

FACILITY PROFILE

Northern Energy Solutions Limited

Wood Pellet Plant

Miramichi, N.B.

**Prepared by:
Authorization Branch
Department of Environment and Local Government**

November 2018

TABLE OF CONTENTS:

BACKGROUND

PROCESS DESCRIPTION

POTENTIAL AIR QUALITY IMPACTS

POTENTIAL ACOUSTIC IMPACT

AIR QUALITY COMPLIANCE AND ENFORCEMENT

PUBLIC OUTREACH

CONTACT INFORMATION

BACKGROUND

Northern Energy Solutions Limited (NES) is proposing to construct a wood pellet manufacturing facility in the City of Miramichi, New Brunswick (NB). The plant will be situated on a brownfield site at the former UPM Kymmene pulp and paper location. The plant, once fully operational, will have a target production of 275,000 tonnes of wood pellets annually up to 315,000 tonnes depending on a variety of operating conditions. The production from the plant is intended for export to the market in Europe.

The plant will produce wood pellets and will be used primarily in power plants to displace coal to produce renewable electricity. The facility will have a workforce of approximately 65 persons, and include onsite amenities (safety, parking, sanitation) consistent with provincial regulations and good industry practice.

PROCESS DESCRIPTION

Introduction

The wood pellet manufacturing process starts with the procurement of low grade wood fibre to be converted through the process. The NES facility will process in the range of 630,000 green tonnes of low grade wood each year, at its target production, which will consist of primary sources including biomass roundwood, tops and branches, along with secondary sources from mills which include sawdust, bark and shavings. The majority of primary wood fibre will be sourced from sustainably harvested Sustainable Forestry Initiative (SFI)-certified Crown lands, with a smaller portion coming from private land in the region. The raw fibre is stored on site in wood piles or in residual piles before it is conveyed to the manufacturing process. The manufacturing process starts by drying the wood from an average moisture of 50% to an output moisture of 8% by using a direct fired rotary dryer.

Dryer

The rotary dryer is fueled primarily by a combustion system that uses wood bark as its fuel. After drying, the wood is ground into a fine powder and is sent to the pelletizing machines where it is pressed into wood pellets. Pellets are then cooled and stored in a silo system for loading and delivery by truck to the Port of Belledune.

Electricity Requirement

The plant will require approximately 9 megawatts of electricity that it will receive from the NB Power transmission grid via lines that are already present on site. An onsite diesel backup generator will be used to provide emergency power for critical systems in the event of power outage.

Air Pollution Controls

Principal sources of air emissions are the combustion system, rotary dryer, and the negative pressure system used to remove wood fines from various stages of manufacturing. The NES design uses a multiclone configuration to address particulate matter from the combustion system gas

stream and uses a cyclofilter to remove particulate matter from the negative pressure system. The exhaust from the rotary dryer/combustion system and negative pressure system are combined and exit via a stack near the dryer. There is also an emergency stack for venting heat from the furnace in the event of a power failure, or briefly during system restart. Emissions modelling has been undertaken by NES, with input from equipment manufacturers and NES engineers, to determine the air emissions profile of the plant. The current design emissions will be well below all regulated limits.

POTENTIAL AIR QUALITY IMPACTS

Early in the design process, a screening level air dispersion model was conducted to assess ground level concentrations (GLCs) at nearest receptors (i.e., residences and commercial properties nearest to the site), relative to regulatory limits, to indicate if concern should be high or low. As expected, total particulate matter (TPM) was the highest concern for this type of facility, although none of the air contaminants exceeded regulatory limits.

Following refinements in the design, the air quality dispersion model was run again using the final facility emissions profile. The ground level concentrations at the nearest receptors are summarized in Table 1.

Table 1 Air Quality Dispersion Model Results

Contaminant	Total Emission Rate (g/s)	Max. GLC at Receptor (µg/m ³)	Averaging Period (hours)	Regulated Limit (µg/m ³)	Source of Criteria	Percentage of Criteria (%)
TPM (filterable)	10.35	15.19	24	120	NBDELG	12.66
		0.94	Annual	70	NBDELG	1.34
SO ₂	3.05	10.28	1	900	NBDELG	1.14
		4.47	24	300	NBDELG	1.49
		0.28	Annual	60	NBDELG	0.46
NO _x	6.45	21.74	1	400	NBDELG	5.43
		9.46	24	200	NBDELG	4.73
		0.58	Annual	100	NBDELG	0.58
CO	7.48	25.21	1	35,000	NBDELG	0.07
		18.89	8	15,000	NBDELG	0.13
CO ₂	6693.62	22557.90	24	255,800	MOECC, Ontario	8.82
Selected VOCs						
Formaldehyde	0.51	0.75	24	65	MOECC, Ontario	1.22
Acetaldehyde	0.25	0.37	24	500	MOECC, Ontario	0.08
Phenol	0.03	0.04	24	30	MOECC,	0.75

					Ontario	
Acrolein	0.05	0.07	1	0.4	MOECC, Ontario	8.66

Note(s):

1. g/s – grams per second, µg/m³ – micrograms per cubic metre
2. VOCs – Volatile organic carbons, MOECC - Ministry of the Environment and Climate Change
3. Modeled with AERMOD, based on maximum PM concentration of about 144 mg/Nm³.

These results are based on “worst case” operating conditions, and the actual performance will generally produce lower volumes of contaminants. Based on the air dispersion modelling, the NES facility will comply with all regulated air quality parameters.

POTENTIAL ACOUSTIC IMPACT

Several components of the proposed operation will generate noise, including mobile equipment, an outdoor chipper and de-barker, the combustion system, rotary dryer, biosizer, and pelletizing machines, as well as transport trucks and general-purpose vehicles. A summary of expected noise levels (at source) for the major noise emitters is presented in Table 2.

Table 2 Major Noise Sources

Noise Source	Noise Level (dB)
Wheel Loader (3 units)	105
Material Handler / Log Loader (2 units)	104
Flail Chipper (and de-barker)	105
Dryer Island (furnace, rotary drum, cyclones)	85
Biosizer / Hog ¹	102.5
Hammermills ¹	85
Pelletizers ¹	90
Transport Trucks	85

Note(s)

1. This equipment will be located inside the warehouse building, so noise levels outside will be less

The facility will operate 24 hours per day and 7 days per week; however, care will be taken to avoid loud night-time activities if possible. Transport trucks entering and exiting the property for delivery and pick-up of raw and produced material will use the existing access road beside the guard house, but delivery times will be scheduled to occur between the hours of 6 am and 10 pm on weekdays.

NES has incorporated noise abatement measures in the design of the yard layout by using the wood material stockpiles as noise barriers between the processing areas and the nearest receptors. The core processing area, which includes the chipper/de-barker and the dryer island, are located to maximize distance to all nearest receptors; approximately 360 m south of the nearest residence,

and 300 m north of a government office building. To the extent possible, the core processing area components will be surrounded by stockpiles of raw and processed wood material 9 to 12 m in height.

The electric substation will be located in the northwest section of the site, approximately 40 m south of the nearest residence at Jones Crossing. The substation may generate noise up to 50 decibels (dB).

Baseline Acoustic Environment

The nearest noise receptor is a provincial office building (formerly occupied by the Public Service Pay Centre) on the former UPM Kymmene property, located approximately 300 m south of the core processing area. The building is currently vacant and future plans for this office building are unknown. Air exchange fans located on the roof and the side of the building facing the noise monitor were audible, turning off and on intermittently. Water rush from the Miramichi River on the southern edge of the building's property, and traffic drone from Route 8 and Anderson Bridge, were prevalent. The nearest residence to the Project is approximately 360 m northwest of the central processing area, behind a row of trees. The entrance to the Project is considered representative of the noise levels at the closest residences, 100 m west of the guard house.

The land west of the NES site is occupied by a major provincial highway (Route 8) and an active railway (Anderson Bridge), both of which cross the Miramichi River south of the site. There is an active railroad track immediately west of the site. The train passes a couple times a day and does not typically blow its whistle. A 138-kV power transmission line corridor also spans the area west of the project property near Anderson Bridge. The areas east and north of the NES site will continue to be predominantly abandoned industrial land for the foreseeable future, including a large wastewater treatment pond (north of Curtis Road). A few residences (4 or 5) are located near the northwest corner of the site at Jones Corner, approximately 360 m north of the processing area. Some residences and commercial properties are located at the east end of Curtis Road, more than 500 m from the NES site. The existing residences were present when the former pulp and paper facility was in operation.

Baseline Sound Monitoring

Noise monitoring was conducted at both nearest receptors (the provincial office building, and the entrance to the Project site), using standard sound level instruments with logging capability. Monitoring was performed for 48 continuous hours. A-weighted hourly equivalent sound levels were used to calculate the 24-hour equivalent sound level (LAeq-24h) for one full calendar day. The LAeq-24h calculated from recorded data for each day are presented in Table 3.

Table 3 Baseline Noise Measurements at Nearest Receptors

Monitor Location	Address	Date ¹	L _{Aeq-24h} (dBA ²)
Site Access Guard House	345 Curtis Road	17 June, 2017	44.9
		18 June, 2017	44.4
Provincial Office Building	115 Curtis Road	17 June, 2017	48.2
		18 June, 2017	44.9

Note(s)

1. The L_{Aeq-24h} value was calculated from measured 1-hour L_{Aeq} data obtained over a complete calendar day
2. dBA is the symbol for A-weighted decibels

Potential Sound Impacts

Pathways for potential effects on the acoustical environment during operations include facility equipment, outdoor mobile equipment and delivery/shipping of raw and finished products at the project footprint. The predicted sound levels at the receptors were calculated using the inverse square law only and taking no account of the noise reduction provided by the wood stockpiles surrounding the equipment. The predicted levels are based on individual stationary equipment; however, this will vary as the mobile equipment will be operating at various locations and all equipment may be running concurrently.

Table 4 presents predicted levels at the provincial office building located approximately 300 m south of the core processing area.

Table 4 Predicted Sound Levels – Provincial Office Building

Equipment	Max. Sound Level L _{Amax} (dBA)	Distance to Receptor (m)	Predicted Sound Level L _{Aeq} (dBA ²)
Trucks Transporting Wood, Pellets, etc.	85	300	35.5
Wheel Loader	105	300	55.5
Material Handler	104	300	54.5
Flail Chipper	105	300	55.5

Predicted noise levels at the provincial office building due to Project activities may be above 55 dBA, at a distance of 300 m from the facility. The predicted levels are higher than the baseline L_{Aeq-24h} values (48.2 and 44.9 dBA). Other sources in the area contributing to noise levels are traffic along Highway 8, the rail line, and the Miramichi River.

Table 5 presents predicted sound levels during operation at the nearest residential receptors located northwest of the property approximately 360 m from the core processing area.

Table 5 Predicted Sound Levels – Nearest Residential Receptors

Equipment	Max. Sound Level LAmax (dBA)	Distance to Receptor (m)	Predicted Sound Level LAeq (dBA ²)
Substation with 10 MVA Transformer	45-50	40 m	13 - 18
Trucks Transporting Wood, Pellets, etc.	85	360 m	33.8
Wheel Loader	105	360 m	53.9
Material Handler	104	360 m	52.9
Flail Chipper	105	360 m	53.9

Predicted noise levels at the nearest residences, due to Project activities may be above 50 dBA, at a distance of 360 m from the facility. The predicted levels are higher than the baseline LAeq-24h values (44.4 and 44.9 dBA). Other sources in the area contributing to noise levels are traffic along Curtis Road, Route 8 and the rail line.

AIR QUALITY COMPLIANCE AND ENFORCEMENT

Compliance and Enforcement options used by the Department of Environment are outlined in the Department's *Compliance and Enforcement Policy*. These options include schedules of compliance, verbal and written warnings, orders and prosecutions. Although not specifically outlined in the Policy, it is also possible to amend approvals with more stringent conditions, both during its valid period and at the time of renewal, to address specific compliance issues or to improve the environmental impact of the facility. Also, the Administrative Penalties Regulation under the *Clean Air Act* allows for the issuance of "administrative penalties" for minor violations as an alternative to traditionally used enforcement options.

Compliance with the Approval to Operate

All sources of air emissions in New Brunswick, including the Miramichi Wood Pellet Plant, are required to operate in compliance with the *Clean Air Act* and the *Air Quality Regulation* filed under it. In addition, the facility operator must comply with site-specific conditions contained in the Approval to Operate pursuant to Section 3 of the *Air Quality Regulation - Clean Air Act*.

PUBLIC OUTREACH

A Public Open House Information Session was held by NES on August 1st, 2018, from 4 to 8 pm at the Miramichi Kin Centre, 100 Newcastle Boulevard. Over the course of the event, 91 people attended, 26 of which submitted completed Exit Questionnaires (28%); 25 in English, 1 in French. Respondents identified themselves as landowners/producers (12%), part of special interest groups (8%), local politicians (2%) and/or students/members of business/industry (15%). Nineteen of the respondents expressed an interest in being contacted about future information and events related to this project and left contact information, one of whom suggested that he would be interested in touring the Plant upon completion. Many attendees expressed interest in gaining employment associated with Plant operations.

CONTACT INFORMATION

For further information on the operation of the NES facility, please contact:

Fenton Travis, P. Eng.
Project Manager
Northern Energy Solutions (NES)
P.O. Box 338 Station A
Fredericton, NB E3B 4Z9
Telephone: (506) 444-7153
Mobile: (506) 449-2177
Fax: (506) 443-3105
E-mail: fenton.travis@marwoodltd.com

For further information on this document, or on environmental regulations relating to air quality, please contact:

J r mie Doucet
Approval Coordinator
Authorization Branch
Department of Environment and Local Government
P.O. Box 6000, Marysville Place
Fredericton, NB E3B 5H1
Telephone: (506) 543-3805
Fax: (506) 453-2390
E-mail: Jeremie.Doucet@gnb.ca

Regional office:

Ian Donald
Acting Director
Region 2 – Miramichi Regional Office
316 Dalton Avenue
Industrial Park
Miramichi, NB E1V 3N9,
Telephone : (506) 778-6032
Fax : (506) 778-6796
E-mail : Ian.Donald@gnb.ca

For comments or inquiries on the public participation process, please contact:

Chandra Clowater

Public Participation Officer

Education and Stakeholder and First Nations Engagement

Department of Environment and Local Government

P.O. Box 6000, Marysville Place

Fredericton, NB E3B 5H1

Telephone: (506) 453-3700

Fax: (506) 453-3676

E-mail: Chandra.Clowater@gnb.ca

Website: www.gnb.ca/environment