

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

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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 since operated it as Lake Utopia Paper. Using the NSSC pulping process, recycled cardboard, and the corrugating paper machine, the plant produces approximately 516 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 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-8900 and associated amendments) issued under the *Air Quality Regulation* expires on June 12, 2020.

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 516 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. The remainder is made from recycled fibre originating from old corrugating containers (recycled cardboard).

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 burned onsite in the biomass boiler.

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. The cooked chips are then directed to mechanical disc refiners that refine the chips to form the pulp. The pulp produced from the combined efforts of

the digester and disc refiners is 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 cleaners before being delivered to the corrugating paper machine. 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 paper is wound onto a roll, cut to customer specification and then delivered to the finishing area where the final preparation of the corrugating medium roll 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, a BVF anaerobic reactor, an activated sludge system, and finally a secondary gravity clarifier. In 2017 a new BVF anaerobic reactor was built to replace two existing UASB reactors. The BVF reactor was operational in January 2018. In 2018 the UASB reactors were removed as well as two wastewater storage ponds.

The steam used for space heating and unit operations is generated at the steam plant, which consists of three Babcock and Wilcox Boilers and one Wellons Biomass boiler. All three of the Babcock and Wilcox boilers use natural gas and biogas which is a product of the BVF reactor at the Effluent Treatment System. These three boilers also have the ability to burn No 6 fuel oil, if required. The biomass boiler burns bark and reject chips from the mill, as well as natural gas.

## **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, biomass and biogas in the boilers at the steam plant, all three boiler stacks are 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 smoke 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 BVF reactor 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 cover on the BVF reactor is controlled under a vacuum as to not release biogas to the atmosphere. This is a significant improvement over the operation of the UASB covers.

A white-water tank was built in 2017 which, in conjunction with the BVF operation, allowed for two of the waste water storage ponds to be decommissioned.

## **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<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs) from the Steam Plant;
- Sulphur Dioxide (SO<sub>2</sub>) 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 and Local Government'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-8900 (issued on June 13, 2015, and expiring June 12, 2020) 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.**

The Saint John Regional office and Central office in Fredericton to date have received timely notifications from the Approval Holder as it pertains to events which have the potential to cause upset conditions.

The Approval Holder is in compliance with this condition.

### **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 SO<sub>2</sub> 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 SO<sub>2</sub> has not been exceeded.

The Approval Holder is in compliance with this requirement.

- 2. Total facility emissions of SO<sub>2</sub> shall not exceed 500 tonnes per year.**

The facility has reported the following annual emissions of SO<sub>2</sub>:

**Table 1: Sulphur Dioxide (SO<sub>2</sub>) Emissions from Lake Utopia Paper**

<b>Year</b>	<b>Reported Emission Rate of Sulphur Dioxide (tonnes per year)</b>	<b>Approval Emission Cap of Sulphur Dioxide (tonnes per year)</b>
2014	178	500
2015	167	500
2016	105	500
2017	133	500
2018	406	500

As shown in the above table, the approval holder is in compliance with this requirement. The SO<sub>2</sub> emissions in 2018 can be attributed to the increase in biogas production since upgrading the anaerobic reactor to the BVF. Biogas is a carbon neutral fuel and replaces a significant amount of natural gas.

**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/m<sup>3</sup>) 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 on No. 6 fuel, more than 700 hours between 2014 and 2018, 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) Bi-annual dredging program for the equalization basin (also part of the wastewater treatment system), to remove odour-generating sludge;
- d) Use of covers on the EQ basin to retain temperature and contain some of the odours;
- e) Operation of the biomass boiler to reduce odours from burning Bunker C; and
- f) 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.

Since the removal of the Equalization pond and UASB reactors, the potential impacts mentioned in points c, d and f (above) have been eliminated.

The A2 pond was dredged in 2015 and since then the operation has changed to minimize the quantity of sludge put into the A2 pond by dewatering the sludge as it is produced.

## **Testing and Monitoring**

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

1. Operate and maintain continuous opacity monitors for all three of the Boiler Exhaust Stacks and keep the associated records.
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 the previous year.
3. Conduct annual source testing on the Sulphur Dioxide (SO<sub>2</sub>), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), and Particulate Matter (PM) being released from the biomass boiler exhaust stack.
4. 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.
5. Operate an ambient air quality monitoring station for sulphur dioxide (SO<sub>2</sub>).
6. Have in place data acquisition system loggers to ensure data is being provided to the Department on a continuous and real-time basis.
7. A Total Reduced Sulphur Ambient Monitoring Network Study is to have been carried out. The study focus is to evaluate the effectiveness of an Ambient Total Reduced Sulphur monitoring station located around the facility.

The Approval Holder is in compliance with these Approval requirements.

## **Reporting**

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

1. Report non-emergency complaints to the department, within one business day;
2. Report non-emergency approval violations to the department;
3. Submit a final report for all required Source Testing Events;
4. 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<sub>2</sub> 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.
5. **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<sub>2</sub> emissions from process sources at the facility in tonnes per year;
  - c. the mill total SO<sub>2</sub> emissions in tonnes per year;
6. **Beginning in 2016, it is required that a Greenhouse Gas Emissions Report and a Progress Reports on Greenhouse Gas Management Plan is submitted annually for the Department to review. These report submissions are to be consistent with Environment Canada's Greenhouse Gas Emissions Reporting System.**

The Approval Holder is in compliance with these Approval requirements.

### **Enforcement**

Enforcement options used by the Department of Environment 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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