FACILITY PROFILE
J. D. IRVING, LIMITED - LAKE UTOPIA PAPER

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Department of Environment and Local Government
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BACKGROUND

Lake Utopia Paper is a pulp and paper mill located 6.5 km east of the town of St. George. The mill manufactures corrugating medium from a mixture of two fibre types. The primary component is virgin fibre produced by the neutral sulphite semi-chemical (NSSC) pulping process from hardwood chips. The remainder is made from recycled cardboard. The mill facility was initially commissioned in 1971 and was operating as Fundy Forest Products. J.D. Irving Limited purchased the mill in 1973 and has operated it since as Lake Utopia Paper. Using the NSSC pulping process, recycled cardboard, and the corrugating paper machine, the plant produces approximately 507 tonnes per day of finished corrugating medium.

As required under the Air Quality Regulation - Clean Air Act, the mill complex operated by Lake Utopia Paper is considered a source and therefore, must apply for and obtain an Air Quality Approval to Operate from the Department. The facility is required to conduct its operations according to conditions outlined in the issued Air Quality Approval aimed at preventing unfavourable air quality conditions. The conditions are generally wide-ranging and may include such requirements as:

- limitations on operational parameters;
- requirements for testing and monitoring emissions from specific unit operations;
- requirements for testing and monitoring the ambient air quality surrounding the facility;
- requirements to operate air pollution control equipment;
- limits on emissions that are approved to be released to the atmosphere;
- provisions for equipment upgrade and/or maintenance;
- requirements for environmental emergency and/or compliance reporting; and
- other conditions aimed at minimizing the facility’s impact on the environment.

The Regulation provides for approvals to be issued by the Minister of the Environment and Local Government for a specified period, not to exceed five years.

The current Approval to Operate the Lake Utopia Paper mill complex in St. George, New Brunswick (identified as I-6881) issued under the Air Quality Regulation expires on March 12, 2015.

This document is intended to provide: background information on the Lake Utopia Paper mill complex, a list of potential air quality impacts associated with the facility, and a compliance review of the Air Quality Approval to Operate.

PROCESS DESCRIPTION

General Overview

The first step in the manufacture of paper products consists essentially of separating the wood into fibres better known as pulp. Wood is made up predominately of lignin and fibres. The lignin can be thought of as the glue that holds the fibres together. The fibres have the strength properties used to form different types of paper products. Therefore, in the pulp and paper process the main objective is to separate the lignin from the fibre and then blend suitable grades of pulp with non-fibrous
additives, and form and dry the blended mixture into paper sheets with characteristics suitable for the intended use.

Lake Utopia Paper manufactures 507 tonnes per day of a finished corrugating medium paper product. The corrugated medium is comprised of a mixture of two types of fibres. The primary fibre is produced from the Neutral Sulphite Semichemical (NSSC) pulping process of hardwood chips, constituting approximately 65 percent of the product mass. The remainder is made from recycled fibre originating from old corrugating containers (recycled cardboard). The two fibre types are blended and directed to a corrugated paper machine where the paper web is formed and dried. The dry formed paper web is then directed to the finishing area to prepare the medium for shipment.

The NSSC pulping process consists of the following operations:

- Hardwood Preparation and Storage;
- Cooking Liquor Preparation and Storage;
- Pulping Process;
- Mechanical Refiners; and
- Pulp Storage.

The mill is supplied with hardwood chips during the periods of the year when woodland access roads are open. To allow for the time of year when the roads are closed the facility establishes an onsite chip inventory. The chips are stored on site in the wood yard for further use in the process. The bark and off-spec chips are stored on site in the wood yard and either burned onsite in the biomass boiler or taken to Irving Pulp and Paper Ltd. and other customers, and used as wood waste fuel on an as needed basis.

The cooking liquor preparation and storage consist of producing an-alkaline sodium sulphite cooking liquor. Elemental sulphur is combusted with air in a sulphur burner to produce sulphur dioxide gas. The sulphur dioxide is then directed into an absorption tower where the sulphur dioxide gas is absorbed and reacted with a liquid medium of sodium hydroxide to produce the final alkaline sodium sulphite cooking liquor. The prepared cooking liquor is stored in a liquor storage tank for further use in the process on an as needed basis.

The pulping process consists of mixing the prepared hardwood chips and cooking liquor in a digester while carefully controlling the temperature and pressure to ensure uniform penetration of the cooking liquor into the hardwood chips. The cooking liquor reacts with the lignin in the wood chips, which forms a soluble solution that is discharged with the spent liquor. After this delignification reaction the wood chips consist mostly of fibres and are typically referred to as the cook. The cook is then directed to mechanical disc refiners that refine the cook to form the pulp. The pulp produced from the combined efforts of the digester and disc refiners is mechanically screened and directed to storage chests for further use in the furnishing of the corrugating medium.

The recycled pulp is prepared from old corrugating containers (recycled cardboard). The recycled containers are agitated with water to create a slurry mixture. This mixture is passed through several types of mechanical screens and to remove contaminants and directed to a storage chest for further use in the furnishing of the final corrugating medium.
The virgin pulp produced from the NSSC process and the recycled pulp produced from the old corrugating containers are blended together to form a combined furnish for formation into a paper web. The combined furnish is passed through additional screens and mechanical cleaners before being delivered to the corrugating paper machine. No chemicals are added during the blending process. The combined furnish is delivered to the corrugating paper machine where it is formed into a full width sheet while being pressed and dried. The dried formed sheets are then delivered to the finishing area where the final preparation on the corrugating medium sheets is performed prior to shipment. The liquid effluent from the mill is treated in a Liquid Effluent Treatment Plant that consists of a primary gravity clarifier, anaerobic reactors, an activated sludge system, and finally a secondary gravity clarifier. There is a DAF clarifier installed as a backup system to the secondary gravity clarifier.

The steam used for space heating and unit operations is generated at the steam plant, which consists of three Babcock and Wilcox Oil-fired Boilers, which burn either No. 6 fuel or natural gas as the main fuel. All three of the Babcock and Wilcox boilers burn biogas which is a product of the anaerobic reactors at the Effluent Treatment System. The facility also uses a biomass boiler, which burns bark and reject chips from the mill, as well as other biomass.

Approval I-6881 was amended on September 17, 2013 to include Natural Gas and Flakeboard as a fuel source for the biomass boiler.

**Air Pollution Control**

The mill is equipped with an Absorption Tower, which scrubs the sulphur dioxide gas produced from the combustion of elemental sulphur in the sulphur burner. The sulphur dioxide is reacted with the sodium hydroxide scrubbing medium to form the sodium sulphite cooking liquor. The exhaust gases from the Absorption Tower unit operation are released to the atmosphere in a 0.3 meter diameter fibreglass stack that is located 37.4 meters above adjacent ground-level.

As means of smoke density and particulate matter control from the combustion of No. 6 Fuel Oil and biogas in the oil-fired boilers at the steam plant, the common stack that services boilers No.1, No. 2 and No. 3 is equipped with an in-stack continuous emission monitor (CEM) that measures the opacity of the exhaust gas being released to the atmosphere. In the event the instrument monitors an exhaust gas density that would indicate a potential emission problem, an alarm is triggered and the operator adjusts the operating parameters to eliminate the potential emissions. The biomass boiler is also equipped with an in-stack CEM to measure opacity.

The Anaerobic Reactors used at the Mill to biodegrade the organics in the liquid effluent stream has the potential to emit odorous compounds to the atmosphere. The biogas is collected and directed to the steam plant for combustion in Boilers No.1, No. 2 or No. 3 or can be flared as a back-up measure. As a means of controlling the odour emissions, the mill collects any biogas that has not been captured and sent to the boilers with an offgas collection system and blower which directs the gas to the bottom of the AST, where it is scrubbed.
POTENTIAL AIR QUALITY IMPACTS

There exist potential environmental impacts to the atmosphere from the operation of the facility. The following potential air quality impacts have been identified and are the focus of present and future Air Quality compliance.

- Particulate Matter (PM), Sulphur Dioxide (SO$_2$), Nitrogen Oxides (NO$_x$), Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs) from the Steam Plant;
- Sulphur Dioxide (SO$_2$) from the Absorption Tower;
- Volatile Organic Compounds (VOCs) from the Sulphite Digester and Paper Machine Dryer;
- Nuisance issues that include odour, noise and dust from the operation of the Facility.

AIR QUALITY COMPLIANCE & ENFORCEMENT

Lake Utopia Paper is required to comply with the Air Quality Regulation - Clean Air Act and operate under terms and conditions established in its Approval to Operate, issued pursuant to Section 3 of the Air Quality Regulation - Clean Air Act. Conditions are aimed at ensuring that the facility's environmental impact during its day-to-day operations does not adversely affect air quality in surrounding areas, as well as regionally and globally. Any violation of the conditions of the Approval may be subject to compliance and enforcement measures as described in the Department of Environment's Compliance and Enforcement Policy.

Current Air Quality Approval to Operate Terms and Conditions and Compliance History

The primary Terms and Conditions that the facility is required to comply with as per the current Air Quality Approval to Operate I-6881 (issued on March 13, 2010, and expiring March 12, 2015) and the mill’s associated compliance history to date are summarized below:

Emergency Response:

The Approval requires the Approval Holder to immediately notify the Saint John Regional office in the case of upset conditions and provide verbal and written reports to the Department to describe the upset, the associate impacts, what was done to prevent the impact, and what steps have been implemented to prevent reoccurrence.

An audit conducted in August 2014 shows that the Approval Holder is in compliance with this requirement.

Emission Limits

The Approval Holder is required to ensure that the emissions being released from the facility meet the following requirements:

1. All point source emissions of Particulate Matter, Sulphur Dioxide, and Nitrogen Oxides do not exceed the maximum ground level concentrations outlined in Schedule B of the Air Quality Regulation 97-133 filed under the Clean Air Act;
There has been no indication that the maximum ground level concentrations of Particulate Matter or Nitrogen Oxides have been, or are at risk of being exceeded.

The Approval Holder is required to monitor the ambient concentration of \( \text{SO}_2 \) in the area surrounding the mill. Monitoring results are submitted to the department on a monthly basis, and indicate that the maximum ground level concentration of \( \text{SO}_2 \) has not been exceeded.

The Approval Holder is in compliance with this requirement.

2. **Total facility emissions of \( \text{SO}_2 \) shall not exceed 1260 (2009-2010) and 500 (2011-2013) tonnes per year.**

The facility has reported the following annual emissions of \( \text{SO}_2 \):

**Table 1: Sulphur Dioxide (SO2) Emissions from Lake Utopia Paper**

<table>
<thead>
<tr>
<th>Year</th>
<th>Reported Emission Rate of Sulphur Dioxide (tonnes per year)</th>
<th>Approval Emission Cap of Sulphur Dioxide (tonnes per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>260</td>
<td>1260</td>
</tr>
<tr>
<td>2010</td>
<td>192</td>
<td>1260</td>
</tr>
<tr>
<td>2011</td>
<td>197</td>
<td>500</td>
</tr>
<tr>
<td>2012</td>
<td>244</td>
<td>500</td>
</tr>
<tr>
<td>2013</td>
<td>205</td>
<td>500</td>
</tr>
</tbody>
</table>

As shown in the above table, the approval holder is in compliance with this requirement.

3. **Particulate matter concentration in the exhaust gas from the two boiler stacks (Common exhaust stack for Boilers No. 1 and No. 2, and the Boiler No. 3 stack) must be less than 200 milligrams per cubic metre (mg/m3) at dry standard conditions.**

There is no indication that the PM concentration in the exhaust gas from the two boiler stacks would exceed this limit, when burning natural gas or biogas. There is the potential for higher PM concentrations when burning No. 6 fuel oil. As such, the Approval Holder is required to conduct testing to prove this limit is being met, whenever the boilers are operated on No. 6 fuel oil for more than 700 hours in any given year.

None of the boilers operated more than 700 hours between 2009 and 2013, therefore no testing was required in those years.

The approval holder is in compliance with this requirement.
4. The Approval Holder shall ensure that odour, noise, and fugitive particulate matter emissions do not impact beyond the boundary of the facility.

There has been no indication that noise or fugitive particulate matter emissions are causing an impact beyond the boundary of the facility.

There have been several concerns about odour impacts in the area surrounding the facility. As such, a condition was added to the approval requiring the Approval Holder to provide an annual update of steps taken towards reducing the potential impacts. These steps include:

a) Use of a centrifuge to reduce the amount of sludge going to the A2 pond;

b) Dredging of the A2 pond to reduce the amount of sludge;

c) Use of a sludge dewatering system to remove odour-generating sludge from the A2 Pond (part of the facility’s wastewater treatment system);

d) Bi-annual dredging program for the equalization basin (also part of the wastewater treatment system), to remove odour-generating sludge;

e) Use of covers on the EQ basin to retain temperature and contain some of the odours;

f) Operation of the biomass boiler to reduce odours from burning Bunker C; and

g) Use of roof covers for the anaerobic component of the treatment plant to reduce fugitive emissions.

The Approval Holder is continuing to work to reduce the odour generated by the facility.

**Testing and Monitoring**

The Approval Holder is required to conduct the following testing and monitoring activities:

1. **Operate and maintain continuous opacity monitors for the two Boiler Exhaust Stacks, and keep the data for a period of two years.**

2. **Conduct annual source testing activities for the Boiler Exhaust Stacks, if the associated boilers operate more than 700 hours on No. 6 fuel oil, in a given year.**

3. **Conduct source testing on the sulphite digester exhaust stack to determine the amount of total reduced sulphur compounds (TRS) and volatile organic compounds (VOCs) being released under normal operating conditions.**

4. **Operate an ambient air quality monitoring station for sulphur dioxide (SO2).**

The Approval Holder has been in compliance with these Approval requirements to date, with the exception of opacity incidents, during commissioning of the Biomass boiler, where the opacity was exceeded for a short period of time. The issues were addressed and the incidents were resolved to the satisfaction of the department.
Reporting

The Approval Holder is required to conduct the following Reporting activities.

1. Submit a final report for all required Source Testing Events;

2. Submit a monthly air quality report for each month, including:
   a. copies of any reports related to Emergency Response episodes that month,
   b. the 1-hour and 24-hour rolling average ambient concentrations for SO\textsubscript{2} measured at the ambient monitoring station,
   c. a summary of any operating problems related to the continuous emission monitors and/or the ambient air quality monitors, and
   d. the results of the opacity monitoring at the boiler exhaust stacks.

3. Submit an Annual Air Quality Report each year that includes:
   a. the amount of fuel burned and its average sulphur content and a calculation of the annual emission of sulphur dioxide in tonnes from all combustion sources;
   b. an itemized list of SO\textsubscript{2} emissions from process sources at the facility in tonnes per year;
   c. the mill total SO\textsubscript{2} emissions in tonnes per year;

4. Report non-emergency complaints to the department, within one business day.

5. Report non-emergency approval violations to the department.

The Approval Holder is in compliance with these requirements.

Enforcement

Enforcement options used by the Department of Environment and Local Government are outlined in the Department's Compliance and Enforcement Policy. These may include, but are not limited to: 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, either during its valid period or at the time of renewal, to address specific compliance issues or to improve the environmental impact of the facility. Also, a regulation under the Clean Air Act allows for the issuance of "administrative penalties" for minor violations as an alternative to traditionally used enforcement options.

During the life of the current Approval, Lake Utopia Paper has had no warnings or orders issued, nor have there been any prosecutions or administrative penalties initiated by this agency during this period, related to air quality.
PUBLIC OUTREACH

Lake Utopia Paper indicates that its position on public outreach is to foster positive community relations by maintaining an open-door policy, whereby any member of the public or interested party wishing to obtain further information about the operation may contact Lake Utopia Paper during regular business hours. The facility may also make arrangements for tours of the facility or other community interaction.

Facility staff members are on call 24 hours a day to respond to any complaints directed from the public. The company also makes efforts to notify the public in instances where environmental events may have an impact on nearby residents.

CONTACT INFORMATION

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