



Department of
Environmental
Conservation

JBI, Inc., Niagara Falls, NY

Authorizing a Plastic-to-Oil Facility Under NYS Solid Waste Regulations

January 14, 2015

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JBI, Inc.: Background

- Thorold, Ontario, Canada-based company
www.plastic2oil.com
- Entrepreneur John Bordynuik
- Inventor of “Plastic 2 Oil” proprietary process for cracking of plastic into usable hydrocarbon-chain sizes for fuel or chemical precursor use
- Sought authorization in US – in New York State



JBI, Inc.: Background

Plastic2Oil process generates, per 100 pounds plastic:

- 90 pounds light naphtha and heavy naphtha (precursors to gasoline and diesel, respectively, or inputs to chemical manufacturing)
- 8 pounds gaseous hydrocarbons (used to fuel the process; negligible emissions)
- 2 pounds carbon (landfilled or used for fuel)



JBI, Inc.: Short Regulatory History

- March 2010: JBI receives permission from Air Quality Engineer in DEC's Buffalo office, to conduct trial operation of reactor in Niagara Falls
- August 2010: JBI petitions for a beneficial use determination (BUD) under solid waste regulations (Title 6 Part 360 of the NYCRR)
- December 2010: Buffalo Materials Management Engineer responds to JBI: You need a Part 360 **permit!**



JBI, Inc.: Short Regulatory History

- BUD is for a *material*; permit is for a *process*
- JBI in violation of Part 360: operating a solid waste management facility without a permit
- December 2010 Order on Consent allows trial facility operation with deadline for permit application
- Type of permit: Pyrolysis of Solid Waste (in same regulation subpart as waste-to-energy)



JBI, Inc.: Short Regulatory History

- March 2011: JBI submits permit application. “Negative declaration” for the State Environmental Quality Review (SEQR) process
- June 2011: Part 360 Permit and Air State Permit issued together. A BUD also granted for the outgoing “naphtha” products.
- July 2012 and June 2013 – Permit Modified
- July 2014 – Permit Renewed



JBI, Inc.: Why a solid waste facility permit?

- Waste generated off-site; not eligible for any exemption or registration
- Solid waste pyrolysis (waste to energy)
- Enhanced requirements for incoming waste, vector, odor, runoff, noise and traffic control – facility-specific plans required
- Time-limited
- It can include conditions unique to facility (special conditions)
- Financial assurance (surety)
- Enhanced yearly reporting
- Greater latitude to receive materials (especially dirty plastic such as agricultural film)



JBI, Inc.: Why a solid waste facility permit?

Prevent Diversion of
Recyclable Plastics into
Fuel Production!



JBI, Inc.: How to prevent diversion of recyclable plastics?

Approach developed with the company:

- Limit *resins*
- Limit *sources*



JBI, Inc.: Limiting resins in the permit

Olefin resins:

No. 2 – HDPE

No. 4 – LDPE

No. 5 - polypropylene

Prohibited in the permit:

No. 3 – PVC or other chlorinated resins (Air permit condition)



JBI, Inc.: Limiting sources in the permit

Pre-consumer:

- Industrial: parts and cuttings
- Packaging film
- Shopping bag film
- Strapping, packaging

Prohibited (except where approved in writing by DEC): MRF post-consumer plastic; Plastic generated in a municipality without a comprehensive recycling plan



JBI, Inc.: Special Permit Conditions

- Throughput limited to 39,000 tons plastic per year, based on 150 tons per day, three reactors at facility
- Permit Modification No. 2 added off-spec Crayola crayon wax and marker tubes; used oil (oil combined with ag plastic to facilitate reaction)



JBI, Inc., Niagara Falls Plastic2Oil Facility

- August 2011 Site Visit
- Entrance to facility on Iroquois Avenue past a small security shack. New reactor unit in foreground.



JBI, Inc., Niagara Falls Plastic2Oil Facility

Yard next to JBI facility.
Shipping container houses the
on-site fuel testing lab.



JBI, Inc., Niagara Falls Plastic2Oil Facility

John Bordynuik, JBI Chief of Technology, explains pre-melter. This addition to approved equipment under the 6 NYCRR 360 Permit allows input of plastic without shredding and allows for recovery of metal



JBI, Inc., Niagara Falls Plastic2Oil Facility

Condensing and separating towers



JBI, Inc., Niagara Falls Plastic2Oil Facility

Incoming plastic staging area.
Separate plastic storage building on permit-approved site plans was constructed later.



JBI, Inc., Niagara Falls Plastic2Oil Facility

Collection of carbon residue



JBI, Inc., Niagara Falls Plastic2Oil Facility

Reactor for gasifying and catalytic cracking of plastic. Feed conveyor for shredded plastic is behind this unit.



JBI, Inc., Niagara Falls Plastic2Oil Facility

General view inside facility
(2011)



JBI, Inc., Niagara Falls Plastic2Oil Facility

Exit point for diesel fuels; fuel additives can be introduced here. “Heavy naphtha” produced here is capable of being used by facilities which normally use No. 2, 4, or 6 diesel, without further refining off-site.



JBI, Inc., Niagara Falls Plastic2Oil Facility

This incoming shredded plastic is from off-spec manufactured car gasoline tanks. This shred is a mixture of HDPE and other plastics that is not recyclable but suitable for JBI's process and allowable under the permit.



JBI, Inc., Niagara Falls Plastic2Oil Facility

A view of the pre-melter and separation towers in 2011 – reactor not shown (two additional reactors have since been installed)



JBI, Inc., Niagara Falls Plastic2Oil Facility

“Light naphtha” (gasoline precursor) collection area. JBI can sell this product directly as a “white gasoline” for camp stoves.



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On-site fuel testing lab with fume hood.



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Material coming out of the pre-melter



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Various types of fuel comparable to No. 2, 4, or 6 diesel fuel. JBI's plastic-derived heavy naphtha fuels contain only low parts per million of sulfur, whereas conventional heavy petroleum distillate fuels can contain up to several percent by weight sulfur.



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The on-site fuel testing lab



Thank You

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