/AA Non Title 5/1250-1299/1283 – Teal Jones/Nat_Gas_Boilers_Plus_8_Kilns/emission calculations.

Emission factors for the boilers are based on:

- EPA AP-42 Table 1.4-3 (July 1998) Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

Emission factors for the kilns are based on:

- EPA letter dated 2009 with ODEQ emission factors;
- Cowlitz Stud Company/Horizon Engineering study;
- Plywood MACT Docket (OAC-2003-0048-0189) Table D4, June 2000;
- Per Jim Wilson of ORCAA, for Cedar PM₁₀, Formaldehyde, Methanol and Phenol emission factors, use Hemlock emission factors;

Emission factors reflect a maximum kiln temperature of 200 °F and are based on the maximum quantity of lumber, using the species with worst-case emissions for each TAP, dried over a year, rather than an hourly emission rate. Meaning, worst-case, short-term emission rates (in lb/24-hr or lb/hr) are based on the average long-term emission rates (in lb/yr).

Not included in this TAP evaluation are emissions of urban HAPs (mercury, arsenic, beryllium, cadmium, lead, chromium, manganese, nickel, POM (as 7-PAH), ethylene dioxide, and PCB) or metal HAPs/TAPs from the natural gas boilers installed as part of this project.

Per the federal register notice published June 4, 2010 as part of the area source boiler rule, EPA has determined that natural gas-fired boilers are not sources of these urban HAPs (Section III. Clarification of the Source Category List). In addition, the chromium emission factor in AP-42 was developed using results compiled from (5) tests on boilers ranging in size from 330 to 7500 MW, which are very dissimilar in size to the boilers reviewed under this project.

Further, neither SWCAA nor PSCAA use EPA AP-42 emission factors for metals from natural gas combustion because of the poor quality of such factors (emission factors for these metals typically have a factor rating of D or E). Therefore, NWCAA has not quantified emissions of urban or metal HAPs/TAPs from combustion of natural gas in small boilers due to highly uncertain emission factors.

I. Health Impact Assessment for Acetaldehyde, Acrolein & Formaldehyde

In reviewing the Health Impact Assessment for this project, Ecology determined that the project is permissible if constructed and operated as permitted.

The assessment predicted an increased cancer risk assuming a continuous lifetime exposure at the maximally impacted residential receptor of 10.570618 per million when evaluating a maximum throughput of 114 million board feet of lumber dried per year.

Ecology considers any cancer risk above 10.0 unacceptable and recommended a restriction on the maximum annual throughput. Teal Jones agreed to restrict maximum annual throughput through the kiln to 106 MMbf/yr, which scales the increased cancer risk at the maximally impacted residential receptor to 9.9 per million.

This limitation on the kilns is enforceable through both a kiln throughput restriction in Condition 7, as well as emission restrictions for both acetaldehyde and formaldehyde in Condition 14, along with associated recordkeeping and reporting requirements in Condition 15. Note that acrolein is not a carcinogen, was not part of the evaluation for cancer risk, and therefore will not have a pollutant-specific emission restriction imposed on a 24-hr basis (the averaging period from WAC 173-460-150) through this OAC.

Table 5 shows the change in controlled PTE from the project with kiln lumber drying throughput restricted to 106 MMbf/yr, affecting the pollutants emitted by the kilns.

Table 5: Project PTE Restricted to Address Cancer Risks – Impact on Pollutants

Pollutant	PTE @ 114 MMbf/yr	PTE @ 106 MMbf/yr	Change in Project Emissions
PM ₁₀	3.9 ton/yr	3.8 ton/yr	0.1 ton/yr
PM _{2.5}	3.9 ton/yr	3.8 ton/yr	0.1 ton/yr
VOC	35.3 ton/yr	32.9 ton/yr	2.4 ton/yr
Acetaldehyde	12,876 lb/yr	11,978 lb/yr	898 lb/yr
Acrolein	182 lb/yr	170 lb/yr	12 lb/yr
Formaldehyde	179 lb/yr	168 lb/yr	11 lb/yr

While the assessment for non-cancer hazards determined hazard indices that exceeded one largely due to acrolein, Ecology concluded that Teal Jones' emissions are not likely to cause serious short- and long-term respiratory hazards for residents near Teal Jones.

According to Gary Palcisko, Toxicologist at Ecology, hazard indices that exceed unity do not mean adverse health effects will occur. In the case of the maximally impacted resident's long-term exposure to acrolein emitted by Teal Jones, estimated concentrations exceed the US EPA's reference concentration. These exposure levels, however, were much lower than the more recently developed reference exposure level (REL) derived by California EPA's Office of Environmental Health Hazard Assessment (OEHHA). These reference values differ mainly because OEHHA was able to derive the REL based on a more recent animal study with less uncertainty. Given that estimated levels of acrolein are far below OEHHA's more

recently developed REL, emissions are not likely to contribute to increased serious long-term respiratory hazards for residents near Teal Jones.

J. Prevention of Significant Deterioration (PSD) Program

Emission increases associated with this project were reviewed for Prevention of Significant Deterioration (PSD) Program applicability.

The facility is not an existing PSD major source. This project is not over the PSD significance thresholds (including 75,000 tpy CO_{2e}).

K. Registration Program

Teal Jones was an EM01 registration category prior to this project. This project will change the facility's registration category with the NWCAA, likely to the EM03 or EM04. Emissions of criteria air pollutants, VOC and toxics will increase as a result of this project.

L. Air Operating Permit (AOP) Program

After consideration of emission increases associated with this project, the Title V Air Operating Permit (AOP) program applicability for the entire source has been reviewed.

The Title V AOP thresholds are based on any of the following;

- Criteria air pollutants: PTE 100 tpy of any one pollutant.
- Hazardous air pollutants: PTE 10 tpy for any single HAP, or 25 ton/year of any combination of HAPs.
- Applicability of any federal NSPS or NESHAP regulation unless it is specifically exempt.

The facility is not a Title V air operating permit source because post project PTE remains below Title V applicability thresholds and criteria. The source is considered a "**natural minor**".

M. NWCAA Compliance Database (Stratus)

The NWCAA Stratus database has been updated to include the emission unit(s) approved by this OAC.

N. Confidential Business Information (CBI)

The NOC application does not contain any information deemed by the applicant to be CBI.

O. Applicable/Inapplicable Regulations

Relevant sections of NWCAA, state and federal regulations as they relate to the approved emission units listed in the OAC.

1. Northwest Clean Air Agency

NWCAA Section 342 – Operation and Maintenance

The OAC requires an O&M Plan for the equipment.

NWCAA Section 451 – Opacity 20%

The OAC limits opacity to 0% Method 9A.

2. State

WAC 173-400 contains requirements similar to those listed above.

WAC 173-460 contains requirements for new sources of Toxic Air Pollutants.

3. Federal

40 CFR 60 Subpart A General Provisions – **Applicable**

40 CFR 60 Subpart Dc NSPS for Small (10 – 100 MMBtu/hr) Industrial, Commercial, Institutional Steam Generating Units – **Applicable** because the 3 natural gas-fired boilers are rated over 10 MMBtu/hr.

- 60.48c(a) Notification of date of construction and actual startup, including: design heat input capacity of boiler, identification of fuels to be combusted in boiler, and annual capacity factor based on the fuel fired that the owner or operator anticipates operating the boiler on.
- 60.48c(g)(2) Record and maintain records of the amount of fuel combusted during each calendar month or (3) Record and maintain records of the total amount of fuel delivered during each calendar month.
- 60.48c(i) All records shall be maintained by the owner or operator of the boiler for a period of two years following the date of such record.
- 60.48c(j) The reporting period for reports required is each six month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

40 CFR 63 Subpart JJJJJ NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources – **Not applicable** because natural gas-fired boilers are exempt.

P. Best Available Control Technology (BACT) Technology Review

1. This Project is Similar other NWCAA approved projects

Natural Gas-Fired Boilers

OAC 1271 Chemco – (1) 10.043 MMBtu/hr low NO_x, FGR.
NO_x 9 ppm, CO 50 ppm, VE limit 0%

OAC 997 Skagit Valley Hospital – (3) 10.2 MMBtu/hr natural gas-fired with diesel backup
NO_x 9 ppm, CO 50 ppm, VE limit 5% opacity, diesel usage limitation

Kilns

OAC 1295 Chemco - (1) 250,000 bf kiln used to cure resin for wood hardening process

VE limit 0% opacity, temperature limit & monitoring, TAP emission limitation

OAC 1279 Skagit River Reman - (4) 25,000 bf kilns
VE limit 0% opacity, throughput limit, wood species restriction

OAC 1257 Home Fire Prest Logs - 4.474 MMBtu/hr wood shaving rotary drum dryer
VE limit 5% opacity, fuel restriction, drying time, species & throughput limitation

OAC1048 Socco Forest Products - (2) 138,000 bf kilns
VE limit 10% opacity, computerized steam management system to control kiln temperatures to no more than 200 F, species restriction, TAP emission limitation

2. Case-By-Case BACT

Case-by-case BACT for Kilns

The NWCAA is responsible for establishing BACT and tBACT for the (8) kilns to minimize emissions of VOC and the TAPs acetaldehyde, acrolein, and formaldehyde. Teal Jones has proposed use of a computerized steam management system and maximum hourly average kiln drying temperature of 200°F enforceable through permit conditions, as BACT and tBACT for the lumber drying kilns. Teal Jones did not find any cost effective controls for lumber drying kilns in their review of the RBLC or for any recently permitted lumber drying kilns in Washington state.

BACT for VOC and tBACT is control of kilns via computerized steam management and continuous monitoring of kiln temperatures through use of thermocouples to ensure kilns to do not exceed 200 °F during any stage of operation.

Case-by-case BACT for (small) Natural Gas-fired Boilers

The NWCAA is responsible for establishing BACT and tBACT for the natural gas-fired boilers to minimize emissions of criteria pollutants, VOC, and TAPs.

Teal Jones has proposed the following as presumptive BACT and tBACT for the natural gas-fired boilers.

Table 6. Proposed BACT and tBACT for Natural Gas Boilers

Pollutant	Control	Emission Rate
NOx	Low NOx burner	0.011 lb/MMBtu (9 ppmvd @ 3% O ₂)
CO	Proper Combustion Practices (PCP)	0.037 lb/MMBtu (50 ppmvd @ 3% O ₂)
PM/PM ₁₀	Exclusive use of pipeline natural gas	0.0075 lb/MMBtu (0.1253 lb/hr)
SO ₂	Exclusive use of pipeline natural gas	0.0073 lb/MMBtu (0.1219 lb/hr)
VOC	PCP	0.005 lb/MMBtu (4 ppmvd @ 3% O ₂)
TAPs	Same as for CO & VOC	Same as for CO & VOC

Source: Teal Jones Application

BACT and tBACT for the boilers has been determined to be the proposed NOx and CO limits for the natural gas-fired boiler with low NOx burner, use of good combustion practices and computerized steam management system for VOC and TAPs, and exclusive use of pipeline natural gas for PM/PM₁₀ and SO₂.

Q. Basis for OAC conditions

Natural Gas-fired Boiler

1. VE limit 0% opacity – Proper Operation of boilers
2. NOx & CO emission limits – BACT
3. Periodic testing requirement for NOx & CO
4. Boiler O&M
5. Natural gas usage tracking

Kilns

6. Limitation on wood species, tracking and recordkeeping – TAP assumptions used as basis for permitting & impacts analysis
7. Throughput limitation – TAP Tier 2 throughput restriction to address cancer risk at maximally impacted residential receptor
8. Throughput limitation monthly and 12-month rolling total tracking
9. Kiln temperature max – BACT for VOC/tBACT for toxics
10. Install, operate & maintain computerized steam management system & temperature sensors in kilns (e.g., thermocouples) – BACT for VOC/tBACT for toxics

11. Continuously monitor dry-bulb temperature w/ devices accurate to within \pm 1.8° F. Record maximum dry-bulb temperature measured in each kiln at least every 5 minutes of each lumber drying batch – BACT for VOC/tBACT for toxics

12. Calibrate and replace TC according to manufacturer's specifications – O&M monitoring & recordkeeping

13. VE limit 10% opacity – BACT for visible emission limits, consistent with other kiln OACs.

General Requirements

14. Toxic emission limits – tBACT & Tier 2 impacts

15. Toxic emissions compliance demonstration, annual emission inventory requirement, emission factor Table.

16. Recordkeeping Requirements

17. Startup Notifications

R. Timeline and Review

Timeline		Date
NOC Received		6/16/17
NOC Revised 1 st time		5/4/18(1 st rev)
NOC Revised 2 nd time		7/19/18(2 nd rev)
NOC Incompleteness Determined (due 30 days from receipt)		7/14/17
NOC Completeness Determined		10/17/17
Revised NOC Completeness Determined		6/1/18(1 st rev) 8/8/18(2 nd rev)
Final Decision Due (due 60 days from complete)		12/16/17
Revised Final Decision Due (due 60 days from complete)		7/31/18(1 st rev) 10/7/18(2 nd rev)
Public Comment Period		9/2/18-10/5/18
Public Hearing		10/4/18
Final OAC issued		
Review		Date
NWCAA Engineering	Dan Mahar Agata McIntyre(2 nd rev)	12/19/17 8/10/18(2 nd rev)
NWCAA Compliance	Rebecca Brown	12/15/17 8/13/18(2 nd rev)
Ecology Toxicologist	Gary Palcisko	8/13/18(2 nd rev)
Source	Bob Lindstrom, Achim Fuchs & Eric Albright	12/15/17 8/16/18(2 nd rev)

S. Correspondence

8/28/18 emails from Eric Albright, Ramboll

Temperature sensors proposed for kilns by Teal Jones are T-type thermocouples which are accurate to +/-1.8 °F. Eric requested Condition 11 be changed to allow for T-type thermocouple use as they are more durable than RTD sensors (RTD sensors are accurate to +/- 0.5 °F). Changes were made.

Also received information re: computerized steam management system, temperature sensors, lumber moisture sensors, fans, and dampers to control air flow and temperatures within kilns.

8/27 - 28/18 comments from Eric Albright, Ramboll and Teal Jones on draft permit

Requested removal of requirement to track length of time lumber is dried in each kiln, requested boiler VE limit of 5%, kiln VE limit of 10% consistent with Socco and Sierra Pacific OACs and use of EF for calculated emissions from kilns that are unrounded. NWCAA proposed VE limit for boilers of 0% or a VE prohibition with immediate shutdown of boiler if VEs are seen that can't be resolved until boiler can be fixed. NWCAA agreed to remove requirement to track length of time lumber is dried, but required tracking the date each batch of lumber starts drying in kiln. TJ agreed to track start date of each batch of lumber dried and to keep boiler VE limit of 0% opacity. Kiln VE limit changed to 10% opacity.

8/14/18 call with Gary Palcisko Ecology

Discussed boiler model and potential decrease in exhaust flow and impacts to assumptions used in AQ dispersion model in HIA. Gary said boilers are a very small contribution to toxic emissions and a 5% change to exhaust characteristics, when mass emissions are decreasing slightly, will not cause a significant change to the assumptions used to evaluate health impacts from the project.

8/14/18 call from Eric Albright, Ramboll

In response to email re: boiler model, Teal Jones decided over the weekend to go with higher efficiency boiler SE-404 which has slightly lower emissions, BTU input and 5% lower exhaust flow. Eric & I discuss possible ramifications re: Tier 2 analysis – I agreed to discuss with Gary Palcisko.

7/31/18 – 8/10/18 vm from Margaret Donegan-Ryan, Ramboll and emails to & from Bob Lindstrom, Teal Jones and Margaret Donegan-Ryan, Ramboll

Re: questions with respect to kiln construction phasing, public hearing locations in Sumas, and final questions re: project.

7/26/18 emails from Gary Palcisko, Ecology to & from Margaret Donegan-Ryan, Ramboll

Re: cancer risk over 10 per million for maximally impacted residential receptor & changes to project to lower risk, must capture change in permit (106 MMbf/yr)

7/24 - 27/18 –to & from Margaret Donegan-Ryan, Ramboll

Re: updated SEPA checklist or addendum, and questions specific to changes in the application, and throughput restrictions.

7/19/18 – email from Margaret Donegan-Ryan & Eric Albright, Ramboll and Bob Lindstrom, Teal Jones

Submittal of updated application, HIA & modeling files

7/12/18 – email to Margaret Donegan-Ryan & Eric Albright, Ramboll & Bob Lindstrom, Teal Jones

Re: lack of reliable metal HAP/TAP emission factors in AP-42 for predicting emissions from natural gas combustion in small boilers, EPA federal register notice for area source GACT stating “no urban HAP from natural gas combustion in boilers” and neither PSCAA nor SWCAA use AP-42 EF for metal HAP from natural gas combustion in boilers due to poor quality of such factors, therefore, NWCAA does not base permitting decision on those factors.

7/11/18 – email to Eric Albright & Margaret Donegan-Ryan, Ramboll & Bob Lindstrom, Teal Jones & Eric Lenaburg, Blythe Plumbing & Heating

Stack and rain guard info sent.

7/6/18 – conf call with Eric Albright & Margaret Donegan-Ryan, Ramboll

Discussed updated sections of application and additional info to submit, as well as likely timeline for application review.

7/4/18 – email from Eric Albright, Ramboll & Bob Lindstrom, Teal Jones

Specifications & emission estimates on (3) natural gas-fired boilers to replace WFB in OAC 1283 were submitted. A request to discuss scope of application updates was made.

6/8/18 – meeting at NWCAA with Eric Albright & Margaret Donegan-Ryan, Ramboll Environ; Bob Lindstrom, Teal Jones

Discussion of BACT analysis for WFB, difference of opinion that re: analysis, discussion of concerns re: compliance with NWCAA VE standards & OAC VE standards. Pointed out that state HFB opacity exemptions for opacity during startup will not apply to Teal Jones boiler (exemption is for existing boilers) and even if it did, there is no similar exemption in NWCAA's rules that would exempt operation of WFB from NWCAA opacity standard during startup and consistent with other NWCAA permitting decisions, NWCAA would not provide such an exemption.

Bob Lindstrom indicated they were considering natural gas-fired boiler to replace wood-fired boiler, they did not want another construction season to pass without a permit in hand. Eric Albright asked what BACT would be for a gas boiler. I emailed copies of recent gas-fired boiler approval orders after the meeting.

6/1 - 4/18 email to & from Eric Albright, Ramboll

Re: completeness letter & NWCAA's continuing concerns about BACT for WFB

5/4 – 11/18 – email from Eric Albright, Ramboll

Updated application & HIA & Modeling files

2/1/18 – email to Eric Albright, Ramboll & Bob Lindstrom & Achim Fuchs, Teal Jones

Re: next steps to update application, payment of fee, additional justification/supporting documentation to submit with updated application specific to BACT analysis

1/30/18 – conf call w/ Eric Albright, Ramboll & Bob Lindstrom, Teal Jones

Discussion re: status of permit application – 4 additional kilns, higher BACT emission limits for NOx & CO for the WFB based on recommendations from Wellons re: expected boiler emission performance.

1/26/18 – email to Eric Albright, Ramboll Environ from Agata McIntyre, NWCAA

Boiler emissions comparison table sent to Eric.

1/22/18 – email from Eric Albright & Margaret Donegan-Ryan, Ramboll Environ & Bob Lindstrom, Teal Jones

Comments on draft permit and response to 12/19/17 email.

12/19/17 – email to Eric Albright, Ramboll Environ; Bob Lindstrom, Teal Jones from Agata McIntyre, NWCAA

NWCAA response re: 11/28/17 meeting and email dated 12/14/17, specifically addressing BACT at Teal Jones, BACT for WFB in NWCAA's jurisdiction for the last 19 years, and NWCAA's dissatisfaction with the evaluation of BACT for the WFB with explanation and expectations.

12/15/17 – Email to Eric Albright, Ramboll Environ; Bob Lindstrom, Teal Jones

Draft permit sent for comments, discussion about emission limitations and tracking.

12/14/17 – Email from Eric Albright, Ramboll Environ re: BACT for additional controls

No additional controls for visible emission of particulate matter during 2 planned startups per year lasting ~ 2 hours each were determined to be cost effective, therefore no changes were made to the proposed BACT nor controls.

11/28/17 – Meeting @ NWCAA to discuss Incomplete App – Bob Lindstrom and Achim Fuchs, Teal Jones & Eric Albright, Ramboll Environ

Discussion included potential permit conditions, expectations of performance of the wood-fired boiler and control equipment, and 10 year history of performance at Hampton Lumber in Darrington. Also discussed were opportunities for Teal Jones and consultant to consider engineering solutions that could still be designed to ensure continuous compliance with emission standards while the permit review was still active. Next steps and timeline were discussed before the meeting ended.

11/27/17 – Email re: outline of draft permit conditions to Bob Lindstrom & Achim Fuchs, Teal Jones & Eric Albright, Ramboll Environ

Topic list of potential permit conditions sent to attending parties.

11/16/17 – Email re: request for meeting to discuss status of application, draft permit conditions & concerns re: confidence achieving compliance with permit
Agenda and invitation sent to attending parties.

10/17/17 – Email from Margaret Donegan-Ryan & Eric Albright of Ramboll Environ, Bob Lindstrom, Teal Jones

Responses to 10/3/17 email

10/3/17 – Email to Eric Albright & Margaret Donegan-Ryan of Ramboll Environ, Bob Lindstrom, Teal Jones

Questions specific to the assertions that an ESP is equally effective at controlling emissions as a baghouse when an ESP will not be used during startup. Discussion regarding BACT demonstrations within NWCAA jurisdiction over last 20 years for wood-fired burners with baghouses as CD and 6 out of 7 using supplemental fuel for startup and flame stabilization - why is it not reasonable for the unit to be installed at Teal Jones to be so equipped? Also, why no discussion of other means of controlling emissions during startup?

9/22/17 – Email from Margaret Donegan-Ryan re: HIA report & response to questions.

I asked for electronic version of HIA report and said I am working on a few more questions for Ramboll in response to their reply to their reply to incompleteness email, but not as extensive as first set & that I should be starting to work on permit conditions soon.

8/23/17 – Email from Eric Albright & Margaret Donegan-Ryan of Ramboll Environ, Bob Lindstrom of Teal Jones

Response to questions in correspondence re: incomplete application.

7/14/17 & 8/23/17 – Email to Eric Albright and Margaret Donegan-Ryan of Ramboll Environ

Notice of incomplete application & check-in re: notice of incomplete application.

7/11/17 - Eric Albright and Margaret Donegan-Ryan of Ramboll Environ, Ranil Dhammapala and Gary Palcisko of Ecology, Agata McIntyre and Crystal Rau of NWCAA, Bob Lindstrom of Teal Jones – webinar.

Tier 2 toxics review.

5/25/17 – Margaret Donegan-Ryan Ramboll Environ, Agata McIntyre, Crystal Rau – teleconference.

Pre-application discussion including addressing emissions during startup in application, exchange of kiln drying emission factors (from NWCAA to Ramboll) and source test results (from Ramboll to NWCAA) for unit purchased while it was operating for Rough and Ready Lumber in Oregon.