PAPER EXCELLENCE

NORTHERN PULP

NORTHERN PULP BACKGROUND

In 1967, the Abercrombie facility opened as a Northern Bleached Softwood Kraft (NBSK) pulp mill. Today, Northern produces approximately 300,000 tonnes annually of NBSK pulp which is sold around the world creating 339 fulltime, local jobs and another 2,050 indirect jobs for Nova Scotians. Northern Pulp Nova Scotia Corporation contributes over $315 million into the economy annually and pays $10 million in taxation. Northern Pulp's energy basket is made up of over 92% renewable energy; has reduced its greenhouse gas emissions by 44% since 1990, and produces over 23 megawatts of green electricity. Economists believe the entire Nova Scotian forest industry is hinged on the daily operation of Northern Pulp and its consumption of local Nova Scotian wood chips.

NORTHERN PULP PROCESSES

Northern Pulp utilizes a kraft sulphide pulping process that uses a pressure vessel called a digester to cook wood chips at high temperature and in an alkaline solution to dissolve the natural lignin glue in wood from the wood fibres. Brown cooked pulp and spent pulping liquor (made up of dissolved lignin) are released from the cooking digester. The liquor is burned as fuel in the mill's recovery boiler to generate steam and to recover the pulping chemical for reuse. The brown pulp is further washed and then bleached using chlorine dioxide solution much like adding bleach to a washing machine. After the pulp is fully bleached and cleaned, it is dried and converted into 280 kilogram bales for export on deep sea ships.

MANAGING ENVIRONMENTAL DISCHARGES

The kraft process does create wastewater, air emissions discharges and solid waste all of which require appropriate disposal.

Use of water to convey wood chips into pulp fibre and finally into bleached pulp results in the water getting contaminated with wood based and chemical based pollutants. This raw untreated wastewater, called untreated effluent, is cleansed in a process that first separates out floatable and settable materials and then treats the remainder of the wastewater with live microscopic-organisms (called biological activated sludge) that eat the dissolved pollution. The organisms grow in population and over a 24 hour period the facility converts about 40 tonnes of settable and dissolved contamination into 20 tonnes of settable solids and biological micro-organisms that can then be burned as a clean fuel in the mill's boiler.

260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE | NORTHERN PULP

Air emissions associated with a kraft facility include odorous sulphur based gases from the pulping area and combustion of pulping liquor, bleach plant emissions from the bleaching process, and combustion gases from the boilers burning the spent pulping liquor, bark and micro-organisms. Emissions controls in place across typical Canadian pulp mills like Northern Pulp include collection and incineration devices for odour based gases, liquid scrubbers for washing bleach plant emissions, and liquid scrubbers or electrostatic precipitators for removing particulate emissions from boiler discharges.

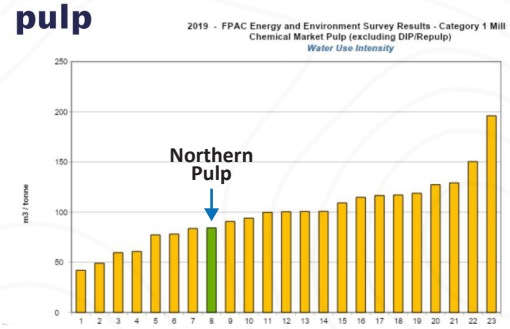
Northern Pulp also generates solid waste materials mostly dominated by wood ash from burning bark and contaminated lime waste from its liquor recycling process. All solid waste is disposed of in a fully engineered and lined landfill with groundwater monitoring wells.

MILL BENCHMARKING – NORTHERN PULP IS VERY TYPICAL OF CANADIAN NBSK PULP MILLS

Today in Canada, 89 pulp and paper mills are in operation from British Columbia to the Maritimes in most instances discharging treated air emissions, creating solid waste and discharging treated wastewater into either rivers, lakes or marine environments. In virtually all respects, Northern Pulp is a very typical NBSK pulp mill compared to the other Canadian mills. As an approach to understanding Northern Pulp's emissions with respect to other facilities, a comparison of its wastewater, air emissions, and solid waste has been made. 2018 treated effluent data collected in July 2019 by the Forest Products Association of Canada was used to compare Northern Pulp's effluent performance to Canada's other 22 standalone kraft facilities. Similarly, Northern Pulp's parent company, Paper Excellence, provided air emissions and solid waste data for its 9 other facilities in Canada and France. Those graphics are provided below showing Northern Pulp's performance in green.

Water use measures the total amount of fresh water consumed per tonne of finished pulp at the facility.

2018 Water use per tonne pulp



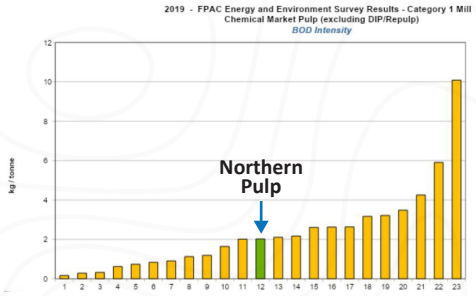
260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE | NORTHERN PULP

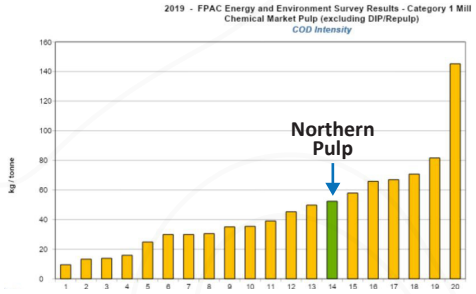
Biochemical oxygen demand is a measure of the amount of organic matter left in the treated effluent that can remove oxygen in the receiving environment.

2018 BOD per tonne pulp



Chemical oxygen demand is a measure of the amount of organic matter and inorganic chemicals left in the untreated effluent that can remove oxygen in the receiving environment.

2018 COD per tonne pulp



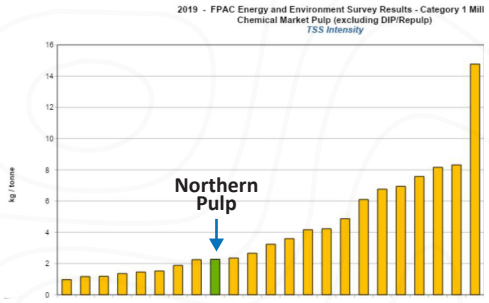
260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE | NORTHERN PULP

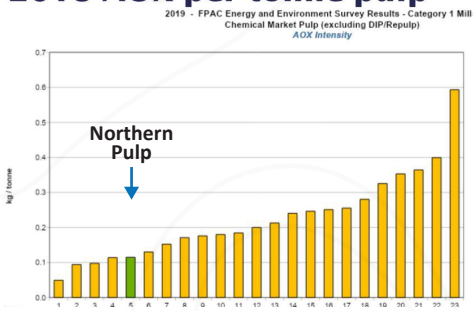
Total suspended solids are a measure of the amount of total particulate matter in treated effluent that could accumulate in the receiving environment.

2018 TSS per tonne pulp



Adsorbable Organic Halides (AOX) is a measure of the organic compounds containing chlorine in treated effluent that could accumulate in the receiving environment.

2018 AOX per tonne pulp



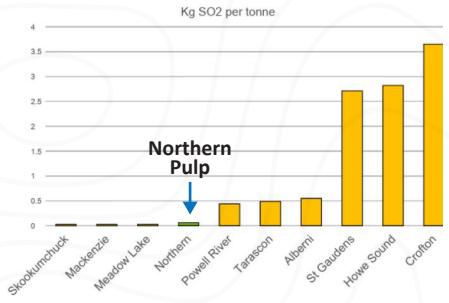
260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE | NORTHERN PULP

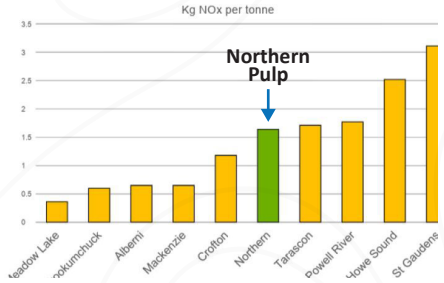
Sulphur dioxide gases are released during combustion processes in the boilers and can contribute to acid rain.

2018 SO2 per tonne



Nitrogen oxide gases are released during combustion processes in the boilers and can contribute to urban smog.

2018 NOx per tonne



260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

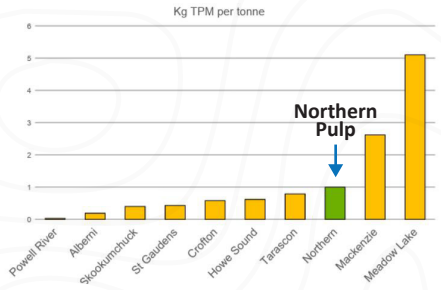
NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE

NORTHERN PULP

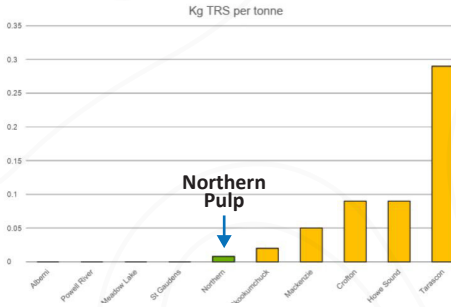
Total particulate matter is the residual ash and solid material carried through a boiler after combustion that can contribute to urban smog.

2018 TPM per tonne



Total Reduced Sulphur (TRS) are the family of odourous gases released from the pulping area and combustion of spent cooking liquor and creates the rotten cabbage smell associated with mills.

2018 TRS per tonne



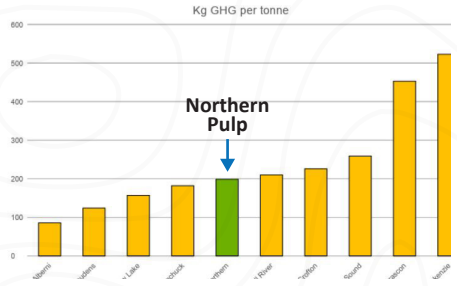
260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

PAPER EXCELLENCE | NORTHERN PULP

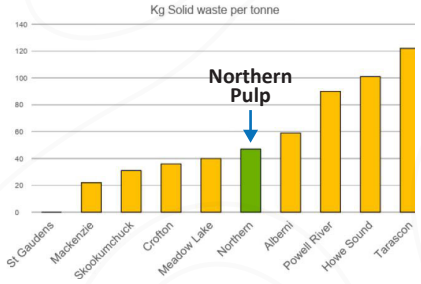
Greenhouse gases are a family of combustion byproducts that trap solar energy within Earth's atmosphere raising temperatures.

2018 GHG per tonne



Mill solid wastes include waste boiler wood ash, lime waste and construction debris and demolition wastes that cannot be recycled and must go to landfill.

Solid waste per tonne



260 Granton Abercrombie Branch Rd, Abercrombie, NS B2H 5C6
902.752.8461 / info@paperexcellence.com / www.paperexcellence.com

NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY