State of Idaho
Department of Environmental Quality
Air Quality Division

AIR QUALITY PERMIT
STATEMENT OF BASIS

Tier II Operating Permit and Permit to Construct No. T2-2008.0067

Final

North Idaho Energy Logs

Moyie Springs, Idaho

Facility ID No. 021-00015

January 4, 2010

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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

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Acronyms, Units, and Chemical Nomenclature

AAC	acceptable ambient concentration
AACC	acceptable ambient concentration for carcinogens
acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
Btu	British thermal unit
CFR	Code of Federal Regulations
CMS	EPA Compliance Monitoring Strategy of April, 2001
CO	carbon monoxide
DEQ	Department of Environmental Quality
gr	grain (1 lb = 7,000 grains)
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
HAP	Hazardous Air Pollutant
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
$\mu g/m^3$	micrograms per cubic meter
MMBtu	million British thermal units
NAICS	North American Industry Classification System
NESHAP	National Emission Standards for Hazardous Air Pollutants\
NIEL	North Idaho Energy Logs
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
PC	permit condition
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SO_2	sulfur dioxide
TAP	Toxic Air Pollutant
TEQ	toxic equivalent
T2	Tier II operating permit
T2/PTC	Tier II operating permit and permit to construct
T/yr	tons per year
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. FACILITY INFORMATION

1.1 Facility Description

The raw material consists primarily of raw wood and bark. Stockpiled material is unloaded into a receiving bin and metered and is then sent to the dryer via an infeed conveyor. The dryer and burner system is designed by SolaGen Incorporated Inc. and is designed to dry 40% moisture content wood chips.

The drum dryer is a 10-foot diameter x 42-foot long triple pass rotary dryer. The feed material is impacted by the hot gases from the natural gas fired burner to remove the water from the wood. The dried wood then is conveyed through ducting into a separation cyclone (Cyclone #1) for extraction from the warm humid dryer exhaust air. The dryer exhaust gas passes through a blower and is discharged to atmosphere via the dryer stack. The cyclone is designed to separate the dried material from the air at an efficiency of 98.5%. Collected dry material flows through a rotary airlock to transfer the material out of the collector into a hammermill metering bin. The bin is fully enclosed.

The material from Cyclone #1,and material processed in the hammermill, is then pneumatically transferred to Cyclone #2. Material collected in Cyclone #2 is discharged to a fabric filter and is then returned back to Cyclone #2 and included in the feed for the final product. Overfeed material is collected from the production process and is collected in Cyclone #3. Material collected in Cyclone #3 is discharged into a screw conveyor which returns the collected material to the production process.

The collected material is sent to a surge bin for the pellet mills where the wood particles are compressed into fuel pellets. The fuel pellets are then cooled, screened and conveyed to a bagging unit.

1.2 Permitting Action and Facility Permitting History

This Tier II operating permit and permit to construct (T2/PTC) is for a modification at an existing minor facility, and it is also a renewal of the facility's existing Tier II permit. The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

October 23, 1998	Tier II OP issued. On February 26, 1998 DEQ staff visited the facility and determined that based on the opacity observed, Cyclone #2 may not be controlling emissions at the efficiency rate used in the previous PTC applicability analysis. Therefore, to protect NAAQS DEQ would issue a Tier II to supersede the PTC requirements in effect up until that time. NIEL opted to install a baghouse following Cyclone #2 to control emissions from that source.(S)
March 20, 1998	Revised PTC Exemption; DEQ completed a revised PTC applicability analysis that accounts for re-starting the pellet production process that was not operating or accounted for in the previous PTC analyses. The facility was still found to meet PTC exemption requirements. (S)
November 10, 1997	Revised PTC Exemption; DEQ completed a revised PTC applicability analysis that accounts for the dryer's natural gas combustion emissions in addition to other facility emissions. The facility was still found to meet PTC exemption requirements. (S)
August 29, 1997	PTC Exemption; NIEL submitted a PTC application on June 16, 1997, and DEQ issued a PTC exemption letter for the facility. (S)

2. APPLICATION SCOPE AND APPLICATION CHRONOLOGY

2.1 Application Scope

This project involves the following:

- Renewal of the facility's Tier II permit
- Increase the Dryer's dried wood production capacity from 6 to 8 tons/hr
- Replacement of Cyclone #1 to handle the increased production capacity. This cyclone is used for transferring dried chips from the dryer to the production process. It is part of the material handling system; it is not an emissions control device.

2.2 Application Chronology

January 9, 2006	Tier II renewal application was received. This application was withdrawn on June 20, 2006 pending submittal of a PTC application for modification of the plant.
April 26, 2007	PTC application received to replace expired Tier II OP and for modification of the Dryer to switch fuel from natural gas to wood chips (including new Cyclone #1 for material transfer from the Dryer), and to increase Dryer production capacity from 5 to 8 tons/yr. This application was withdrawn on February 12, 2008.
May 1, 2008	PTC application and application fee received by DEQ
May 15, 2008	DEQ requested confirmation that baghouse exhaust release is actually vertical and the application information was clarified
May 15-30, 2008	Notice was issued and opportunity for comment period was provided
May 29, 2008	Application was determined complete
June 2, 2008	Information was received from the facility's modeler that a request had been sent to Beeline Software to help resolve the 7440 meter hill height problem
June 9, 2008	Revised/corrected model was received by DEQ
June 12, 2008	Clarification was received that the Cyclones are "process equipment" that operate as part of the material transfer systems. They are not "emissions control devices".
September 4, 2008	Draft permit was issued for peer and Regional Office review
September 12, 2008	Draft permit was issued to NIEL for review
April 1, 2009	Comments received from Coeur D'Alene office for consistency with other pellet mill permits
July 30, 2009	Draft permit was provided for Regional Office review
August 19, 2009	Draft permit re-issued to NIEL for review
October 7, 2009	Comments received by phone from NIEL regarding the draft permit indicating that the burner modification to combust wood fuel will not be completed as part of this project; however, the dryer production increase from 6 to 8 tons/hr will be completed. The dryer burner fuel will continue to be natural gas exclusively. Most, if not all, of the permit analyses completed for the conversion from natural gas to wood fuel for the dryer can most likely be used in the future if the facility decides to go forward with this change at a future date. Another PTC will be necessary to complete this action.

October 30, 2009	Additional changes were requested from the Coeur d'Alene Regional Office to improve consistency between this permit and the other permits for wood pellet manufacturing facilities
November 2, 2009	DEQ received a letter from NIEL requesting the permit be issued as a PTC instead of as a Tier II permit. It was also indicated that the wood-fired burner will not be constructed, however, the dryer production increase from 6 to 8 tons/hr is still requested.
November 9, 2009	DEQ issued a conditional approval letter for the permit. The permit will be issued after the PTC fee is received.
November 29, 2009	The PTC processing fee was received

3. TECHNICAL ANALYSIS

3.1 Emission Unit and Control Device

Table 3.1 EMISSION UNIT AND CONTROL DEVICE INFORMATION

Emission Unit /ID No.	Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
SolaGen Drum Dryer/ D01	Natural gas-fired Rotary Drum Dryer; production capacity is 8 tons/hr of dried chips @ approximately 8% moisture	None. However, even though it is not a "control device", the new material transfer cyclone through which the exhaust passes has a design efficiency of 82% for 5-10 µg range, and 98% for 10-20 µg and larger particles	Cyclone #1 stack; ID No. 1; 61 feet high, 5.5 ft exit diameter, 120F exit temp, 39,500 acfm, vertical upward flow, induced draft with 200 hp blower
Material transfer system Cyclone #2 and Baghouse/ BH1	Pneumatic material transfer system	Clark Baghouse; model No. 40-20, reverse air type; 20 each 12"x20' bags, plus 20 each 16"x20' bags	Baghouse outlet; stack ID No. 2; 24 feet high, 11.7 ft exit diameter, 100F exit temp, 15,250 acfm, vertical upward flow, forced draft with 50 hp blower
Material transfer system Cyclone #3	Pneumatic material transfer system	None	Cyclone #3 outlet; stack ID No. 3; 24 feet high, 11.7 ft exit diameter, 100F exit temp, 15,250 acfm, vertical upward flow, forced draft with 40 hp blower
Fugitive dust sources	Wood stockpiles, transfer points, vehicle operations, etc.	Fugitive Dust Control Plan	Multiple site-wide fugitive dust sources

3.2 Emissions Inventory

Emissions estimates were provided in the permit application. The estimated emissions shown below are for the "worst case" operating scenario where the dryer burner is fired using 30 MMBtu/hr of pre-dried wood fuel. Since the scope of this project changed near the time of permit issuance, the emissions shown below, and the corresponding compliance demonstrations are higher than the emissions that are expected for natural gas firing in the dryer instead of using wood, which is the final permitted operating scenario. If the facility later chooses to complete the burner modification to allow for wood firing in the dryer, it may be possible to use the following emission estimates and compliance demonstrations so long as the new proposed operating scenario is similar to that which was presented in the application for this permit.

The methods used were reviewed and found to be consistent with DEQ methods. A summary of the results are provided in the tables below. Emission estimates for the rotary dryer were calculated using emission factors from AP-42 Section 1.6, Wood Residue Combustion in Boilers and AP-42 Section 10.6.2 Particleboard Manufacturing. To be conservative, potential emission estimates were based on the emission factor that resulted in the highest hourly emission rate. For the dust collection system baghouse and cyclones, emissions were calculated using grain loading emission factors in the Idaho DEQ Emission Factor Guide for the Wood Industry. For the dryer emissions estimates, it is noted that the estimates again are conservative since they do not take credit for the full control of the dryer cyclone (e.g., 98.5% control for PM_{10}), therefore, actual emissions of particulate matter are expected to be lower. With regard to estimated arsenic emissions, it is noted that EPA did not include an arsenic emission factor in AP-42 for an uncontrolled wood-fired particle dryer, so the factor for a wood fired boiler was used to provide an estimate. Other toxic air pollutant (TAP) emissions from the dryer's 30 MMBtu/hr wood combustor were also estimated. The uncontrolled emissions rate increases of many TAPs were found to be less than the emissions screening levels (EL) in IDAPA 58.01.01.585-586, and those found to exceed the screening levels are shown in Table 3.4. For details regarding the emissions estimates, refer to the permit application.

Table 3.2 UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS FOR WOOD-FIRED DRYER

Emissions Point	PM_{10}		SO_2		NO_x		CO		VOC		LEAD
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/quarter
Point Sources Affected by this Permitting Action											
Dryer		49.5		3.3		64.4		78.8		31.5	6.3E-03
Cyclone 2 [a]		7.1		---		---		---		---	---
Cyclone 3		4.1		---		---		---		---	---
Total, Point Sources		60.7		3.3		64.4		78.8		31.5	6.3E-03
Process Fugitive/Volume Sources Affected by this Permitting Action											
Loader/Stockpile disturbance		0.01		---		---		---		---	---
Stockpile/wind		1.4		---		---		---		---	---
Total, Process Fugitives		1.4		---		---		---		---	---

[a] Cyclone 2 uncontrolled = (0.0146 gr/dscf)(12,990 dscfm)(lb/7000 gr)(T/2000lb)(60 min/hr)(8760 hr/yr) = 7.1 T/yr

Table 3.3 CONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS FOR WOOD-FIRED DRYER

Emissions Unit	PM_{10}		SO_2		NO_x		CO		VOC		LEAD
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/quarter
Point Sources Affected by this Permitting Action											
Dryer	11.3	49.5	0.75	3.3	14.7	64.4	18.0	78.8	7.2	31.5	6.3E-03
Cyclone2/Baghouse	0.11	0.49	---	---	---	---	---	---	---	---	---
Cyclone3	0.94	4.13	---	---	---	---	---	---	---	---	---
Total, Point Sources	---	54.2	---	3.3	---	64.4	---	78.8	---	31.5	6.3E-03
Process Fugitive/Volume Sources Affected by this Permitting Action											
Loader/Stockpile disturbance	0.00	0.01	---	---	---	---	---	---	---	---	---
Stockpile/wind	0.10	0.42	---	---	---	---	---	---	---	---	---
Total, Process Fugitives	---	0.44	---	---	---	---	---	---	---	---	---

Table 3.4 UNCONTOLLED TAP AND HAP EMISSIONS INCREASE SUMMARY FOR WOOD-FIRED DRYER

TAPs	HAPs	24-hour Average[a]	Annual Average[a]
		lb/hr	lb/hr
	Acrolein	0.12	---
	Hydrogen chloride	0.57	---
Silver		0.051	---
	Acetaldehyde	---	0.104
	Arsenic	---	6.6E-04
	Benzene	---	0.126
Benzo(a)pyrene		---	7.8E-05
	Beryllium	---	3.3E-05
	Cadmium	---	1.23E-04
	Carbon tetrachloride	---	0.00135
	Chloroform	---	8.4E-04
	Chromium VI	---	1.05E-04
	1,2-Dichloroethane (Ethylene dichloride)	---	8.7E-04
	Dichloromethane (Methylene chloride)	---	8.7E-03
	Formaldehyde	---	0.131
	Methylene chloride	---	5.04E-03
	Nickel	---	9.9E-04
	Polycyclic organic matter (POM)	---	8.81E-05
	Dioxins and Furans as 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TEQ)	---	6.95E-08

a. 24-hour average only applies to non-carcinogenic TAPs. Annual average only applies to carcinogenic TAPs.
b. NA = not applicable.

Emission Estimates for Natural Gas Fired Burner (not wood-fired)

The following emission inventory information applies to the revised project to continue using natural gas as dryer fuel and to increase the dryer production rate from 6 to 8 tons/hr:

Based on comments received for the draft permit, the facility will not be converting the dryer burner for combustion of wood fuel as part of this project. This project only includes modifications as necessary to increase the production rate from 6 to 8 tons/hr and the dryer burner will continue to be fired using natural gas. For this operating scenario, the estimated emissions increases, for both criteria pollutants and TAPs, will be lower than that which was estimated for a wood-fired dryer burner, except for VOC. For example, for a wood-fired dryer, the formaldehyde increase estimate is 0.131 lb/hr, and for a natural gas-fired dryer the increase estimate is 0.0172 lb/hr. Using the factors in AP-42 Table 10.6.2, the total estimated emissions of criteria pollutants is estimated as shown below:

PM = (0.42 lb/ODT) * (8 ODT/hr) = 3.4 lb/hr (3.4 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 15 tons/yr
PM_{10} = (0.12 lb/ODT) * (8 ODT/hr) = 0.96 lb/hr (0.96 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 4.2 tons/yr
NOx = (0.31 lb/ODT) * (8 ODT/hr) = 2.5 lb/hr (2.5 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 10 tons/yr
CO = (0.12 lb/ODT) * (8 ODT/hr) = 0.96 lb/hr (0.96 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 4.2 tons/yr
VOC = (1.6 lb/ODT) * (8 ODT/hr) = 13 lb/hr (13 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 56 tons/yr
SO_2 = (2.4 lb/MMscf)(30MMBtu/hr)(scf/1020 Btu) = 0.071 lb/hr
SO_2 = (0.071 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 0.31 tons/yr

Table 3.5 provides a summary of the controlled emissions estimates for the facility for the revised project (i.e., based on using a natural gas for dryer fuel, not wood, and an 8 ton/hr dryer production rate).

Table 3.5 CONTROLLED EMISSIONS OF CRITERIA POLLUTANTS, GAS-FIRED DRYER AT 8 T/hr OUTPUT RATE

Emissions Unit	PM_{10}		SO_2		NO_x		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Sources Affected by this Permitting Action										
Dryer	0.96	4.2	0.071	0.31	2.5	10	0.96	4.2	13	56
Cyclone2/Baghouse	0.11	0.49	---	---	---	---	---	---	---	---
Cyclone3	0.94	4.13	---	---	---	---	---	---	---	---
Total, Point Sources	---	8.8	---	0.31	---	10	---	4.2	---	56
Process Fugitive/Volume Sources Affected by this Permitting Action										
Loader/Stockpile disturbance	0.00	0.01	---	---	---	---	---	---	---	---
Stockpile/wind	0.10	0.42	---	---	---	---	---	---	---	---
Total, Process Fugitives	---	0.44	---	---	---	---	---	---	---	---

Using the factors in AP-42 Table 10.6.2, the increase of criteria pollutants for a dryer production rate increase from 6 tons/hr to 8 tons/hr is estimated as follows:

PM = (0.42 lb/ODT) * (2 ODT/hr) = 0.84 lb/hr (0.84 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 3.7 tons/yr
PM_{10} = (0.12 lb/ODT) * (2 ODT/hr) = 0.24 lb/hr (0.24 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 1.1 tons/yr
NOx = (0.31 lb/ODT) * (2 ODT/hr) = 0.62 lb/hr (0.62 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 2.7 tons/yr
CO = (0.12 lb/ODT) * (2 ODT/hr) = 0.24 lb/hr (0.24 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 1.1 tons/yr
VOC = (1.6 lb/ODT) * (2 ODT/hr) = 3.2 lb/hr (3.2 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 14 tons/yr
SO_2 = (2.4 lb/MMscf)(30MMBtu/hr – 22.5 MMBtu/hr)(scf/1020 Btu) = 0.018 lb/hr
SO_2 = (0.018 lb/hr) * (8760 hr/yr)(ton/2000 lb) = 0.077 ton/yr

Table 3.6 provides a summary of the estimated "increases" of controlled emissions for the facility as a result of the revised project (i.e., based on using a natural gas for dryer fuel, not wood, and an increase of the dryer production rate from 6 to 8 T/hr). It is noted that the cyclone and baghouse emissions change is shown as "0" because the estimated emissions are based on the air flow rates for the material transfer systems and these rates are not projected to change.

Table 3.6 EMISSIONS INCREASE OF CRITERIA POLLUTANTS FOR 6 T/hr to 8 T/hr PRODUCTION INCREASE

Emissions Unit	PM_{10}		SO_2		NO_x		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Sources Affected by this Permitting Action										
Dryer	0.24	1.1	0.018	0.077	0.062	2.7	0.24	1.1	3.2	14
Cyclone2/Baghouse	0	0	---	---	---	---	---	---	---	---
Cyclone3	0	0	---	---	---	---	---	---	---	---
Total, Point Sources	---	1.1	---	0.077	---	2.7	---	1.1	---	14

3.3 Ambient Air Quality Impact Analysis

The ambient air impact analysis submitted with the application, in combination with DEQ's verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard. A copy of the results shown in the modeling analysis memorandum is provided below. The ambient air impact analysis demonstrates compliance with the worst case scenario (wood fired dryer). Since emissions will be lower when the dryer is fired with natural gas, then compliance has been demonstrated for that scenario as well at the increased dryer production rate of 8 tons/hr. Refer to the modeling analysis in Appendix B for details.

Table 3.7 RESULTS OF FULL IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact ($\mu g/m^3$)**	**NAAQS[b] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[c]	24-hour	63.3	73	136.3	150	90.9%
	Annual	17.1	26	43.1	50	86.2%
SO_2[d]	3-hour	6.3	34	40.3	1,300	3.1%
	24-hour	2.8	26	28.8	365	7.9%
	Annual	0.24	8	8.2	80	10.3%
CO[e]	1-hour	205.2	3,600	3,805	40,000	9.5%
	8-hour	109.4	2,300	2,409	10,000	24.1%
NO_2[f]	Annual	4.7	17	21.7	100	21.7%

[a] Micrograms per cubic meter. All design concentrations for this full impact analysis are the highest first high (H1H) value due to use of one year of meteorological data

[b] National ambient air quality standards

[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

[d] SO_2 = sulfur dioxide; CO = carbon monoxide; $_{NO2}$ = nitrogen dioxide

Table 3.8 RESULTS OF TAPs ANALYSES				
Toxic Air Pollutant	**Averaging Period**	**Maximum Modeled Concentration (ug/m^3)[a]**	**AAC/AACC[b] (ug/m^3)**	**Percent of AAC/AACC**
Non-carcinogenic TAPs				
Acrolein	24-hour	0.46	12.5	3.7%
Hydrogen Chloride	24-hour	2.16	375	0.6%
Silver	24-hour	0.19	5	3.8%
Carcinogenic TAPs				
Acetaldehyde	Annual	3.3E-02	4.5E-01	7.3%
Arsenic	Annual	2.1E-04	2.3E-04	91.3%
Benzene	Annual	4.0E-02	1.2E-01	33.3%
Benzo(a)pyrene	Annual	2.5E-05	3.0E-04	8.3%
Beryllium	Annual	1.1E-05	4.2E-03	0.3%
Cadmium	Annual	3.9E-05	5.6E-04	7.0%
Carbon tetrachloride	Annual	4.3E-04	6.7E-02	0.6%
Chloroform	Annual	2.7E-04	4.3E-02	6.3%
Chromium (+6)	Annual	3.3E-05	8.3E-05	39.8%
1,2-Dichloroethane	Annual	2.8E-04	3.8E-02	0.7%
Dichloromethane	Annual	2.8E-03	2.4E-01	1.2%
Formaldehyde	Annual	4.2E-02	7.7E-02	54.5%
Methylene chloride	Annual	1.6E-03	2.4E-01	0.7%
Nickel	Annual	3.2E-04	4.2E-03	7.6%
Polyaromatic hydrocarbons	Annual	2.8E-05	1.4E-02	0.2%
Dioxins and furans as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Annual	2.2E-08	2.2E-08	100%

[a] Micrograms per cubic meter

[b] Acceptable ambient concentration for non-carcinogens/acceptable ambient concentration for carcinogens

4. REGULATORY REVIEW

4.1 Attainment Designation (40 CFR 81.313)

The facility is located in Boundary County which is designated as attainment or unclassifiable for PM_{10}, $PM_{2.5}$, CO, NO_2, SO_X, and Ozone. Reference 40 CFR 81.313.

4.2 Permit to Construct (IDAPA 58.01.01.201)

The modifications proposed as part of this permitting action do not qualify for a PTC exemption, therefore, a PTC must be issued.

4.3 Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

The facility is not a designated facility as defined in IDAPA 58.01.01.30, and it is classified as a true minor source for the Title V Program since the uncontrolled potential to emit (PTE) is less than the 100 tons/yr threshold. Also, since the controlled/permitted PTE is less than 80 tons/yr, the facility is not classified as an SM-80 facility and is not subject to a full compliance evaluation every 5 years per EPA's Compliance Monitoring Strategy. The AIRS/AFS facility classification for the Title V Program is B.

4.4 PSD Classification (40 CFR 52.21)

The facility is not a designated facility, and it is classified as a true minor source for the NSR/PSD Program since the uncontrolled potential to emit is less than the 250 ton/yr NSR/PSD threshold. The AIRS/AFS facility classification for the NSR/PSD Program is B.

4.5 NSPS Applicability (40 CFR 60)

NSPS requirements do not apply to this facility.

4.6 NESHAP Applicability (40 CFR 61)

NESHAP requirements do not apply to this facility.

4.7 MACT Applicability (40 CFR 63)

MACT requirements do not apply to this facility.

4.8 CAM Applicability (40 CFR 64)

Compliance Assurance Monitoring (CAM) program requirements do not apply to this facility since it is not classified as a major facility under the Title V program.

4.9 Excess Emissions (IDAPA 58.01.01.130-136)

The permittee shall comply with the procedures and requirements of IDAPA 58.01.01.130-136 for excess emissions. Monitoring, recordkeeping and reporting requirements for excess emissions are provided in Sections 131 through 136. Standard permit conditions for these requirements have been added to the Facility Wide Conditions section of the permit.

4.10 TAP Emissions (IDAPA 58.01.01.203.03, 210)

Demonstration of preconstruction compliance with the toxic air pollutant (TAP) standards has been provided in the permit application per Section 210.04. Increased TAP emissions as a result of this project have been identified and quantified per Sections 210.01, .02 and .03. In particular, increased TAP emissions for which the uncontrolled emissions rate was shown to be less than the applicable emissions screening level (EL) meet Section 210.05. For those TAPS with an emissions rate increase greater than the EL (see Table 3.4), modeling was conducted and it was demonstrated that the uncontrolled ambient concentration at the point of compliance for the TAP was less than or equal to the applicable acceptable ambient concentration (AAC/AACC). For the given stack configuration and operating parameters, Refer to the modeling memorandum. Therefore, no further procedures for demonstrating preconstruction compliance is required.

For this project, the TAP compliance demonstration was provided for an operating scenario where the dryer is fired with wood fuel. However, since the final permitted configuration will only allow for natural gas firing of the dryer, and estimated emissions for a natural gas fired dryer are lower, then compliance with this scenario has been demonstrated also.

4.11 Fugitive Dust (IDAPA 58.01.01.650-651)

To better address the control and management of fugitive dust, the fugitive dust requirements have been modified to incorporate requirements for development and use of a site specific Fugitive Dust Management Plan. To provide flexibility, this plan may be modified over time, when needed and without requiring a permit modification, through concurrence between the facility and the DEQ Coeur d'Alene Regional Office.

4.12 Tier II Operating Permit (IDAPA 58.01.01.401)

Permit No. 021-00015 was issued on October 23, 1998 as a Tier II Operating Permit for purposes of addressing emissions from Cyclone #2 to assure protection of the PM_{10} NAAQS. Prior to that, NIEL had applied for PTCs for activities at the facility and DEQ had issued PTC exemptions. The majority of conditions in the Tier II permit are PTC type conditions that applied under the PTC exemption and that would have been included in a PTC if a PTC had been issued instead of an exemption. At this time, additional PTC conditions are being added to the permit, and it is being issued as a Tier II renewal permit.

4.13 Visible Emissions (IDAPA 58.01.01.625)

The visible emissions standard continues to apply to all point sources at the facility. The standard monitoring conditions for visible emissions are included in this permit. For this particular modification project to increase the dryer production rate from 6 to 8 tons/hr, there is insufficient information available to determine how well the dryer will be able to continuously meet the standard. For this reason, additional operating monitoring and recordkeeping conditions are included in Permit Condition 2.7 for purposes of assuring and documenting on-going compliance with this standard. In addition, based on the relationship between the temperatures within the dryer and opacity and other emission rates, requirements for establishing a maximum dryer inlet temperature and associated monitoring were added as Permit Conditions 3.9, 3.11 and 3.12.

4.14 PM Standard for Fuel Burning Equipment (IDAPA 58.01.01.675-681)

The particulate matter standard for fuel burning equipment applies to the dryer burner. This standard sets the following limit: PM shall not be emitted in excess of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume for gaseous fuel. For natural gas fuel, compliance has already been demonstrated and no further information/testing is necessary.

4.15 Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions (PC) that have been added, revised, modified or deleted as a result of this permitting action.

Permit Section 2 - Facility-wide Conditions. Standard Tier II operating permit facility-wide conditions were added to the permit. This set of conditions appears in all Tier II permits. The standard conditions have also been tailored to match the specific needs for this facility as described below:

Existing PC 1.3. This permit condition is no longer necessary for this particular facility and it has been removed from the permit. Control, monitoring and recordkeeping of fugitive dust emissions will now be accomplished by use of a site specific Fugitive Dust Control Plan.

1.3 <u>Visible Emission Limits</u>

Visible fugitive emissions shall not be observed leaving the property boundary for a period or periods aggregating more than three minutes in any sixty minute period. Visible emissions shall be determined by EPA Reference Method 22, as described in 40 CFR 60, Appendix A, or a DEQ approved alternative method.

Existing PCs 2.2 and 3.4. The existing conditions for the reasonable control of fugitive dust have been replaced. These requirements now appear in PCs 2.1 - 2.5 of the Facility-wide Permit Conditions. Refer to the information described below.

New PCs 2.1 - 2.5. Wood products facilities are known to have fugitive dust type emissions that will vary depending on the weather and operating conditions. To address this situation, an approach that relies upon a site specific Fugitive Dust Control Plan is used. This approach is set forth by PCs 2.1 - 2.6. This plan allows for a site specific plan to be developed that is practical for the facility to use and that is acceptable to DEQ for controlling fugitive dust emissions. This plan may be changed/updated from time to time, when needed, without requiring a permit modification or revision.

Existing PC 3.3. The visible emissions monitoring requirements have been moved and they now appear in PC 2.7 of the Facility-wide Permit Conditions.

New PCs 2.6 - 2.7. The existing permit condition for the visible emissions standard under Section 625 was updated. To demonstrate compliance with the visible emissions standard, periodic visible emissions monitoring, corrective action, and recordkeeping requirements to document those actions have been added. DEQ has found that dryers at wood pellet mills are sometimes prone to having visible emissions that may vary depending on the operating conditions. Therefore, the monitoring and corrective action frequency is increased from weekly to daily.

New PC 2.8.1. Requirements for recording information about odor complaints received were added. These conditions are consistent with the current permitting template requirements for operating permits. If no complaints are received, then it is advisable that this information be periodically recorded in the records. For example, the record could contain an entry that says something similar to the following: "From January 1, 2009 through June 30, 2009, no odor complaints were received."

Existing PC 1.1:

1.1 Emission Limits

Particulate matter (PM) and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) shall not exceed eleven (11) pounds per hour (lb/hr)from the dryer cyclone and shall not exceed two (2) pounds per hour (lb/hr) from the chipper hop baghouse.

Modified PC 3.3:

3.3 Emission Limits

- The emissions of particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) and carbon monoxide (CO) from the dryer exhaust stack shall not exceed any corresponding emissions rate limits listed in Table 3.2.
- The PM_{10} emissions from the baghouse which controls emissions from Cyclone #2 shall not exceed any corresponding emissions rate limit listed in Table 3.2.

Table 3.2 EMISSION LIMITS [a]

Source Description	Daily PM_{10} [b] Emissions (lb/day) [d]	Annual CO Emissions [c] (T/yr)
Dryer Stack	271	79
Baghouse Stack	2.64	---

[a] As determined by a pollutant-specific EPA reference method, a DEQ-approved alternative, or as determined by DEQ's emissions estimation methods used in this permit analysis.

[b] Includes condensibles
[c] As determined by multiplying the actual or allowable (if actual is not available) pound per hour emission rate by the allowable hours per year that the process(es) may operate(s), or by actual annual production rates.
[d] Pounds per calendar day

PC 3.3 establishes PM_{10} emissions limits for the dryer and baghouse for the purposes of assuring compliance with the PM_{10} NAAQS because the total ambient PM_{10} concentration for this project is close to the NAAQS. The dryer is the largest contributor toward the modeled PM_{10} impact by this facility, therefore, emphasis in controlling PM_{10} emissions has been placed on this source. Compliance with the dryer PM_{10} emission rate limit will be demonstrated by performance tests, and by complying with the production, dryer temperature and fuel throughput limits, and the monitoring requirements associated with those limits (see PCs 3.7 – 3.12).

For the baghouse, an emission rate limit and operations and maintenance requirements are also included to assure compliance with the NAAQS. If a baghouse is maintained and operated as designed, it is reasonable to assume that a high control efficiency will be maintained and that emissions will remain low as described in the permit application. The emission rate limits for the dryer and the baghouse are based on the lb/hr emission rate estimate provided in the permit application that was used to demonstrate compliance with the PM_{10} 24-hour average NAAQS. Compliance with the 24-hour average NAAQS standard will also assure compliance with the annual NAAQS standard. The limits are derived as follows:

Dryer PM_{10} Limit = (11.3 lb/hr) * 24 hr/day) = 271 lb/day
Baghouse PM_{10} Limit = (0.11 lb/hr) * 24 hr/day) = 2.64 lb/day

Compliance with the daily emission rate limits is determined as follows:

PM_{10} = (lb/hr emission factor derived from performance testing) * (maximum operating hours per day)

New PC 3.4. The PM standard for fuel burning equipment applies and it is included in this permit condition. For natural gas firing, compliance with this standard is assured by burning natural gas exclusively in the dryer. For wood-fired operation, compliance is demonstrated by periodic performance testing per PC 3.12.

New PC 3.5. This PC clarifies how compliance with the emissions limits is determined. This is standard text for all new permits and it states the following: "In absence of any other creditable evidence, compliance with emission limits is assured by complying with this permit's operating, monitoring and record keeping requirements."

Modified PC 2.1, 3.1 and 3.2 (new PC 3.6):

Permit condition 3.6 was changed to make it clear that installation of this baghouse is a requirement, in addition to the requirements for how it is to be operated. Installation of this baghouse is a key component for purposes of maintaining compliance with the PM_{10} NAAQS. This permit condition is consistent with the current standard approach used to regulate emissions from baghouses throughout the state. As noted above, the approach used to regulate baghouse emissions is based on the premise that if a baghouse is maintained and operated as designed, it is reasonable to assume that a high control efficiency will be maintained and that emissions will remain low as described in the permit application. For this reason, and because the baghouse is not a primary contributor to the PM_{10} impact from this facility, additional testing is not required beyond that which is required by the permit condition. As long as the low baghouse emission rate can be assured and demonstrated through good operational, maintenance and inspection practices, then additional requirements are not required for this source.

Existing PC 2.3:

2.3 Throughput Limit

The permittee shall not process more than one hundred forty four tons per day of raw product.

Modified PC 3.7:

3.7 Production Limit

The permittee shall not produce more than 192 tons per day of logs and pellets.

The throughput limit was changed in two ways. It was changed to be based on the amount of product produced instead of on the amount of raw product used. This change was made to simplify measurement of the daily production rate. Also, it was changed by increasing the daily production rate limit to correspond to the production rate used in the analysis for this permit, and for PM_{10} NAAQS compliance in particular, as follows:

8 tons/hr * 24 hr/day = 192 tons/day.

New PC 3.9: Requirements for establishing a dryer temperature inlet temperature limit were added to the permit to assure compliance with the NAAQS, opacity and emission limits in the permit. The temperature limit is derived based on the performance test results. Refer to Section 4.13 above regarding visible emissions for additional information.

Existing PC 3.5:

3.5 Throughput Monitoring

The permittee shall monitor and record the daily tonnage of final product to demonstrate compliance with Section 2.3 of this permit. The production record shall be kept at the facility for the most recent two (2) year period and be made available to DEQ representatives upon request.

Modified PC 3.10

3.10 Production Monitoring

The permittee shall monitor and record the total daily production of logs and pellets, in units of tons/day, to demonstrate compliance with Permit Condition 3.7. The records shall be maintained in accordance with General Provision 7.

As described above for PC 3.7, the throughput monitoring was changed so it is clear that all operating, monitoring and recordkeeping requirements regarding plant throughput are based on the amount of final product produced instead of on the amount of raw product processed. Also, requirements for maintaining records are more clearly specified in General Provision 7 so a reference to that requirement is used.

New PC 3.11: Monitoring and recordkeeping requirements for the new dyer temperature inlet temperature limit were added to the permit to assure compliance with the opacity and emission limits in the permit. With regard to selection of a dryer inlet temperature monitor, the data output resolution of that monitor must be sufficient to readily determine if a 15 minute excursion has occurred. Refer to Section 4.13 above regarding visible emissions for addition information.

New PC 3.12: Periodic performance testing requirements were added to the permit to demonstrate compliance with the emissions rate limits in PCs 2.6, 3.3, and 3.4. Periodic performance tests for PM and PM_{10} are required because the estimated emissions rates for each are close to applicable limits (i.e., PM_{10} modeled emissions are close to NAAQS with the chosen stack design).

For PM, a one time test to demonstrate compliance with the grain loading standard is considered sufficient also. For PM_{10} and opacity, periodic testing is specified. The testing frequency for PM_{10} and opacity will be based on DEQ's standard conditions for testing, which are based on the results of each prior test. If test results show that actual emissions are close to an emissions limit, then testing will occur on a more frequent basis to demonstrate ongoing compliance with the that limit.

Permit Section 4 - Permit General Provisions. The most current version of the permit General Provisions were used in this renewal permit. This set of conditions appears in all PTC/Tier II permits. An additional option was added to the end of General Provision 7 for maintaining records during periods when equipment is not operated.

5. PERMIT FEES

This permit is subject to PTC fees. The processing fee associated with this permitting action is based on the increase in emissions for the project to increase the dryer production rate from 6 to 8 tons/hr. Based on the information in Table 3.6 above, the emissions increase for this project is 19 tons/yr (1.1 + 0.077 + 2.7 + 1.1 + 14 = 19). The facility is subject to a PTC processing fee of $5000.00 because this is a modification to an existing source with an increase of emissions of between 10 and 100 tons/yr. Based on the information in Table 3.5, payment of this fee amount will also satisfy the requirement for the Tier II permit renewal. It is emphasized that commencement of operations under the modified PTC must not occur (i.e., increasing the dryer production rate from 6 to 8 tons/hr) until the PTC processing fee is paid in full.

6. PUBLIC COMMENT

An opportunity for public comment period on the T2/PTC application was provided from May 15, 2008 through May 30, 2008 in accordance with IDAPA 58.01.01.209.01.c and 404.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Therefore, the requirements of these rules have been met and an additional 30-day comment period is not required.

Appendix A – Ambient Air Quality Impact Analysis

MEMORANDUM

DATE: July 9, 2008

TO: Ken Hanna, Permit Writer, Air Program

FROM: Darrin Mehr, Air Quality Analyst, Air Program

PROJECT NUMBER: T2-2008.0067

SUBJECT: Modeling Demonstration for North Idaho Energy Logs, PTC/Tier II Operating Permit Modification for Their Facility Near Moyie Springs, Idaho

1.0 SUMMARY

North Idaho Energy Logs (NIEL) submitted an application for a modification to their Tier II operating permit on May 1, 2008.

NIEL is an existing facility with a facility-wide Tier II operating permit issued on October 23, 1998, and expired on October 23, 2003. This proposed project consists of:

- Adding a wood-fired dryer burner with a heat input capacity of 30 million British Thermal Units per hour (MMBtu/hr);
- Replacement of the existing 5 oven-dry tons per hour (ODT/hr) rotary drum dryer with a direct contact triple pass rotary dryer rated at 8 ODT/hr; and,
- Replacement of the existing dryer cyclone with a new cyclone sized to handle the increased production throughput.

Emission rates will increase above currently permitted allowable emissions; therefore, this modification is subject to review under IDAPA 58.01.01.200. IDAPA 58.01.01.203.02 requires the facility to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). IDAPA 58.01.01.210 requires the facility to demonstrate compliance with the toxic air pollutants (TAPs) increments, which are listed in IDAPA 58.01.01.585 and 586. This project will also address the renewal of the expired Tier II operating permit, and is required to demonstrate compliance with NAAQS with facility-wide emissions in accordance with IDAPA 58.01.01.403.02.

JBR Environmental Consultants, Inc. (JBR) performed the ambient air dispersion modeling demonstration for this project on behalf of NIEL. The modeling analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations.

DEQ performed a sensitivity analysis on the exhaust parameters of the dust collection baghouse. See Section 3.5 to review the assumptions and results of the sensitivity analysis.

Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Combined dioxin and furan emissions for this project were estimated to be 6.95E-08 pounds per hour. The screening emission rate limit for these pollutants is 1.5E-10 lb/hr. The applicable AACC for combined dioxins and furans is 2.2E-08 micrograms per cubic meter ($\mu g/m^3$), annual average. Impacts of mixtures of dioxins and furans were estimated to be equal to 100% of the AACC. The basis for the dioxins and furans emission rates is 30 million Btu/hr heat input to the proposed drum dryer and 8,760 hours per year of operation. Modeling staff interpretation of these operating parameters is that the combined dioxin and furan TAPs compliance demonstration is based on an uncontrolled emission and uncontrolled ambient concentration (at rated equipment capacity and unlimited hours of operation), per IDAPA 58.01.01.210.05 and 210.06.	The modeling report only predicted ambient impacts of the single 2,3,7,8-tetrachlorodibenzo-dioxin (TCDD) TAP. The emission inventory for the project also included estimates for multiple dioxins and furans. IDAPA 58.01.01.586 requires a compliance demonstration using EPA's toxicity equivalency quotient (TEQ) for each isomer to derive a a weighted emission rate for each isomer. These emission rates are to be summed and compared against the screening emission rate limit (EL), and if in excess of the EL, compliance using the maximum ambient impact based on the summed TEQ emission rate is established against the AACC increment for 2,3,7,8-TCDD.
PM_{10} ambient impacts were predicted to be at 91% of the 24-hour NAAQS and 86% of the annual NAAQS. Combined dioxin and furan impacts were predicted to be at 100% of the carcinogenic AACC for 2,3,7,8-TCDD.	Exhaust parameters for the proposed dryer cyclone stack are critical to the criteria and toxic air pollutant compliance demonstrations. This is especially true for TAPs analysis, because the dryer stack is the only TAP source modeled for this project. If a PM_{10} emission rate performance test is required by the permit, validation of the exhaust parameters used in the analysis will be possible. Actual exhaust temperature and flow rate (which determines exit velocity) which are less than the 120 degrees Fahrenheit and 39,500 actual cubic feet per minute could cause a situation where ambient impacts exceed the concentrations presented in the application's dispersion modeling demonstration.

2.0 BACKGROUND INFORMATION

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The NIEL facility is located in Boundary County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

There are no Class I areas within 10 kilometers of the facility.

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources at the facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.102, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants

involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a] IDAPA 58.01.01.006.102
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1st highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been developed. EPA has asserted through a policy memorandum that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard.

2.1.3 TAPs Analyses

The increase in emissions from the proposed project are required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact dispersion analysis for any TAP with a requested potential emission rate that exceeds the screening emission rate limit (EL) specified by IDAPA 58.01.01.585 or 58.01.01.586.

This project is for a modification to an existing facility. The analyses submitted in this application included a TAPs compliance demonstration per the requirements of IDAPA 58.01.01.210.

2.2 Background Concentrations

Ambient background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. The criteria pollutant background concentrations for this site were based on the default rural agricultural background values. Background values are listed in Table 3.

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

Table 3. BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	24-hour	73
	Annual	26
NO_2[c]	Annual	17
CO[d]	1-hour	3,600
	8-hour	2,300
SO_2[e]	3-hour	34
	24-hour	26
	Annual	8

[a] Micrograms per cubic meter
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c] Nitrogen dioxide
[d] Carbon monoxide
[e] Sulfur dioxide

3.0 MODELING IMPACT ASSESSMENT

3.1 Modeling Methodology

Table 4 provides a summary of the modeling parameters used in the submitted modeling analyses.

Table 4. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	AERMOD	AERMOD, Version 07026
Meteorological data	December 2002 through November 2003	One year of on-site met data from the Riley Creek Lumber facility in Moyie Springs for surface data, and one year of upper air data from the Spokane, Washington airport. This met data file was already processed for use in AERMOD, and was provided by DEQ to NIEL for this project. NIEL rotated the windfield 30 degrees clockwise.
Land Use (urban or rural)	Rural	Urban heat rise coefficients were not used. The application stated that greater than 50% of the land surrounding the proposed site consists of low-level residential buildings and agricultural land. DEQ verified that the appropriate land use designation is rural.
Terrain	Considered	Receptor 3-dimensional coordinates were obtained from USGS DEM files and used to establish elevation of ground level receptors. Base elevations of buildings and sources were not re-generated from the DEM file by DEQ.
Building downwash	Downwash algorithm	Building dimensions obtained from the submitted facility plot plan. BPIP-PRIME and AERMOD, which contains the PRIME algorithm, were used to evaluate downwash effects.
Receptor grid	Grid 1	Approximately 20-meter spacing along facility property boundary
	Grid 2	Approximately 50-meter spacing in a nested grid centered on the facility of 400 meters (East-West) by 900 meters (North-South)
	Grid 3	100-meter spacing in a nested grid extending 300 meters outward in a grid centered on the facility and Grid 2
	Grid 4	250-meter spacing extending 1000 meters outward in a grid centered on the facility and Grid 3
	Grid 5	500-meter spacing extending 2,500 meters outward in a grid centered on the facility and Grid 4

3.1.1 Modeling protocol

A modeling protocol was submitted to DEQ by JBR, on behalf of NIEL, on August 7, 2007, prior to submission of the 15-day PTC application. The modeling protocol was approved, with comments, by DEQ on August 16, 2007. Modeling was conducted using methods documented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline*.

3.1.2 Model Selection

AERMOD was used by NIEL to conduct the ambient air analyses. AERMOD is the recommended model for this project. Building-induced downwash effects are of concern for this project because ambient air receptors are located within structure recirculation cavities. The PRIME algorithms in AERMOD and BPIP-PRIME calculate ambient impacts influenced by building wake effects within recirculation cavities.

3.1.3 Meteorological Data

DEQ provided JBR with one year of on-site met data from the Riley Creek Lumber facility in Moyie Springs for surface data, and one year of upper air data from the Spokane, Washington airport. This met data file was already processed for use in AERMOD. NIEL stated they did not revise any surface data albedo, Bowen ratio, or surface roughness coefficients because the raw met files were not provided to them. The results listed in this memorandum were determined using meteorological data with a windfield rotation of 30 degrees clockwise to account for terrain features that would influence wind directions at the NIEL site in comparison to the terrain features surrounding the met monitoring site.

3.1.4 Terrain Effects

The modeling analyses conducted by NIEL considered elevated terrain. AERMAP was used by NIEL to determine the actual elevation of each receptor and the controlling hill height elevation using United Geological Survey (USGS) digital elevation map (DEM) files for the area surrounding the facility. Elevations of emission sources, buildings, and receptors were developed based on surrounding terrain elevations from the DEM files.

The original modeling demonstration contained a hill height value of 7,440 meters for all receptors. This value was obviously an error as no terrain of that high of elevation is present in this area. DEQ asked NIEL to recheck ambient impacts using corrected data. NIEL submitted an additional modeling demonstration on June 9, 2008 which used a DEM file obtained from another source. Hill heights appeared correct. Design concentrations were unaffected by correcting the elevation and hill height data.

3.1.5 Facility Layout

DEQ verified proper identification of the facility boundary and buildings on the site by comparing the modeling input file to the scaled plot plan submitted with the application and to satellite images of the site on the Google Earth internet website.

3.1.6 Building Downwash

Plume downwash effects caused by structures present at the facility were accounted for in the modeling analyses. The Building Profile Input Program (BPIP) with the Plume Rise Model Enhancements (PRIME) algorithm was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for AERMOD for building-induced downwash effects.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist for all areas immediately exterior to the facility's fenced property

boundary. The property boundary is established as the ambient air boundary according to the methods specified in the *State of Idaho Air Quality Modeling Guideline*.

3.1.8 Receptor Network

The receptor grids used by NIEL met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined that the receptor grid was adequate to reasonably resolve the maximum modeled ambient impacts.

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for DEQ modeling:

- All modeled criteria air pollutant and TAP emissions rates were equal to or greater than the facility's emissions calculated in the PTC application or requested permit allowable emission rates.

The short-term emission rates listed in Table 5 were modeled for 24 hours per day.

Table 5. MODELED CRITERIA POLLUTANT SHORT-TERM EMISSIONS RATES

Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c], 3-hr avg and 24-hr avg	CO, 1-hr avg and 8-hr avg
DRYRCYCL	Rotary Drum Dryer Cyclone (wood-fired burner and dryer exhaust)	11.31	0.75	18.00
CYCLONE3	Hammermill cyclone	0.94	NA	NA
BAGHOUSE	Baghouse controlling Cyclone 2	0.11	NA	NA
STRPIL1	Wood storage pile (east side of facility)	0.018	NA	NA
STRPIL2	Wood storage pile (south side of facility)	0.022	NA	NA
STRPIL3	Wood storage pile (large pile west side of facility)	0.041	NA	NA
STRPIL4	Wood storage pile (small pile west side of facility)	0.019	NA	NA

[a] Pounds per hour
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers, 24-hour averaging period
[c] Sulfur dioxide
[d] Carbon monoxide
[e] NA = pollutant not emitted by this source

The hourly emission rates listed in Table 6 were modeled for 8,760 hours per year.

Table 6. MODELED CRITERIA ANNUAL EMISSIONS RATES

Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c]	NO_2[d]
DRYRCYCL	Rotary Drum Dryer Cyclone (wood-fired burner and dryer exhaust)	11.31	0.75	14.70
CYCLONE3	Hammermill cyclone	0.94	NA[d]	NA
BAGHOUSE	Baghouse controlling Cyclone 2	0.11	NA	NA
STRPIL1	Wood storage pile (east side of facility)	0.018	NA	NA
STRPIL2	Wood storage pile (south side of facility)	0.022	NA	NA
STRPIL3	Wood storage pile (large pile west side of facility)	0.041	NA	NA
STRPIL4	Wood storage pile (small pile west side of facility)	0.019	NA	NA

[a] Pounds per hour
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c] Nitrogen dioxide
[d] Sulfur dioxide
[e] NA = pollutant not emitted from this source

The toxic air pollutant (TAP) emission rates listed below in Table 7 were modeled for 24 hours per day for non-carcinogenic TAPs and 8,760 hours per year for carcinogenic TAPs to determine compliance with the applicable TAP increments. All TAPs were emitted from the wood-fired burner and rotary dryer and exhausted through the dryer cyclone (DRYRCYCL).

Table 7. MODELED TOXIC AIR POLLUTANTS EMISSIONS RATES		
Pollutant	**Averaging Period**	**Emission Rate (lb/hr)[a]**
Noncarcinogenic TAPs		
Acrolein	24-hour	0.12
Hydrogen Chloride	24-hour	0.57
Methyl Isobutyl Ketone	24-hour	0.019
Silver	24-hour	0.051
Carcinogenic TAPs		
Acetaldehyde	Annual	1.04E-01
Arsenic	Annual	6.60E-04
Benzene	Annual	1.26E-01
Benzo(a)pyrene	Annual	7.80E-05
Beryllium	Annual	3.30E-05
Cadmium	Annual	1.23E-04
Carbon tetrachloride	Annual	1.35E-03
Chloroform	Annual	8.40E-04
Chromium (+6)	Annual	1.05E-04
1,2-Dichloroethane	Annual	8.70E-04
Dichloromethane	Annual	8.70E-03
Formaldehyde	Annual	1.31E-01
Methylene chloride	Annual	5.04E-03
Nickel	Annual	9.90E-04
Polyaromatic hydrocarbons	Annual	8.81E-05
Dioxins and furans as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Annual	6.95E-08

[a] Pounds per hour

3. 3 Emission Release Parameters

Table 8 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Documentation on the release parameters indicated that the data for the emission sources were obtained from the design specifications for the project's contractor, H.J. Burns. Several important parameters for the proposed drum dryer cyclone (DRYRCYCL) include 40% moisture content in the exhaust, an exhaust flow rate of 21,657 dry standard cubic feet per minute (dscfm), and a release temperature of 120 degrees Fahrenheit (322 Kelvin). These values were used to establish the actual volumetric flow rate of 39,500 actual cubic feet per minute (ACFM) used in the modeling demonstration.

DEQ performed a sensitivity analysis on the exhaust velocity for the BAGHOUSE emission point because advice provided by DEQ to JBR during the modeling protocol approval stage was deemed incorrect. See Section 3.5 below to review the basis and results of DEQ's sensitivity analysis. Other values used in the analyses appeared reasonable and within expected ranges for the assumptions used in the submitted analyses.

Table 8. POINT SOURCE STACK PARAMETERS					
Release Point	Description	Stack Height (m)[a]	Modeled Stack Diameter (m)	Stack Gas Flow Temperature (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
DRYRCYCL	Rotary drum dryer and wood burner exhaust (proposed)	18.59	1.68	322.0	8.45
CYCLONE3	Overfeed material and process cyclone (existing)	6.74	0.91	310.9	6.36
BAGHOUSE	Controls emissions from Cyclone 2 (existing)	7.50	3.56	310.9	0.36[d]

[a] Meters
[b] Kelvin
[c] Meters per second
[d] Exit velocity based on assumption of one half of fan system capacity and cross-sectional area of the diameter of the top of the baghouse structure

Four area sources were included in the modeling demonstration. The storage piles were described as moist wood chip piles. The piles ranged in size from 8,000 square feet to 33,000 square feet. Pile heights were not discussed in the application materials. The NIEL submittal used a release height of 4 feet (1.2 meters) to simulate disturbance of the piles by front end loader material transfers. Area source modeling parameters are listed in Table 9.

Table 9. AREA SOURCE RELEASE PARAMETERS							
Release Point	Description	Source Base Elevation (m[a])	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Angle From North (degrees)	Vertical Dimension (m)
STRPIL1	Wood storage pile (east side of facility)	690.9	1.22	12.19	60.96	0.0	1.22
STRPIL2	Wood storage pile (south side of facility)	690.0	1.22	60.96	18.29	0.0	1.22
STRPIL3	Wood storage pile (large pile west side of facility)	690.0	1.22	18.29	167.64	0.0	1.22
STRPIL4	Wood storage pile (small pile west side of facility)	690.0	1.22	12.19	76.20	0.0	1.22

[a] Meters

3.4 Results for Ambient Impact Analyses

3.4.1 Full Impact Analyses

A significant contribution analysis was not submitted with this application. NIEL performed a full impact analysis for criteria air pollutants that triggered modeling requirements for this permitting project.
The use of a single year of meteorological data requires the applicant to use the highest first high (H1H) values for all pollutants and averaging periods. The submitted analyses used the H1H value for the design concentrations. The results of the full ambient impact analysis are listed in Table 10.

Table 10. RESULTS OF FULL IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact ($\mu g/m^3$)**	**NAAQS[b] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[c]	24-hour	63.3	73	136.3	150	90.9%
	Annual	17.1	26	43.1	50	86.2%
SO_2[d]	3-hour	6.3	34	40.3	1,300	3.1%
	24-hour	2.8	26	28.8	365	7.9%
	Annual	0.24	8	8.2	80	10.3%
CO[e]	1-hour	205.2	3,600	3,805	40,000	9.5%
	8-hour	109.4	2,300	2,409	10,000	24.1%
NO_2[f]	Annual	4.7	17	21.7	100	21.7%

[a] Micrograms per cubic meter. All design concentrations for this full impact analysis are the highest first high (H1H) value due to use of one year of meteorological data
[b] National ambient air quality standards
[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d] Sulfur dioxide
[e] Carbon monoxide
[f] Nitrogen dioxide

Compliance with the applicable NAAQS was demonstrated by NIEL.

3.4.2 Toxic Air Pollutant Impact Analyses

Modeling for TAPs was required to demonstrate compliance with the TAP increments specified by IDAPA 58.01.01.585 and 586. The results of the TAPs analyses are listed in Table 11. TAPs subject to modeling demonstration compliance were emitted only from the drum dryer cyclone stack. Impacts were estimated using a design concentration (maximum ambient impact) based on a one pound per hour emission rate in the model. Design concentrations were then calculated by multiplying the maximum ambient impact by the TAP emission rates. Design concentrations per one pound per hour of emissions were 3.791 $\mu g/m^3$, 24-hour average, and, 0.3178 $\mu g/m^3$, annual average.

A modeling compliance demonstration was not required for methyl isobutyl ketone. The emission rate provided was 0.019 pounds per hour, and the correct screening emission rate limit (EL) is 13.7 pounds per hour.

Table 11. RESULTS OF TAPs ANALYSES				
Toxic Air Pollutant	**Averaging Period**	**Maximum Modeled Concentration (ug/m^3)[a]**	**AAC/AACC[b] (ug/m^3)**	**Percent of AAC/AACC**
Noncarcinogenic TAPs				
Acrolein	24-hour	0.46	12.5	3.7%
Hydrogen Chloride	24-hour	2.16	375	0.6%
Silver	24-hour	0.19	5	3.8%
Carcinogenic TAPs				
Acetaldehyde	Annual	3.3E-02	4.5E-01	7.3%
Arsenic	Annual	2.1E-04	2.3E-04	91.3%
Benzene	Annual	4.0E-02	1.2E-01	33.3%
Benzo(a)pyrene	Annual	2.5E-05	3.0E-04	8.3%
Beryllium	Annual	1.1E-05	4.2E-03	0.3%
Cadmium	Annual	3.9E-05	5.6E-04	7.0%
Carbon tetrachloride	Annual	4.3E-04	6.7E-02	0.6%
Chloroform	Annual	2.7E-04	4.3E-02	6.3%
Chromium (+6)	Annual	3.3E-05	8.3E-05	39.8%
1,2-Dichloroethane	Annual	2.8E-04	3.8E-02	0.7%
Dichloromethane	Annual	2.8E-03	2.4E-01	1.2%
Formaldehyde	Annual	4.2E-02	7.7E-02	54.5%
Methylene chloride	Annual	1.6E-03	2.4E-01	0.7%

Table 11. RESULTS OF TAPs ANALYSES				
Toxic Air Pollutant	**Averaging Period**	**Maximum Modeled Concentration (ug/m^3)[a]**	**AAC/AACC[b] (ug/m^3)**	**Percent of AAC/AACC**
Nickel	Annual	3.2E-04	4.2E-03	7.6%
Polyaromatic hydrocarbons	Annual	2.8E-05	1.4E-02	0.2%
Dioxins and furans as 2,3,7,8-tetrachlorodibenzo-p-dioxin	Annual	2.2E-08	2.2E-08	100%

[a] Micrograms per cubic meter
[b] Acceptable ambient concentration for non-carcinogens/acceptable ambient concentration for carcinogens

3.5 DEQ Sensitivity Analyses

DEQ re-ran the PM_{10} modeling demonstration using all of the same modeling inputs presented by NIEL, except for the exit velocity for the baghouse (BAGHOUSE). DEQ used an assumed flow rate of 0.001 meters per second under the assumption that the baghouse vents horizontally. An exit diameter of 11.67 feet was used, which represents the diameter of the top of the baghouse. The exhaust is emitted from vents directed horizontally in a ring around the top of the baghouse structure.

JBR Environmental contacted DEQ for recommendations on the treatment of the baghouse exhaust parameters prior to submitting the permit application. JBR's opinion on this baghouse was that the baghouse venting exhibited some level of vertical release. DEQ reviewed the schematic diagram and description of the source provided by JBR and provided a recommendation that the modeling may account for some level of vertical momentum of the exhaust stream. NIEL's modeling demonstration accounted for a vertical uninterrupted release of the exhaust stream at one half of the pneumatic system's fan capacity.

This recommendation provided incorrect guidance for JBR to use in the modeling analysis. Review of an additional baghouse diagram submitted with the permit application revealed that there should be little or no vertical momentum flux because, as described above, the exhaust vents are actually oriented downward.

Table 12. RESULTS OF DEQ SENSITIVITY ANALYSES		
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	24-hour	63.33[c]
	Annual	17.89[c]

[a] Micrograms per cubic meter
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[c] Highest 1st high value for modeling with a single year of met data

There was not an appreciable increase in the predicted design concentration due to the reduced exhaust velocities for the baghouse. The design concentration occurs on the west side of the facility and the maximum ambient impacts attributed to the baghouse occur on the east side of the facility. Additional consideration of the exhaust velocity is not necessary. This baghouse should be considered a horizontal release point for future modeling projects, unless additional documentation supporting a treatment as a partially-blocked emission point is provided.

4.0 CONCLUSIONS

The ambient air impact analysis submitted, in combination with DEQ's verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.