

Written Informational Briefing
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STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

MEMORANDUM

TO: Board of Environmental Protection

FROM: Dana Murch ^{DM} & Brian Kavanah ^{BK}
Bureau of Land & Water Quality

DATE: September 2, 2010

RE: Update on Gulf Island Pond

The purpose of this memo is to update the Board on the status of the Department's ongoing 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 February 18, 2010, we reported that:

- The Gulf Island Pond Oxygenation Project (GIPOP) Partnership¹ had 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;
- Verso had proposed to reduce its final monthly average BOD limit from 4500 lbs/day to 4400 lbs/day; and
- The Department had developed an aggressive schedule to complete all required DEP and EPA regulatory approvals.

Approval of TMDL Addendum

On May 14 & 24, 2010, the Department submitted an addendum to the 2005 Androscoggin River Total Maximum Daily Load (TMDL) report to EPA for review and approval. This addendum was produced as a result of the revision and recalibration of the underlying water quality model for Gulf Island Pond following the correction of a dispersive mixing error and a recalculation of the sediment area contributing phosphorus to the pond. This addendum also reflected: (1) the upgrade of the oxygen injection system at Upper Narrows, which was completed in 2009; (2) the installation of a second oxygen injection system at Lower Narrows, which was scheduled for 2010; and (3) reduced paper mill BOD limits, as

¹ Collectively, FPL Energy, Verso Paper, Rumford Paper, and Fraser Paper.

established in the permitting action subsequent to approval of the 2005 TMDL, and as voluntarily proposed by Verso.

By letter dated June 1, 2010, EPA approved the TMDL addendum.

A copy of the TMDL addendum as approved by EPA is attached.

Permit Modifications

On June 8, 2010, the Department issued final 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, as modified by the Board in its February 7, 2008 appeal orders.

In these orders, the Department modified the oxygen injection requirements for Gulf Island Pond to reflect the recalibration of the water quality model for the pond and the installation of new/upgraded oxygen injection systems at Lower Narrows and Upper Narrows.² The Department also modified the final summer monthly average BOD³ and ortho-phosphorus⁴ effluent limitations for the Verso mill.

No appeals were received on the June 8, 2010 modification orders, so these orders are now final.

New Oxygen Injection System

The new oxygen injection system has now been installed and became operational on or about July 1. Capital and operation and maintenance costs for the new system are being allocated per a contractual agreement among the Partnership members.

As required by the Department's June 8, 2010 modification orders, the new system has been designed and must be operated to inject oxygen at Upper Narrows at a rate of up to 24,279 lbs/day at an oxygen transfer efficiency of 54%, and at Lower Narrows at a rate of up to 34,490 lbs/day at an oxygen transfer efficiency of 75%.⁵

² The approved new oxygen injection rates reflect the rates proposed by the GIPOP Partnership, with an additional margin of safety added, per the EPA-approved TMDL addendum. On June 10, 2010, EPA approved the new oxygen injection rates as part of the wastewater discharge permit for Fraser Paper's Gorham, NH paper mill.

³ Verso's final summer monthly average BOD effluent limitation was reduced from 4500 lbs/day to 4400 lbs/day, per Verso's request. The Verso mill has also 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 further to 4150 lbs/day, per the Board's February 8, 2008 appeal order.

⁴ Verso's final summer monthly average ortho-phosphorus effluent limitation was increased from 22 lbs/day to 28 lbs/day, based on the recalibration of the water quality model for Gulf Island Pond following a recalculation of the sediment area contributing phosphorus to the pond.

⁵ This compares to the original oxygen injection system which was designed to inject up to 73,000 lbs/day at Upper Narrows at an oxygen transfer efficiency of 33% when operating at 100% of its design capacity. So, while the new system is injecting less oxygen into the pond than the original system, more oxygen is actually been transferred into the water column, thus increasing dissolved oxygen levels in the pond.

GIPOP Operational Plan

On July 30, 2010 the Department approved a new GIPOP Operational Plan in compliance with the conditions of the June 8, 2010 modification orders. Under this plan, oxygen is injected at varying rates as a function of average river flow and temperature conditions.

A copy of the approved plan is attached.

Court Appeal

As we reported to you in our August 20, 2009 update memo, FPL Energy filed a timely appeal in Kennebec County Superior Court of the Board's February 7, 2008 appeal order for the Gulf Island-Deer Rips Hydro Project. Verso Paper, Rumford Paper, and the Natural Resources Council of Maine all intervened in the case. The parties to the case all subsequently agreed to a stay of the proceedings pending completion of the re-calibration of the water quality model and any subsequent regulatory proceedings.

On July 30, 2010, at the request of all the parties, the pending appeal was dismissed.

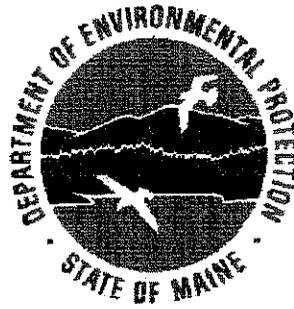
Monitoring and Future Modifications

As in the past, both the Department and the GIPOP Partnership are continuing to monitor water quality conditions in Gulf Island Pond during the summer months. Based on the results of this monitoring and any future revisions to the current water quality model or the approved TMDL, the Department has reserved the right to reopen and modify the approved operational plan and/or maximum oxygen injection rates as appropriate.

Future Updates

This is the Department's last planned update to the Board on this matter. We will, of course, continue to update you in the future as conditions warrant.

**Addendum to the
Androscoggin River 2005 Total Maximum Daily Load
For
Gulf Island Pond
Livermore Falls Impoundment
May 2010**



**Bureau of Land and Water Quality
Division of Environmental Assessment
DEPLW- 1119**

Introduction

In 2005, following issuance of new MEPDES permits for the mills and municipalities affected by this TMDL, and a Water Quality Certification issued for the continued operation of the Gulf Island-Deer Rips Hydro Project, appeals of the Department's decisions were presented to the Board of Environmental Protection. Following a public hearing of these appeals, the Board issued appeal orders on February 7, 2008 establishing additional oxygen injection requirements, water quality monitoring requirements, and final pulp and paper mill effluent limits needed to meet Class C water quality standards in Gulf Island Pond based on the Department's 2005 Androscoggin River Total Maximum Daily Load (TMDL) report.

The Board also directed the Department to revise and re-calibrate its water quality models incorporating the correction of a dispersive mixing error (which could affect oxygen injection requirements) and a recalculation of the sediment area that affects the sediment phosphorus flux in the pond (which could affect final allowable effluent limits for total phosphorus and/or ortho-phosphorus). The Department engaged the services of HydroAnalysis, Inc. of Brookline, Massachusetts to assist with the required recalibration and the recalculation of phosphorus contribution used in the QUAL2E and WASP models for this TMDL. The revised models were then used to evaluate wasteloads and supplemental oxygen injection requirements needed to attain dissolved oxygen standards and phosphorus loads needed to prevent algae blooms in Gulf Island Pond. This 2010 addendum of the 2005 TMDL provides new recommendations for allowable wasteloads and oxygen injection requirements from the 2005 TMDL. Two model outcomes are presented, one with wasteloads set at license load limits established in new draft MEPDES permits for the two mills in Maine (Rumford Paper and Verso) dated January 29, 2010 and as established in the NPDES permit for Fraser paper in NH. The second model outcome uses the same loads as above, except to use permit reductions required in the Verso permit in the event that wastewater from the Wausau-Mosinee Otis mill is no longer sent to the Verso facility for treatment. Note that Rumford Paper and Verso Paper referred to in this addendum report are the former Mead Westvaco and former International Paper facilities, respectively, identified in the 2005 TMDL.

The TSS portion (Livermore Falls impoundment) of the 2005 TMDL document is not addressed in this addendum report.

Results of HydroAnalysis Inc. and Mobley Engineering analyses are in the attached appendices:

- Appendix A. Recalibration of the Gulf Island Pond Water Quality Model (HydroAnalysis Inc., October 31, 2008)
- Appendix B. Final Model Recalibration Results (HydroAnalysis Inc., December 18, 2008)
- Appendix C. Recalibration of the Gulf Island Pond Water Quality Model and Assessment of Oxygen Injection Requirements and Allowable Phosphorus Load (HydroAnalysis, Inc., April 2, 2009)
- Appendix D. Assessment of Oxygen Injection Requirements Under Licensed Discharge Conditions (HydroAnalysis, Inc., April 13, 2009)
- Appendix E. Analyses of GIPOP Partnership Proposed Alternative Oxygen Injection Rates and Analysis of Reduced Oxygen Injection Rates Without Wausau-Mosinee Wastewater (HydroAnalysis, Inc., September 25, 2009, December 1, 2009, and February 4, 2010)
- Appendix F. Evaluation of Oxygen Diffuser Replacement at Gulf Island Pond (Mobley Engineering, May 2008)
- Appendix G. Oxygen Transfer Efficiency Predictions for Oxygen Diffusers Placed in Gulf Island Pond Lower Narrows (Mobley Engineering, September 25, 2009)
- Appendix H. GIP 10% Factor of Safety Calculation (HydroAnalysis, Inc. May 9, 2010)
- Appendix I. Response to Comments on March 2010 Draft Addendum to Androscoggin River 2005 TMDL

Summary of findings from the revised models.

- The revised modeling did not change any of the general findings of the 2005 TMDL, however, it did alter the relative source contributions of oxygen demand and phosphorus, and found a reduced need for supplemental oxygen. The nonpoint source contributions remain the same as the estimates in the 2005 TMDL. This TMDL addendum, based on corrected and recalibrated models, results in a net reduction in total phosphorus but with an increase in the ortho-phosphorus fraction. In addition, this TMDL addendum includes a reduction on CBOD_u based on new BOD limits for Verso and Fraser, as established in permitting actions subsequent to issuance of the 2005 TMDL, and based on a further voluntary reduction on BOD limits for Verso. The wasteload allocations by facility are presented in the Revised Tables 6 (for phosphorus), 8 (for 7-day CBOD), and 9 (for 30-day CBOD) from the 2005 TMDL found at the end of this section.
- The revised modeling also uses a different supplemental oxygenation strategy that results in an overall reduction in total oxygenation required as a result of improved oxygen injection efficiency at Upper Narrows (54%) and the installation of a second oxygenation station at Lower Narrows with 75% efficiency.

Revised 2010 TMDL for Gulf Island Pond

Required loads (ppd)	Total-P	Ortho-P	CBOD _u	CBOD _u	TSS	Oxygen Injection	
						U. Narrows	L. Narrows
Averaging Period	30 day	30 day	30 day	7 day	Annual	Jun-Sep	Jun-Sep
Season	Jun-Sep	Jun-Sep	Jun-Sep	Jun-Sep	Year	Jun-Sep	Jun-Sep
WLA - Point sources	206	52	34,477 ^b	38,652 ^a	42,093	23,300	33,100
LA - Nonpoint sources	77.7	0.3	10,440	9,444	47,907		
Explicit MOS	28	4	na	na	10,000	979	1,390
Total	312	56	44,917	48,096	100,000	24,279	34,490

^a 7-day point source CBOD_u differs slightly from the value reported by HydroAnalysis, Inc. (Appendix D) since discharge limits for Gorham NH were not available at the time the modeling was conducted. As indicated in Revised Table 8, Gorham has licensed limits of 281 pounds. This amounts to less than 0.7% of the 7-day CBOD_u used for modeling and would have negligible effect on model results.

^b 30-day point source CBOD_u differs slightly from values reported in revised Table 9 due to a typo in Table 9 of the May 2005 TMDL that erroneously set the allocation for Bethel for BOD₅ at 75 ppd. This has been corrected in Revised Table 9 at the correct license limit of 85 ppd. This difference amounts to less than 0.03% of the 30-day CBOD_u reported above.

Revised 2010 TMDL for Gulf Island Pond without Wausau-Mosinee

Required loads (ppd)	Total-P	Ortho-P	CBOD _u	CBOD _u	TSS	Oxygen Injection	
						U. Narrows	L. Narrows
Averaging Period	30 day	30 day	30 day	7-day	Annual		
Season	Jun-Sep	Jun-Sep	Jun-Sep	Jun-Sep	Year	Jun-Sep	Jun-Sep
WLA - Point sources	206	52	33,896	37,216	41,579	23,300	32,333
LA - Nonpoint sources	77.7	0.3	10,440	9,444	47,907		
Explicit MOS	28	4	na	na	10,000	979	1,358
Total	312	56	44,336	46,660	99,484	24,279	33,691

Original TMDL table from 2005 TMDL for comparison.

TMDL for Gulf Island Pond in PPD								
Required Loads in ppd		Total-P	Ortho-P	CBOD _u		TSS	Oxygen Injection Loads	
Averaging Period		30-Day	30-Day	30-Day	7-Day	Annual	U. Narrows	L. Narrows
Season		June-Sept	June-Sept	June-Sept	June-Sept	Year	June-Sept	June-Sept
WLA	Point Sources	208	45	39,818	45,673	42,093	30,000	150,000
LA	Non-Point Sources	77.7	0.3	10,440	9,444	47,907		
Explicit MOS 10%		31.7	6	5,585	6,124	10,000		
Total		317	50	55,843	61,241	100,000		

1. Instream aeration is needed as a component of the TMDL load due to sediment oxygen demand. There are no feasible reductions of WLA's and LA's that will result in full attainment of DO criteria without oxygen injection.
2. Oxygen injection loads of 30,000 ppd at Upper Narrows and 150,000 ppd at Lower Narrows are the default requirements. Other systems are possible. See pages 27 to 51.
3. Oxygen injection loads of 50,000 ppd at Upper Narrows, 65,000 ppd at Lower Narrows, and 42,000 ppd near the Deep Hole were investigated with a 3 point injection system.
4. All calculations assume a 1/3 transfer efficiency. Other systems other than those in this report may be acceptable provided they are approved by DEP.
5. Ambient monitoring is required and implemented in licensing.

Revised Table 6: TMDL Allocation of Phosphorus Applies June to September								
	Phosphorus Alloc Outfall in ppd			Assimilation Factors % P Remaining @ Twin Br.		Phosphorus Alloc Twin Br in ppd*		
	TP ppd	OP ppd	OPO4-P ppd	OP	OPO4-P	TP ppd	OP ppd	OPO4-P ppd
Municipal								
Berlin	19.8	2.6	17.2	60.7%	1.6%	1.9	1.6	0.3
Gorham	12.9	1.0	11.9	64.0%	3.9%	1.1	0.6	0.5
Bethel	7.6	0.7	6.9	65.5%	10.8%	1.2	0.5	0.7
Rumford-Mexico	31.4	4.4	27.0	82.8%	14.9%	7.7	3.6	4.0
Liv Falls	9.6	1.3	8.3	93.3%	98.4%	9.4	1.2	8.2
Paper Mills								
Fraser	129	47	82	62.1%	1.7%	30.6	29.2	1.4
Rumford Paper	152	55	97	79.6%	13.8%	57.2	43.8	13.4
Verso Paper	130	102	28	90.9%	97.6%	120.0	92.7	27.3
Total TMDL WLA (Point Sources)						229.0	173.2	55.8
Total TMDL WLA (Point Sources) reduced by clustering factor						199.1	147.2	51.9
Total TMDL LA (Non-Point Source + Natural)						77.7	77.4	0.3
Explicit MOS						28	22	4
Total TMDL						304	247	56

Verso Paper allocation based on final limits proposed in draft DEP MEPDES/WDL (#W000623-5N-K-M) dated January 29, 2010.
Rumford Paper allocation based on final limits as per MEPDES/WDL (#W000955-5N-G-R) dated September 21, 2005

Fraser Paper allocation for total P based on final limits as per NPDES Permit (# NH0000655) dated September 30, 2008. Loading for OP and OPO4 based on Recalibration of the GIP WQ Model and Assessment of O2 Injection Requirements and Allowable P Load, HydroAnalysis - April 2, 2009

Municipal allocations as per Mitnik 2005 modeling based on municipal dischargers at 1.5 times their measured 2004 discharge rates and OPO4 limits for Livermore Falls as per MEPDES/WDL (#W002654-5L-G-R) dated September 21, 2005.

NPS loading, clustering factor, conversion factors and assimilation rates as per Androscoggin River TMDL dated May 2005.

*Twin Bridges or Rte 219 in Turner is the upstream boundary to Gulf Island Pond

Revised Table 8: Gulf Island Pond 7-Day Average TMDL CBOD ₅ PPD June to Sept				
	Allocations at Outfall	CBOD ₅ / BOD ₅	Assimilation	Allocations Twin Bridges*
Source	BOD ₅ based on final NPDES & MEPDES/WDL limits		% BOD Remaining Twin Bridges*	Ultimate CBOD
NPS				9444
Fraser	10298	3.6	17.4%	6451
Rumford P	12500	3.6	31.9%	14355
Verso P.	6400	3.5	63.2%	14157
Berlin	991	Municipal Discharges are grouped in the TMDL due to their de-minimus impact upon dissolved oxygen levels within Gulf Island Pond .		
Gorham	281			
Bethel	128			
Rum-Mex	995			
Liv Falls	750			
Munic Tot	3145		3	39.1%
Total TMDL WLA (Point Sources)				38652
LA = Non-point Sources + Natural				9444
TMDL Total				48096

Verso Paper allocation based on final limits as per BEP order (#W000623-5N-F-R) dated February 7, 2008.

Rumford Paper allocation based on final limits as per MEPDES/WDL (#W000955-5N-G-R) dated September 21, 2005

Fraser Paper allocation based on final limits as per NPDES Permit (# NH0000655) dated September 30, 2008.

Municipal allocations as per current NPDES and MEPDES/WDL.

NPS loading, conversion factors and assimilation rates as per Androscoggin River TMDL dated May 2005.

*Twin Bridges or Rte 219 in Tumer is the upstream boundary to Gulf Island Pond

Revised Table 9. Gulf Island Pond 30-Day Avg. TMDL CBOD ₅ PPD June to Sept				
	Allocations at Outfall	CBOD ₅ / BOD ₅	Assimilation	Allocations Twin Bridges*
Source	BOD ₅ based on final NPDES & MEPDES/WDL limits		% BOD Remaining Twin Bridges*	Ultimate CBOD
NPS				10440
Fraser	9149	3.6	24.7%	8135
Rumford P	8330	3.6	45.8%	13735
Verso P.	4400	3.5	65.0%	10010
Berlin	660	Municipal Discharges are grouped in the TMDL due to their de-minimus impact upon dissolved oxygen levels within Gulf Island Pond .		
Corham	188			
Bethel	85			
Rum-Mex	663			
Liv-Falls	600			
Munic Tot	2096			
Total TMDL WLA (Point Sources)				34477
LA = Non-point Sources + Natural				10440
TMDL Total				44917

Verso Paper allocation based on final limits proposed in draft DEP MEPDES/WDL (#W000623-5N-K-M) dated January 29, 2010.

Rumford Paper allocation based on final limits as per MEPDES/WDL (#W000955-5N-G-R) dated September 21, 2005

Fraser Paper allocation based on final limits as per NPDES Permit (#NH0000656) dated September 30, 2008.

Municipal allocations as per current NPDES and MEPDES/WDL.

NPS loading, conversion factors and assimilation rates as per Androscoggin River TMDL dated May 2005.

*Twin Bridges or Rte 219 in Turner is the upstream boundary to Gulf Island Pond

Oxygen Component of the Model

In draft versions of the 2002 WASP model, it was found that there was an error in the model that allowed for dispersive mixing from downstream of the dam to upstream of the dam, an obvious impossibility. The error was corrected, however, the 2002 model used for the 2005 TMDL was never recalibrated after that correction was made. At the direction of the Board of Environmental Protection, the model has been recalibrated (see Appendices A, B). This recalibration also included improving the calibration results at the 50 foot depth. The initial calibration targets of Mitnik (2002) had used 5, 35, and 60 feet but it was evident from results that model predictions at 50 feet were not representative of measured conditions. To improve model performance, vertical exchange factors for certain segments were modified, improving the model's performance (Appendix B). As a consequence, changes in wasteload and/or oxygen injection rates have been made to predict resultant attainment of water quality standards. It should be noted that this model recalibration had little effect on other calibration targets: total nitrogen, total phosphorus, chlorophyll-a, and carbonaceous biochemical demand. This TMDL addendum uses the recalibrated model to recommend wasteloads and oxygen injection rates.

Oxygen Injection Component of the Model

Following WASP model recalibration, the GIPOP Partnership offered an alternative that would (1) allow a small reduction in CBOD, (2) add an additional oxygen injection station at Lower Narrows (as advised in the 2005 TMDL), and (3) also improve the oxygen transfer efficiency from 33% to 54% at Upper Narrows (as required by in the Board Order) and at a rate of 75% at Lower Narrows (Appendices F, G). This reduces the total requirement for oxygen and puts the units within their optimal operating range. The recalibrated model assigns injection rates of 23,300 lbs per day (Upper Narrows) and 33,100 lbs per day (Lower Narrows) for critical flow, temperature, and wasteload conditions (Appendices C, D).

An additional model run was made using alternative permit limits for Verso that would become effective if Wausau-Mosinee no longer sends its wastewater to Verso (Appendix E). In that event, the Verso discharge would be reduced to 5900 ppd BOD5 (weekly average) and 14,222 ppd TSS (annual average). The resultant oxygen requirements would be reduced to 32,333 ppd (75% efficiency) at Lower Narrows while keeping Upper Narrows at 23,300 (54% efficiency), a reduction of 767 ppd of oxygen (Appendix E).

Phosphorus Component of the Models

The Gulf Island Pond water quality model was recalibrated by modifying the benthic phosphate flux rates to obtain a spatially uniform benthic flux rate (Appendix C). The allowable phosphorus load to Gulf Island Pond was estimated as the maximum orthophosphate and organic phosphate rates at the upstream end of the impoundment which will attain the 2005 TMDL targets for chlorophyll-a. The HydroAnalysis report (Appendix C) provides two alternatives for point source load contributions: 56 pounds per day of orthophosphate and 256 pounds per day of organic phosphorus, or 50 pounds per day of orthophosphate and 277 pounds per day of organic phosphate. By selecting the higher orthophosphate alternative, an additional 6 pounds per day can be assigned to the Verso discharge (noting that uptake between the discharge and the head of the impoundment is estimated at <3%). Current and draft permitted loads amount to 56 pounds of ortho-phosphorus and 229 pounds of total phosphorus. (Revised Table 6 from 2005 TMDL).

Margin of Safety

- This TMDL addendum recommends a different approach to set Margin of Safety. First, the Department is using an improved model which is expected to provide a more confident estimate of water quality response to projected wasteloads and oxygen injection. While the revised TMDL table in this addendum is no longer using a 10% explicit margin of safety for CBODu, the revised models did not use a "clustering factor" that had been used in the 2005 TMDL to acknowledge an expectation that all facilities would not be discharging at maximum allowable load at the same time. The model outputs used for this report were constructed with the conservative assumption that all dischargers could be discharging at maximum permit load simultaneously under critical low flow and temperature condition. This provides an implicit margin of safety and by comparison is relatively the same as the 10% explicit + clustering factor approach used in the 2005 TMDL. The cluster factor used in the 2005 TMDL allowed for an 8.8% reduction of CBODu in the Wasteload Allocation.
- While an explicit Margin of Safety was not added for CBODu, an explicit MOS is recommended for the oxygen injection component of the TMDL (there was no MOS in the supplemental oxygen requirement established in the 2005 TMDL). A factor of 4.2% of the model predicted supplemental oxygen requirement is added at both Upper Narrows and Lower Narrows. This additional oxygen is calculated to replace the amount of oxygen that would be required if the total CBODu load to the impoundment were increased by 10% (Appendix H). Any inaccuracies of the models can best be managed adaptively with the oxygen injection system since there will be additional capacity available.

- An explicit Margin of Safety for phosphorus is included in this TMDL addendum. The original clustering factor used in the 2005 TMDL is still being used (Revised Table 6 from 2005 TMDL).
- Margin of Safety established for TSS in the 2005 TMDL remains the same.
- As indicated in the 2005 TMDL, the Department continues to recommend ambient monitoring by the dischargers for the term of the permit or until attainment of water quality standards have been demonstrated to the satisfaction of the Department. Each permit and the water quality certification shall have a reopener clause that can allow modifications should monitoring indicate that the wasteload or supplemental oxygen injection requirements are insufficient to attain water quality standards.

Implementation

The Department intends to issue modified MEDPES permits for the Verso and Rumford mills and a modified water quality certification for the Gulf Island Pond-Deer Rips Hydro Project requiring that the partnership of FPL Energy, Verso Paper, Rumford Paper, and Fraser Paper, or their successors in interest, inject oxygen at Upper Narrows at a rate of up to 24,279 lbs/day at an oxygen transfer efficiency of 54%, and at Lower Narrows at a rate of up to 34,490 lbs/day (or 33,691 if wastewater from the Wausau-Mosinee Otis mill is no longer sent to the Verso mill for treatment) at an oxygen transfer efficiency of 75%, or at equivalent rates and efficiencies.

Comments on Draft TMDL Addendum

A draft TMDL addendum was sent to interested parties on March 23, 2010 and was posted on the Department's website. A response to the comments received on the March 2010 draft is attached as Appendix I.



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

VIA ELECTRONIC MAIL

July 30, 2010

Chad P. Clark, P.E.
Vice-President
FPL Energy Maine Hydro LLC
160 Capitol Street, Suite 8
Augusta, ME 04330

Scott T. Reed
Environmental Manager
Rumford Paper Company
35 Hartford Street
Rumford, ME 04276

Michael Rowland
Manager of Manufacturing Excellence
Verso Paper
PO Box 20
Jay, ME 04239

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

RE: Gulf Island Pond

Gentlemen:

By filing dated May 14, 2010 and revised June 25, 2010, FPL Energy, on behalf of the GIPOP Partnership, submitted an operational plan to inject oxygen at Upper Narrows and Lower Narrows.

Per the attached order, the DEP has approved a new GIPOP Operational Plan in compliance with Condition 5(C) of the Department's June 8, 2010 order modifying water quality certification for the Gulf Island-Deer Rips Hydro Project.

The attached order also constitutes compliance with Special Condition K(3) of the Department's June 8, 2010 orders modifying the wastewater discharge license and MEPDES permit for the Verso (Jay) pulp and paper mill and the Rumford pulp and paper mill.

By copy of this letter, the Department is notifying EPA that the attached order also fulfills Fraser Paper's obligations to inject oxygen into Gulf Island Pond in compliance with the terms of EPA's September 30 2008 NPDES permit for the Gorham paper mill

Letter to GIPOP Partnership
July 30, 2010
Page 2 of 2

Sincerely,

A handwritten signature in black ink that reads "Dana Paul Murch". The signature is written in a cursive, flowing style.

Dana Paul Murch
Hydropower Specialist

Attachment

cc: David Littell, Commissioner, DEP
Andy Fisk, DEP
Brian Kavanah, DEP
Dave Courtemanch, DEP
Gregg Wood, DEP
Barry Mower, DEP
Rob Mohlar, DEP
Beth DeHaas, DEP
Nicole Kowalski, EPA
Jerry Reid, AG's Office
Frank Dunlap, FPL Energy
Kenneth Gallant, Verso Paper



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

VIA ELECTRONIC MAIL

July 30, 2010

Chad P. Clark
Vice President
FPL Energy Maine Hydro LLC
26 Katherine Drive
Hallowell, ME 04347

RE: GIPOP Operational Plan
Gulf Island-Deer Rips Hydro Project
DEP Order #L-17100-33-U-C

Dear Chad:

Attached is a copy of the final Department Order approving a new GIPOP Operational Plan in compliance with Condition 5 of the Department's modified water quality certification for the Gulf Island-Deer Rips Hydro Project.

Please note that any person aggrieved by the DEP's decision in this matter may appeal that decision to the Board of Environmental Protection or to Maine Superior Court following the procedures set forth in the applicable State law and DEP rules. These procedures are described in the DEP Information Sheet entitled "Appealing a Commissioner's Licensing Decision," which is enclosed with the Order.

Sincerely,

A handwritten signature in black ink that reads "Dana Paul Murch". The signature is written in a cursive, flowing style.

Dana Paul Murch
Hydropower Specialist



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION
AUGUSTA, ME 04333

DEPARTMENT ORDER

IN THE MATTER OF

FPL ENERGY MAINE HYDRO LLC)	WATER QUALITY CERTIFICATION
Lewiston, Auburn, Turner, Greene, Leeds, and)	
Livermore, Androscoggin County)	
GULF ISLAND-DEER RIPS HYDRO PROJECT)	
#L-17100-33-U-C (Approval))	CONDITION COMPLIANCE

Pursuant to the provisions of 38 MRSA Sections 464 *et seq.* and Section 401 of the Federal Water Pollution Control Act (a.k.a. Clean Water Act), the Department of Environmental Protection has considered the application of FPL ENERGY MAINE HYDRO LLC with its supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. Application Summary

On behalf of the Gulf Island Pond Oxygenation Project (GIPOP) Partnership,¹ FPL Energy Maine Hydro LLC ("FPL Energy") has submitted an operational plan for injecting oxygen at Upper Narrows and Lower Narrows in Gulf Island Pond,² in compliance with Special Condition 5(C) of Department Order #L-17100-33-T-M dated June 8, 2010. This order modified the Department's September 21, 2005 order approving water quality certification pursuant to Section 401 of the Clean Water Act in conjunction with the relicensing of the Gulf Island-Deer Rips Hydro Project (No. 2283) by the Federal Energy Regulatory Commission, as subsequently modified on appeal by the Board of Environmental Protection by order dated February 7, 2008.

2. Certification Condition

Condition 5 of Department Order #L-17100-33-T-M reads in pertinent parts as follows:

¹ The GIPOP Partnership consists of FPL Energy, Verso Paper, Rumford Paper, and Fraser Paper.

² The Gulf Island Pond Oxygenation Project has been in place since June 1, 1992 to inject oxygen into Gulf Island Pond. Originally, the project was operated to inject oxygen only at Upper Narrows, located about 5 miles upstream of Gulf Island Dam. In its June 8, 2010 modification order, the Department approved the GIPOP Partnership's proposal to install additional supply lines and diffusers to inject oxygen at both Upper Narrows and Lower Narrows (the later site is about 2 miles downstream of Upper Narrows) in sufficient quantities to meet dissolved oxygen standards in the pond. The new system became operational on or about July 1, 2010. Since that date, by agreement with the Department, FPL Energy has been operating the new system in accordance with the proposed operational plan, pending DEP approval.

“5. GULF ISLAND POND OXYGENATION

- A. FPL Energy shall, in partnership with Verso Paper, Rumford Paper, and Fraser Paper, or their successors-in-interest, operate and maintain a system to inject oxygen into Gulf Island Pond at Upper Narrows and Lower Narrows in such quantities and in such manner as described in this condition. This system shall be installed and operational by June 1, 2010, unless extraordinary river conditions or other circumstances beyond the control of the parties preclude installation and operation of the system by that date, in which case the system shall be installed and operated as soon as practicable thereafter. Any activities associated with the installation of the system that require a permit under the Natural Resources Protection Act shall receive prior review and approval by the Department.
- B. FPL Energy shall, in partnership with Verso Paper, Rumford Paper, and Fraser Paper, or their successors-in-interest, inject oxygen at Upper Narrows at a rate of up to 24,279 lbs/day at an oxygen transfer efficiency of 54%, and at Lower Narrows at a rate of up to 34,490 lbs/day, or 33,691 lbs/day if the wastewater from the Wausau-Mosinee Otis mill is no longer sent to the Verso mill for treatment, at an oxygen transfer efficiency of 75%, or at equivalent rates and efficiencies.
- C. By May 1, 2010, FPL Energy shall, in partnership with Verso Paper, Rumford Paper and Fraser Paper, or their successors-in-interest, submit an operational plan to inject oxygen at Upper Narrows and Lower Narrows in compliance with the terms of this condition. This plan shall be designed to deliver sufficient oxygen to meet dissolved oxygen standards in Gulf Island Pond between June 1 and September 30 annually with all upstream point sources discharging at their final license limits. This plan shall be reviewed by and must receive approval of the Department prior to commencement of system operation.”

3. Condition Compliance Filing

In response to this condition, by filing dated May 14, 2010 and revised June 25, 2010, FPL Energy, on behalf of the GIPOP Partnership, has now submitted an operational plan to inject oxygen at Upper Narrows and Lower Narrows in compliance with Condition 5(C) of the modified water quality certification for the Gulf Island-Deer Rips Hydro Project.³

4. Description of Proposed GIPOP Operational Plan

Pursuant to the operational plan as submitted, the GIPOP Partnership proposes to inject oxygen at varying rates as a function of average river flow and temperature conditions.

³ Verso Paper, Rumford Paper, and Fraser Paper are each subject to a similar condition requiring submittal of an operational plan to inject oxygen at Upper Narrows and Lower Narrows under the terms of their waste water discharge permits as modified on June 9, 2010 by DEP (Verso Paper and Rumford Paper) and June 10, 2010 by EPA (Fraser Paper). This order will constitute Department approval of the required plan for these entities.

Under the worst case conditions (river temperature greater than 24° Celsius and river flow less and or equal to 3,500 cubic feet per second, expressed as three-day averages at Turner Bridge, which crosses Gulf Island Pond about 7 miles upstream of Gulf Island Dam), oxygen will be injected at the maximum rates specified in the Department's June 8, 2010 order. These rates are based on the results of the Department's revised water quality modeling at 7Q10 flow conditions, a maximum river temperature of 26°C, and with all point sources upstream of Gulf Island Pond discharging at their license limits, and with an added margin of safety of 4.2%.⁴ Interim rates are based on modeling conducted by Dr. David Dilks of LimnoTech on behalf of the GIPOP Partnership, with an added margin of safety of 4.2%, and are based on the same temperature and flow threshold conditions as have been approved for the operation of the Upper Narrows oxygen injection system.⁵

5. Discussion

Except as discussed below, the GIPOP Partnership's filing satisfactorily addresses the requirements of Special Condition 5(C) of the Department's June 8, 2010 order with respect to an operational plan to inject oxygen at Upper Narrows and Lower Narrows in Gulf Island Pond.

In its plan, the GIPOP Partnership proposed to increase the amount of oxygen injection to the rate specified in the next higher temperature/flow threshold condition in the event that monitored dissolved oxygen levels have declined to 5.5 ppm or less. Similarly, the GIPOP Partnership proposed to decrease the amount of oxygen injection to the rate specified in the next lower temperature/flow threshold condition in the event that monitored dissolved oxygen levels have increased to 6.0 ppm or more.

While the Department appreciates the GIPOP Partnership's interest in providing enough, but not too much, oxygen injection into Gulf Island Pond to meet dissolved oxygen standards,⁶ it is essential that oxygen be injected at the modeled rates (with the added margin of safety) so that monitoring data can be collected and then used to validate the model on which the required oxygen injection rates are based. Based on the results of future monitoring and any changes in licensed effluent limits, the Department intends to revise the current water quality model and to either increase or decrease required oxygen injection rates to ensure that the minimal amount of oxygen is injected to meet dissolved oxygen levels under worst case

⁴ For further information on the Department's revised water quality modeling, please refer to Department Order #L-17100-33-T-M dated June 8, 2010.

⁵ The current operational plan for injecting oxygen at Upper Narrows went into effect June 1999, and is based on an analysis of the relationship between monitored temperature, flow, and dissolved oxygen conditions in Gulf Island Pond.

⁶ Existing Class C water quality standards for Gulf Island Pond require that dissolved oxygen levels of 5.0 ppm (instantaneous) and 6.5 ppm (30-day average) be met above the point of thermal stratification or topographic isolation. These standards must be met under critical low flow (7Q10) and high water temperature (26°C) conditions and with all upstream point sources discharging at their license limits.

conditions.⁷ This may result in changes in the maximum amount of oxygen injection, as specified in the Department's June 8, 2010 modification order, or in the rates of oxygen injection at various temperature/flow threshold conditions. This may also result in changes in the temperature/threshold conditions specified in the approved operational plan.

Therefore, the operational plan approved by this order does not include the proposed provisions for increasing or decreasing oxygen injection rates based on monitored dissolved oxygen levels.

6. Conclusions

Based on its independent review, and except as discussed above, the Department has determined that the Gulf Island Pond Oxygenation Project operational plan, as submitted, satisfactorily addresses the requirements of Special Condition 5(C) of the Department's June 8, 2010 modification order.

Therefore, based on the above Findings of Fact, the Department CONCLUDES that FPL ENERGY MAINE HYDRO LLC has complied with Special Condition 5(C) of Department Order #L-17100-33-T-M dated June 8, 2010, with respect to an operational plan to inject oxygen at Upper Narrows and Lower Narrows in Gulf Island Pond, SUBJECT TO THE FOLLOWING CONDITION:

1. Effective with the date of this order, the Gulf Island Pond Oxygen Injection Project shall be operated in accordance with the attached operational plan, dated July 2010, until and unless this plan is modified by the Department.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 06/28/2010

Date application accepted for processing: 06/30/2010



This permit has been digitally signed by Jody Breton on behalf of Commissioner David P. Littell. It is digitally signed pursuant to authority under 10 M.R.S.A. §9418. It has been filed with the Board of Environmental Protection as of the signature date.
2010.07.29 14:27:15 -04'00'

This Order prepared by Dana Murch, Bureau of Land and Water Quality.

⁷ The Department has expressly reserved the right, after notice to FPL Energy, Verso Paper, Rumford Paper, and Fraser Paper, to re-open and modify the terms of the relevant water quality certification and waste water discharge permits to change the rates of oxygen injection specified therein.

**OPERATIONAL PLAN FOR
GULF ISLAND POND OXYGENATION PROJECT
EFFECTIVE JULY 2010**

The Gulf Island Pond Oxygenation Project (GIPOP) shall be available for operation beginning June 1 annually, or as soon thereafter as river flows recede to 5,000 cfs or less (to allow for safe inspection and maintenance of the oxygen injection system), and ending September 30 annually.

GIPOP operation shall begin when the 3-day average temperature at Turner Bridge is greater than 18°C in June and shall cease when the 3-day average temperature at Turner Bridge is less than 21°C in September.

During the operational period defined above, GIPOP shall be operated in accordance with the following oxygen injection rates (expressed as pounds per day) for the stated 3-day average river temperature and flow conditions.¹

Oxygen Injection Thresholds	Oxygen Injection At Upper Narrows	Oxygen Injection At Lower Narrows	Oxygen Injection Total
$Q > 3,500$	0	0	0
$T < 24 \text{ \& } 3,000 < Q \leq 3,500$	1,355	34,073	35,428
$T < 24 \text{ \& } 2,500 < Q \leq 3,000$	5,210	31,989	37,199
$T < 24 \text{ \& } Q \leq 2,500$	19,069	32,198	51,266
$T \geq 24 \text{ \& } Q \leq 3,500$	24,279	34,490	58,769

All temperature measurements, in degrees Celsius, shall be obtained from the continuous temperature monitor at Turner Bridge and shall be expressed as a 3-day rolling average. The monitor records maximum and minimum temperatures for a given day. The daily average temperature is defined as the arithmetic mean of the maximum and minimum temperatures for a given day. The 3-day rolling average temperature (T) is defined as the arithmetic mean of three consecutive daily average temperature values.

All flow measurements, in cubic feet per second, shall be obtained from the USGS gage at Rumford and shall be expressed as a 3-day rolling average. The gage records hourly flows. The daily average flow is defined as the arithmetic average mean of the hourly flows for a given day. The 3-day rolling average flow (Q) is defined as the arithmetic mean of three consecutive daily average flow values.

This operational plan shall be evaluated annually and shall be modified as appropriate based on additional monitoring data, water quality modeling results, and any changes in licensed discharges.

Prepared by: Maine DEP

¹ Maximum oxygen injection rates at Upper Narrows and Lower Narrows are based on the results of DEP water quality modeling at 7Q10 flow conditions, a maximum river temperature of 26°C, and with all point sources upstream of Gulf Island Pond discharging at their license limits, and with an added margin of safety of 4.2%. Intermediate oxygen injection rates are based on modeling conducted by LimnoTech on behalf of the GIPOP Partnership, each with an added margin of safety of 4.2%.