

**Information Item Only**

**No Action Required**



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID P. LITTELL  
COMMISSIONER

MEMORANDUM

TO: Board of Environmental Protection

FROM: Dana Murch & Brian Kavanah <sup>DM</sup> <sup>BK</sup>  
Bureau of Land & Water Quality

DATE: February 18, 2010

RE: Update on Gulf Island Pond

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The purpose of this memo is to update the Board on the status of the Department's on-going efforts to meet water quality standards in Gulf Island Pond and to implement the Board's February 7, 2008 appeal orders modifying the water quality certification for FPL Energy's Gulf Island-Deer Rips Hydro Project and the wastewater discharge permits for Verso Paper's Jay pulp and paper mill and Rumford Paper's Rumford pulp and paper mill.

Summary of Previous Update

In our previous update on August 20, 2009, we reported that:

- Proceedings on FPL Energy's Superior Court appeal of the Board's order for the Gulf Island-Deer Rips Project were on hold pending the outcome of the recalibration of the Department's water quality model for Gulf Island Pond;
- A new water quality monitoring plan for Gulf Island Pond had been submitted by FPL Energy and approved by the Department;
- A plan to upgrade the existing oxygen injection system to increase the oxygen transfer efficiency of the system, and thereby increase dissolved oxygen levels in the pond, had been submitted by the Gulf Island Pond Oxygenation Project (GIPOP) Partnership<sup>1</sup> and approved by the Department. The upgraded system was installed and became operational in June of 2009;
- The Department had confirmed that the water quality model runs used in the Androscoggin River Total Maximum Daily Load (TMDL) Report did not hold FPL Energy responsible for mitigating the impact of any point source discharge on dissolved oxygen levels in Gulf Island Pond;
- The Department had completed its effort to recalibrate the water quality model for Gulf Island Pond, as directed by the Board, following the correction of a dispersive mixing error and the recalculation of the sediment area contributing phosphorus to the pond;

<sup>1</sup> Collectively, FPL Energy, Verso Paper, Rumford Paper, and Fraser Paper.

- The Department had run the recalibrated water quality model to determine how much oxygen injection would be required to meet dissolved oxygen standards in Gulf Island Pond with all point sources set to zero, and with all point sources discharging at their final license limits;
- The Department had run the recalibrated water quality model to determine how much phosphorus loadings from point sources could be increased without causing algal blooms;
- The Department had determined that (1) further reductions in effluent limits and/or increases in oxygen injection would be needed to meet dissolved oxygen standards in Gulf Island Pond, and that (2) point source loading to the pond of ortho-phosphorus could be increased by a small amount without causing algal blooms; and
- The Department had made a proposal for a reduction in final BOD limits for the three paper mills and an increase in the final ortho-phosphorus limit for the Verso mill that would meet water quality standards without the need for additional oxygen injection.

#### New GIPOP Proposals

On November 20, 2009, the GIPOP Partnership proposed to install two new supply lines and diffusers and to re-distribute oxygen injection in Gulf Island Pond, with oxygen injection rates at Upper Narrows (location of the existing diffusers) and Lower Narrows (location of the new diffusers) sufficient to meet dissolved oxygen standards in the pond. Capital and operation and maintenance costs for the re-configured oxygen injection system are to be allocated per a contractual agreement among the Partnership members.

In addition, Verso proposed to reduce its final summer monthly average BOD limit from 4500 lbs/day to 4400 lbs/day, while Rumford and Fraser proposed to maintain their current limits.

By letter dated December 22, 2009 (copy attached), the Department has accepted the GIPOP Partnership's proposal, subject to the following:

- Verso's final summer monthly average BOD limit will be reduced from 4500 lbs/day to 4400 lbs/day;<sup>2</sup>
- Oxygen will be injected at Upper Narrows at a maximum rate of 23,300 lbs/day at an oxygen transfer efficiency of 54%, and at Lower Narrows at a maximum rate of 32,800 lbs/day at an oxygen transfer efficiency of 75%;<sup>3</sup> and

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<sup>2</sup> The Verso mill has historically treated the wastewater from the Wausau-Mosinee Otis paper mill. That mill is now closed and the mill property has been acquired by new owners. If the cessation of Verso receiving wastewater from the Otis mill becomes permanent, then Verso's summer monthly average BOD limit will be reduced to 4150 lbs/day, per the Board's February 8, 2008 appeal order.

<sup>3</sup> The oxygen injection transfer efficiency of the original oxygen injection system was 33%. The oxygen transfer efficiency of the upgraded Upper Narrows diffusers is 54%. The expected oxygen transfer efficiency of the new Lower Narrows diffusers will be 75% (this is due to the increased depth at this location).

- The re-configured oxygen injection system will be installed and operational by June 1, 2010, unless extraordinary river conditions preclude installation by that date.

The result of this proposal is that water quality standards should be met in Gulf Island Pond with significantly less total oxygen injection during the course of each summer than is currently the case.

#### Schedule for Regulatory Approvals

As detailed in the attached December 22, 2009 letter, the Department has developed an aggressive schedule to complete all required DEP and EPA regulatory approvals. Draft certification, permit, and TMDL modifications have been issued for review and comment, and final action is expected by April 22, 2010. The Board will have jurisdiction to hear any appeals of the Department's modifications of the existing water quality certification for the Gulf Island-Deer Rips Hydro Project and of the existing waste discharge licenses for the Verso and Rumford paper mills. Any appeals of the Fraser permit action will be handled by EPA.

#### Changes in Effluent Limits for Paper Mill Discharges

Also attached is a summary of changes over time in the effluent limits for the three pulp and paper mills discharges that affect water quality in Gulf Island Pond.



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID P. LITTELL  
COMMISSIONER

VIA ELECTRONIC MAIL

December 22, 2009

Chad P. Clark, P.E.  
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FPL Energy Maine Hydro LLC  
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Environmental Manager  
Rumford Paper Company  
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Rumford, ME 04276

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Ryan Carrier  
Environmental Engineer/WWTP Supervisor  
Fraser NH LLC  
72 Cascade Flats  
Gorham, NH 03581

RE: Gulf Island Pond

Gentlemen:

This is in response to Chad Clark's letter of November 20, 2009, on behalf of the Gulf Island Pond Oxygenation Project (GIPOP) Partnership, proposing new oxygen injection rates for Gulf Island Pond and final BOD limits for the Verso, Rumford and Fraser paper mills.

New Oxygen Injection/BOD Proposals

In brief, the Partnership proposes to install two new supply lines and diffusers and to re-distribute oxygen injection in Gulf Island Pond, with oxygen injection rates at Upper Narrows and Lower Narrows sufficient to meet dissolved oxygen standards in the pond. The Partnership reports that, contingent on approval by the DEP, it has reached a contractual agreement among its members for the allocation of one-time capital costs and on-going operation and maintenance costs for the new oxygen injection system.

In addition, Verso proposes to reduce its final summer monthly average BOD discharge limit from 4500 lbs/day to 4400 lbs/day.<sup>1</sup>

The Department's consultant, HydroAnalysis, Inc., has now completed an analysis of oxygen injection requirements at Upper and Lower Narrows using the recalibrated water

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<sup>1</sup> The Department notes that Verso's current BOD limit includes the historic contribution of wastewater from the Wausau-Mosinee Otis paper mill to the Verso wastewater treatment facility. The Otis mill closed in May 2009 and the mill property has recently been acquired by new owners. If the cessation of Verso receiving wastewater from the Otis mill becomes permanent, Verso's monthly average summer BOD limits will drop to 4,150 lbs/day, per the Board of Environmental Protection's February 8, 2009 appeal order.

quality model for Gulf Island Pond (see attached email report dated December 1, 2009).<sup>2</sup> The results of this analysis are that, with an oxygen injection rate of 23,300 lbs/day at Upper Narrows, at an oxygen transfer efficiency of 54%, and an oxygen injection rate of 32,800 lbs/day (rounded up from 32,769 lbs/day), at an oxygen transfer efficiency of 75%, Class C dissolved oxygen standards will be met in Gulf Island Pond to a depth of 60 feet under critical conditions (i.e., high temperature and low flow) and with all upstream point source discharges at their license limits.<sup>3</sup> The proposed total oxygen injection rate of 56,100 lbs/day is well within the 73,000 lbs/day design capacity of the oxygen injection system.

Based on the results of this analysis, the Department hereby accepts the Partnership's proposal to re-distribute oxygen injection in Gulf Island Pond, subject to the final BOD limits and oxygen injection rates discussed above, and subject to the schedule for operation discussed below.

#### Schedule for Regulatory Approvals

The existing water quality certification for FPL Energy's hydropower project and the existing permits for the Verso, Rumford, and Fraser paper mills must be modified to reflect the re-calibration of the water quality model and the new oxygen injection rates and final BOD limits discussed above.

In addition, the Department has confirmed with EPA that the 2005 TMDL must be modified to reflect the changes to the model made by HydroAnalysis and the changes proposed in oxygen injection requirements and final effluent limits.

Based on these considerations, the Department proposes the following schedule to modify the existing permits, certification, and TMDL.

<u>By January 5, 2010</u>	FPL Energy, Verso Paper, and Rumford Paper submit applications to DEP to modify the oxygen injection requirements for the Gulf Island Pond-Deer Rips Hydro Project and the Verso and Rumford mills. Fraser Paper submits an application to EPA to modify the oxygen injection requirements for the Fraser mill.
<u>By February 1, 2010</u>	DEP issues draft TMDL modifications and proposed draft modifications of water quality certification for Gulf Island-Deer Rips Hydro Project and wastewater discharge permits for Verso and Rumford mills for review and comment.

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<sup>2</sup> As directed by the Board of Environmental Protection, the model has been re-calibrated following (1) the correction of a dispersive mixing error and (2) the recalculation of the sediment area that is contributing phosphorus to the pond.

<sup>3</sup> The Department has previously reviewed and concurred with the estimates of oxygen transfer efficiency for the new Upper Narrows and Lower Narrows diffusers provided by Mobley Engineering.

EPA issues proposed draft modification of wastewater discharge permit for Fraser mill for review and comment.

By March 1, 2010

Comment period ends on draft TMDL modification and draft permit/certification modifications.

By March 15, 2010

DEP submits final TMDL modifications to EPA for review and approval.

By April 15, 2010

EPA approves TMDL modifications.

By April 22, 2010

DEP issues final modifications of water quality certification for Gulf Island-Deer Rips Hydro Project and wastewater discharge permits for Verso and Rumford mills. EPA issues final modification of wastewater discharge permit for Fraser mill.

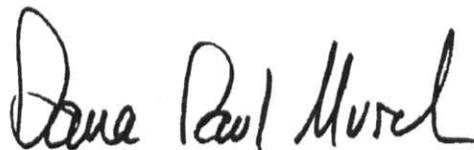
#### Schedule for Operation of New Oxygen Injection System

The Board of Environmental Protection's February 7, 2008 appeal orders require that final oxygen injection requirements go into effect on June 1, 2010. This deadline is intended to bring Gulf Island Pond into compliance with Class C dissolved oxygen standards prior to the September 21, 2010 expiration of the current wastewater discharge permits for the Verso and Rumford mills.

The Partnership's proposal to have the new oxygen injection system installed prior to September 2010 is not acceptable. While the Department recognizes that installation of the new system may be constrained by weather and river flow conditions, it is essential that the new system be installed and operational as early as possible to demonstrate compliance with standards during the critical summer months. Therefore, the Department intends to require that the new system be installed and operational by June 1, 2010, unless extraordinary river conditions preclude installation by that date.

If you have any questions or comments, please contact me by telephone at 207-287-7784 or by email at [dana.p.murch@maine.gov](mailto:dana.p.murch@maine.gov).

Sincerely,



Dana Paul Murch  
Hydropower Specialist

Letter to GIPOP Partnership

December 22, 2009

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cc: David Littell, Commissioner, DEP  
Brian Kavanah, DEP  
Dave Courtemanch, DEP  
Gregg Wood, DEP  
Rob Mohlar, DEP  
Jerry Reid, AG's Office  
Jan McClintock, AG's Office  
Jeff Thaler, Bernstein Shur  
Jack Montgomery, Bernstein Shur  
Asha Echeverria, Bernstein Shur  
Juliet Browne, Verrill Dana  
Scott Anderson, Verrill Dana  
Virginia Davis, Preti Flaherty  
Michael Kaplan, Preti Flaherty  
Frank Dunlap, FPL Energy  
Nick Bennett, NRCM  
Stacey Stitham, Brann & Isaacson  
David Swetnam-Burland, Brann & Isaacson  
Neil Ward, Androscoggin River Alliance  
Steve Silva, EPA  
David Webster, EPA  
Jennie Bridge, EPA  
Sean Mahoney, Conservation Law Foundation

**From:** Bruce Jacobs [mailto:bjacobs@hydroanalysisinc.com]  
**Sent:** Tuesday, December 01, 2009 9:51 PM  
**To:** Courtemanch, Dave L  
**Subject:** GIP model results in response to Nov. 24, 2009 request

Dave,

I have carried out the WASP and QUAL2E simulations of Androscoggin River and Gulf Island Pond per your request of November 24. Namely, I have simulated the following scenarios:

- (1) Revised the oxygen injection rate to 23,300 pounds per day at 54% efficiency at Upper Narrows and 33,100 pounds per day at 75% efficiency at Lower Narrows as called for in the Nov. 20 letter from FPL Energy; and
- (2) Reduced the Verso BOD5 discharge rate from 6400 pounds per day to 6258 pounds per day and then determined the minimum oxygen injection rate to meet the dissolved oxygen standard.

In the first case, under the revised oxygen injection scenario described in item (1) above, the simulated dissolved oxygen concentration results in compliance with the dissolved oxygen standard of 5.0 mg/L at all model segments up to a depth of 60 feet. Figure 1 shows the segment-by-segment dissolved oxygen concentration under this scenario.

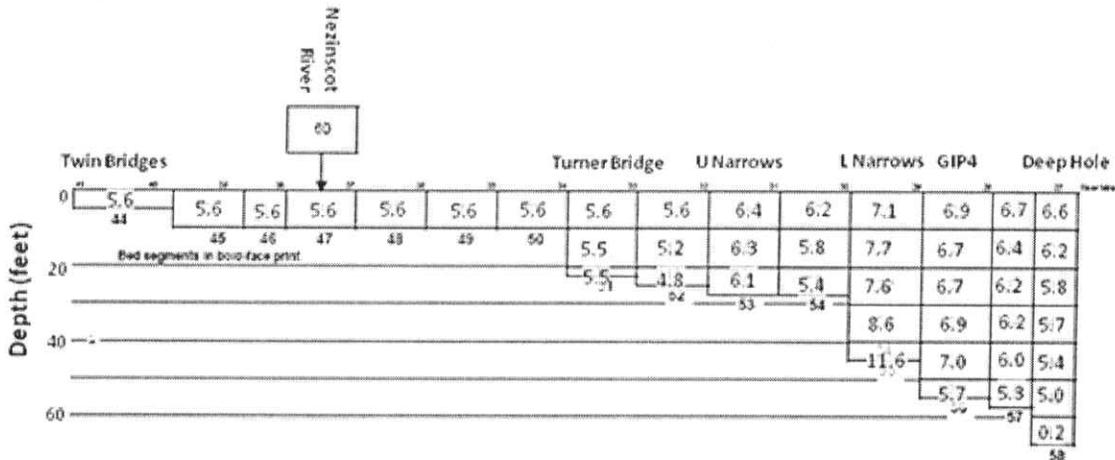


Figure 1. Simulated model segment dissolved oxygen concentration for Lower Narrows oxygen injection rate of 33,100 pounds per day and Verso BOD<sub>5</sub> loading rate of 6400 pounds per day.

In the second case, the revised BOD5 discharge rate resulted in relatively small changes in the simulated Androscoggin River BOD and dissolved oxygen. Table 1 shows the dissolved oxygen and BOD concentrations at the downstream end of the Androscoggin River under the initial and modified (reduced Verso discharge) conditions.

Table 1. Simulated Downstream Androscoggin River Dissolved Oxygen and BOD Concentrations

Scenario	Verso BOD5 Discharge Rate (lb per day)	WASP Model Input File Name	Dissolved Oxygen (mg/L)	BOD (mg/L)
Initial	6400	Lic10.7qt	6.33	5.86
Reduced Verso BOD discharge	6258	Lic21.7qt	6.34	5.82

The results of the QUAL2E simulations with a reduced Verso BOD discharge as shown in Table 1 were next introduced as upstream boundary conditions in the WASP Gulf Island Pond model. This resulted in an increase in the model-wide, minimum dissolved oxygen above a depth of 60 feet from 5.01 mg/L to 5.04 mg/L.

Next, the minimum oxygen injection requirements at the Lower Narrows were evaluated by carrying out two additional simulations of the Gulf Island Pond, with the Lower Narrows injection rate reduced by 1 percent and 5 percent relative to the initial rate of 33,100 pounds per day. Table 2 shows the minimum simulated dissolved oxygen concentration for segments shallower than a depth of 60 feet at these modified injection rates. In each of these simulations, the Upper Narrows rate of oxygen injection was maintained at 23,300 pounds per day with a transfer efficiency of 54%. A Lower Narrows injection rate of 32,769 pounds per day – the one percent injection reduction scenario – is the estimated minimum rate of oxygen injection that resulted in compliance with the dissolved oxygen standard.

Table 2. Minimum Dissolved Oxygen Concentration in Gulf Island Pond at Depths Shallower than 60 feet

Scenario	Lower Falls Dissolved Oxygen Injection (lbs/day)	WASP Model Input File Name	Dissolved Oxygen (mg/L)
Prior Verso BOD discharge and 33,100 lb/day Injection at Lower Falls	33,100	Tsk13	5.01
Reduced Verso BOD discharge	33,100	Tsk14	5.04
Reduced Verso BOD discharge with 5% reduction in oxygen injection	31,445	Tsk15	4.88
Reduced Verso BOD discharge with 1% reduction in oxygen injection	32,769	Tsk16	5.01

Bruce Jacobs

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SUMMARY OF CHANGES IN EFFLUENT LIMITS FOR PULP AND PAPER MILL  
DISCHARGES TO GULF ISLAND POND

Page 1

**Summer Monthly Average BOD Limits**

	Technology-Based Limits	Water Quality-Based Limits	
		Pre-2005	Current
VERSO	23,269 lbs/day	10,900 lbs/day	4,500 lbs /day
RUMFORD	23,740 lbs/day	12,000 lbs/day	8,330 lbs/day
FRASER	16,000 lbs/day	13,400 lbs/day	9,149 lbs/day
<b>TOTALS</b>	<b>63,009 lbs/day</b>	<b>36,300 lbs/day</b>	<b>21,979 lbs/day</b>
		-----39% reduction-----	
		-----65% reduction-----	

**Summer Monthly Average TSS Limits**

	Technology-Based Limits	Water Quality-Based Limits	
		Pre-2005	Current
VERSO	48,750 lbs/day	38,350 lbs/day	12,000 lbs/day
RUMFORD	50,925 lbs/day	32,900 lbs/day	15,500 lbs/day
FRASER	30,000 lbs/day	28,200 lbs/day	9,282 lbs/day
<b>TOTALS</b>	<b>129,675 lbs/day</b>	<b>99,450 lbs/day</b>	<b>36,782 lbs/day</b>
		-----63% reduction-----	
		-----72% reduction-----	

Note 1: Technology-based limits for biochemical oxygen demand (BOD) and total suspended solids (TSS) are derived from EPA's National Effluent Guidelines for pulp and paper mill discharges. These limits included discharges from the original Berlin, NH pulp mill and Gorham, NH paper mill. The pulp mill has since closed. Water quality-based limits are derived from the Maine DEP's 2005 Total Maximum Daily Load (TMDL) report for the Androscoggin River.

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COMMISSIONER

SUMMARY OF CHANGES IN EFFLUENT LIMITS FOR PULP AND PAPER MILL  
DISCHARGES TO GULF ISLAND POND

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**Summer Monthly Average Total Phosphorus Limits**

	<b>2004 Actual</b>	<b>Current</b>	<b>Effective 2010</b>
VERSO	161 lbs/day	150 lbs /day	130 lbs/day
RUMFORD	140 lbs/day	152 lbs/day	152 lbs/day
FRASER	133 lbs/day	129 lbs/day	129 lbs/day
<b>TOTALS</b>	<b>434 lbs/day</b>	<b>431 lbs/day</b>	<b>411 lbs/day</b>
	-----1% reduction-----		
	-----5% reduction-----		

**Summer Monthly Average Ortho-Phosphorus Limits**

	<b>2004 Actual</b>	<b>Current</b>	<b>Effective 2010</b>
VERSO	37 lbs/day	33 lbs /day	28 lbs/day
RUMFORD	97 lbs/day	97 lbs/day	97 lbs/day
FRASER	N/A	N/A	N/A
<b>TOTALS</b>	<b>134 lbs/day</b>	<b>130 lbs/day</b>	<b>125 lbs/day</b>
	-----3% reduction-----		
	-----7% reduction-----		

Prepared by: Dana Murch  
December 10, 2009

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Note 2: Total phosphorus equals organic phosphorus plus ortho-phosphorus. Prior to the last wastewater discharge license renewals in 2005, none of the mills had any phosphorus discharge limits. For purposes of modeling, actual discharges were measured during the summer of 2004 and were reported in the 2005 TMDL. The Fraser paper mill does not currently have an ortho-phosphorus limit.