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Subject: 6th Status Report on XL-2 Projects at IP Androscoggin Mill, Jay, Maine
Progress as of September 30, 2001,

Summary

This letter constitutes the 6th status report on the XL-2 project being conducted at the Androscoggin Mill of International Paper Company in Jay, Maine. This report summarizes progress made as of September 30, 2001. The objective of this project is to implement COD and color reduction projects at the Androscoggin mill in lieu of implementation of best management practice in the cluster rules. To date, eight projects have been either implemented or approved for implementation to reduce COD and color in the mill effluent. It is estimated that successful implementation of all eight projects should reduce the COD load going to the waste treatment plant by approximately 10,860,000 pounds per year of COD and corresponds to a reduction in the mill effluent of approximately 2.6 Kg COD per metric ton of pulp produced. In terms of financial resources, $427,000 out of $780,000 available initially has been spent or approved for spending on the various capital projects under the XL-2 program. The Collaborative Process and Technical Teams forming the XL-2 project are currently engaged in performing a second comprehensive COD and color balance for the Androscogin mill. Progress on these mill wide balances is described.

Introduction

An XL-2 Project is being conducted at the IP paper mill in Jay, Maine[1]. Five (5) previous reports have been written summarizing the status of this project[2].

Under the terms of the XL agreement, the IP mill is exempt from Best Management Practice (BMP) in the water pollution portion of the Cluster rules. In exchange for this exemption, IP has agreed to take a number of steps designed to improve the quality of the mill

[1] International Paper XL Project: Effluent Improvements", Final Project Agreement, Androscoggin Mill, Jay, Maine (June 29,2000).

[2] Genco, J. M., and van Heiningen, A., " Status Report on XL-2 Projects at IP Androscoggin Mill", April 25, 2001 (4th report), "Comparative Analysis of XL-2 Projects", December, 28, 2000 (3rd report), "Mill-Wide COD Balance to Identify Important COD Point Sources", October 18, 2000 (2nd report), "First Summary Report for IP XL-2 Project, Initial Evaluation of COD Balance", August 9, 2000 (1st report).

effluent for COD and color beyond the levels likely to be attained through implementation of the BMP requirements.

There are two groups that are actively participating in this project. These are the Technical Assessment Subgroup and the Collaborative Process Team. The Technical Assessment Subgroup is charged with identifying a list of potential effluent improvement projects at the IP facility primarily associated with the pulping and bleaching operation. These projects, when implemented, will reduce color and COD discharges to the Androscoggin River, which hopefully will achieve the goals of the XL-2 project. The function of the Collaborative Team is to evaluate and recommend effluent improvement projects from the list generated by the Technical Assessment Subgroup. Projects recommend by the Collaborative Team are thought to be most suitable for meeting the performance goals established in the XL-2 agreement. The Jay mill is currently implementing projects recommended by the Collaborative Process Team and hopes to implement additional projects as the Collaborative Team approves them.

Financial Status

A review of the financial status of the budget for the XL-2 project shows that as of September 21st, 2001, $427,000 out of the available $780,000 has been spent or approved for spending on the various XL-2 projects listed in Table 1. This leaves $353,000 of the original $780,000 to be allocated to future projects. This represents 45% of the original funds that are yet to be spent.

Update on Effluent Discharge on COD and Color

COD in Mill Effluent. The data for the COD in the mill effluent is updated to September 2001 and displayed in Figure 1. It shows that over the summer of 2001 the COD discharge of the mill was reduced from a level of about 40 to about 26 kg/1000 kg AD pulp, the latter being the XL-2 goal for the final effluent to be reached by June 2004. Since no new XL-2 projects were implemented during this period, and a cationic flocculent (polymer) was added during the summer to improve the settling of the solids in the wastewater treatment plant, it is plausible that the COD improvement during the summer is related to this polymer addition. Recent data obtained as part of the new COD balance confirm that a very large reduction in COD is obtained by removal of the suspended solids in the effluent coming from the paper machines, the largest contributor to the COD input to the waste water treatment system[3].

Color in Mill Effluent. The development of color in the mill effluent updated to September 2001 is displayed in Figure 2. It shows that the color discharge has declined moderately during the summer of 2001. It can be seen that as of the 3rd quarter in 2001 the color discharge is slightly below 80 lb/ unbleached AD U.S. ton, and approximately midway between the XL-2 color limit (120 lb/ton) and XL-2 color goal of 50 lb/ton. It is interesting to note that although the cationic polymer is added in the summer to reduce the amount of color discharged to the river, the beneficial effect of this procedure appears to improve the COD discharge more so than that of the color. This suggests that dissolved substances are responsible for the final effluent color. Thus, it appears that polymer addition leads to supplementary settling of

[3] Genco, J. M., and van Heiningen, A., "Mill-Wide COD Balance to Identify Important COD Point Sources", October 18, 2000 (2nd report).

suspended material that significantly contributes to effluent COD, such as latex and fiber fines coming from the paper machine operation, while the effluent color is caused by dissolved material, such as organics coming from the black liquor cycle of the pulp mill. The color data taken from recent samples of the 2nd color and COD balance support this hypothesis. Finally, these results reinforce the importance of testing samples for COD content, both before and after filtration through a 0.8µm glass filter.

2nd Mill-Wide COD Balance

The location in the sewer system of the sampling points used for the 2nd mill-wide COD balance is indicated in Figure 3. Table 2 gives a summary of the sewer survey, and the different tests to be performed on the samples taken at the different locations. A complete set of samples were taken on August 14, 16, and 17, 2001. The samples were sent to Acheron Laboratory, an environmental testing laboratory located in Newport, Maine. Measurements were made primarily for the total mass flow, BOD, COD, suspended solids, dissolved solids, specific conductance, pH, and color. BOD and COD measurements were made for the composite sample as obtained directly from the various sewer streams and also after filtering through a 0.8 micron fiberglass filter. These data have been compiled and are currently being evaluated.

Analysis Approach for the 2nd Mill-Wide COD Balance

Raw Data. In order to allow for easy comparison with the 1st mill-wide COD balance, the raw data are being arranged as indicated in Table 3. Since samples were taken during three days, there will be three tables of this form. Next, an additional table is being prepared for the Coefficients of Variation (COV) for each measurement. The COV is defined as the standard deviation for each set of three measurements divided by the average of these three measurements times 100%. If the COV is small relative to 100% then the data are consistent. If not, then the data will be further scrutinised and a decision made whether or not one or more measurement values will be dropped for the calculation of the three day average value of each set. Finally, the data for the 3 day average will be calculated and listed in the same form as Table 3.

Total Flow Balance. The percent closure of the total flow balance at the Bar Screen is being estimated by comparing the sum of the flows of the paper mill, the black liquor cycle (with the exception of the acid sewer), groundwood mill and the Otis mill with that measured at the Bar Screen or entrance to the waste treatment system. Please note that the Otis mill, a small specialty paper mill located downstream from the Androsscoggin mill sends waste water to the Androsscoggin mill for treatment.

Calculated Daily Mass Flows. The mass flow of the BOD, COD (both total and filtered), suspended solids, dissolved solids, total solids, and color may be calculated in terms of pounds per day by multiplying the three-day average value (mg/L) by the flow rate (gpm) times the conversion factor 0.0120. The data is being arranged as indicated in Table 4. A mass balance closure can be calculated at the location of the Bar Screen, where all the flows of the paper mill, the pulp mill (with the exception of the acid sewer) and groundwood mill and Otis are collected. The mass closure is being obtained by comparing this summative daily mass flow rate with that calculated from the three day average concentration measured at the Bar Screen.

Other Calculations. It is of interest to determine whether some selected data sets are correlated with each other. Because the COD/BOD ratio is a measure of difficulty to biodegrade the organic material released from the different processes, this ratio is being determined for both the total and unfiltered data, i.e. $(COD/BOD)_{total}$ and $(COD/BOD)_{filtered}$. Other ratios of interest that are being calculated are the $((COD)_{total}–(COD)_{filtered})$/(Suspended Solids), $(COD)_{filtered}$/(Dissolved Solids), $(COD)_{total}$/(Total Solids), (Color/Dissolved Solids), (Specific Conductance/Dissolved Solids), and (Specific Conductance/Filtered COD).

Efficiencies of Effluent Treatment System. The efficiency of removal by the effluent treatment system of BOD, COD (both total and filtered), suspended solids, dissolved solids, total solids, and color are being estimated based on the average concentrations measured at the bar screen and at the mill effluent.

Graphs. Bar graphs are being prepared that compare the flow, BOD and COD flow rates measured during the 1st and 2nd mill wide balances. Similarly, pie charts are being prepared that compare the BOD, COD (both total and filtered), suspended solids, dissolved solids, total solids, and color contributions from the paper mill, black liquor cycle and other areas of the mill. Finally, pie charts are being constructed that summarized the contributions to the mill wide burden of BOD, COD (both total and filtered), suspended solids, dissolved solids, total solids, and color from the different streams contributing to the total black liquor cycle.

Next Collaborative Meeting. The next meeting of the Collaborative Team will be held at the International Paper Company mill in Jay, Maine on November 2, 2001.

Sincerely yours,

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cc: George Frantz/Tom Saviello/Steve Groves/DougBarton-NCASI/Doug Johnson/Marquita Hill/Chris Rascher/Phil Sekerak/Ben Leber/Curt Treadwell/Sterling Pierce/Don Albert/Shiloh Ring/John Cronin/Neil McCubbin/Mark Perez/Donald Anderson/Betty Frazier/Betty Ingraham/files

Table 1
Implemented and Approved Projects as of September 21st, 2001

Project	Est. COD Reduction (Lbs/year)	Estimated Cost ($1000)	Completion Date
"A" Knot Sluice Filtrate Replacement	690,000	4	1999
"B" Knot Sluice Filtrate Replacement	1,100,000	0	March 2000
"A" Screenings Sluice Filtrate Replacement	2,060,000	15	Approved
"B" Screenings Sluice Filtrate replacement	510,000	3	1999
"B" Cleaner Rejects Screen Upgrade	3,300,000	120	March 2000
"B" Rejects Cleaner Timed Dump	1,100,000	70	September 2001
"A" Flash Steam Condensate Separator	2,100,000	180	Approved
Improved Control Oxygen Delig. Feed	--	35	Approved
All Projects	**10,860,000**	**427**	

Table 2
INTERNATIONAL PAPER COMPANY, ANDROSCOGGIN MILL
XL-2 Sewer Survey (2001)

Sample Point	***ISCO Sampler Present***	***Flow Measurement Device Available***	***Color, pH[1]***	***Toxicity[2]***	***TSS, VSS, Ash, Conductivity, BOD (filtered/ unfiltered), COD (filtered/unfiltered)[2]***	***Comments[3]***
PM 1 & 2 (near main lab)	✓ xx	✓ xx	✓ xx		✓ xx	
PM 1 & 2 General Sewer (inside parshall flume house)		✓ xx	✓ xx		✓ xx	Flow meter requires calibration. Sampler not presently at site.
PM 1 & 2 Caustic Sewer (inside parshall flume house)		✓ xx	✓ xx		✓ xx	Flow meter requires calibration. Sampler not presently at site.
PM 3 & Coating Prep	✓ xx	✓ xx	✓ xx	✓ xx	✓ xx	
PM 4 & 5	✓ xx	✓ xx	✓ xx		✓ xx	
A Pulp Mill General Sewer (inside parshall flume house)	✓ xx	✓ xx	✓ xx		✓ xx	Flow meter requires calibration.
A Pulp Mill Caustic Sewer (inside parshall flume house)		✓ xx	✓ xx	✓ xx	✓ xx	Flow meter requires calibration. Sampler not presently at site.
B Pulp Mill General Sewer	✓ xx	✓ xx	✓ xx		✓ xx	
B Pulp Mill Caustic Sewer			✓ xx		✓ xx	grab sample
Groundwood	✓ xx	✓ xx	✓ xx		✓ xx	
Evaporators			✓ xx		✓ xx	grab sample
Acid Sewer			✓ xx	✓ xx	✓ xx	Acid sewer sample point now available at waste treatment.
Otis	✓ xx	✓ xx	✓ xx		✓ xx	
Water Treatment		✓ xx	✓ xx		✓ xx	grab sample
Total Mill (Bar Screen)	✓ xx	✓ xx	✓ xx	✓ xx	✓ xx	
Mill Effluent	✓ xx	✓ xx	✓ xx		✓ xx	

NOTES:

1) pH and color to be completed by International Paper
2) Toxicity, TSS, VSS, ash, conductivity, BOD, COD to be completed by external laboratory
3) In all cases listed, John will follow-up and get flow meters calibrated. Travis will follow-up and have ISCO samplers, or other means of sampling, available for the survey.
4) Digital photos to be taken of all sewer samples
5) 3, 24 hour composite samples to be taken at each location with an ISCO composite sampler
6) 3 grab samples, taken each day of the survey at approximately 7:00am, will be taken at locations with no ISCO sampler
7) Mill production rates to be recorded by Travis Flagg during the survey

Table 3
Arrangement of the Raw Data for the 2nd Mill-Wide COD Balance

Sample	Flow	Total		Filtered		Solids		Spec.	pH	Color
		BOD	COD	BOD	COD	Susp.	Diss.	Conduc.		
	(gpm)	(mg/L)						(mS/cm)		(mg/L)
Raw Water										
PM #1 & #2 (general)										
PM #1 & #2 (composite)										
PM #3 & Coating Prep										
PM #4 & #5										
Total Paper Mill										
A Pulp Mill (general)										
A Pulp Mill (caustic)										
B pulp Mill (general)										
B Pulp Mill (caustic)										
Acid Sewer										
A Evaporators										
B Evaporators										
B Evaporators (6^{th} & SC)										
Total Black Liquor Cycle										
Groundwood										
Otis										
River Waste										
Total Others										
Bar Screen										
Mill Effluent										

Table 4.
Arrangement of Calculated Daily Mass Flow Rates

Sample	Flow	Total		Filtered		Solids			Color
		BOD	COD	BOD	COD	Susp.	Diss.	Total	
	(gpm)	(#/day)							
Raw Water									
PM #1 & #2 (general)									
PM #1 & #2 (composite)									
PM #3 & Coating Prep									
PM #4 & #5									
Total Paper Mill									
A Pulp Mill (general)									
A Pulp Mill (caustic)									
B pulp Mill (general)									
B Pulp Mill (caustic)									
Acid Sewer									
A Evaporators									
B Evaporators									
B Evaporators (6^{th} & SC)									
Total Black Liquor Cycle									
Groundwood									
Otis									
River Waste									
Total Others									
Bar Screen									
Sum Paper Mill, BL Cycle, Others minus Acid Sewer									
Mass Closure at Bar Screen(%)									
Mill Effluent									

Figure 1

COD (kg COD/ADMT) Discharge in Final Mill Effluent

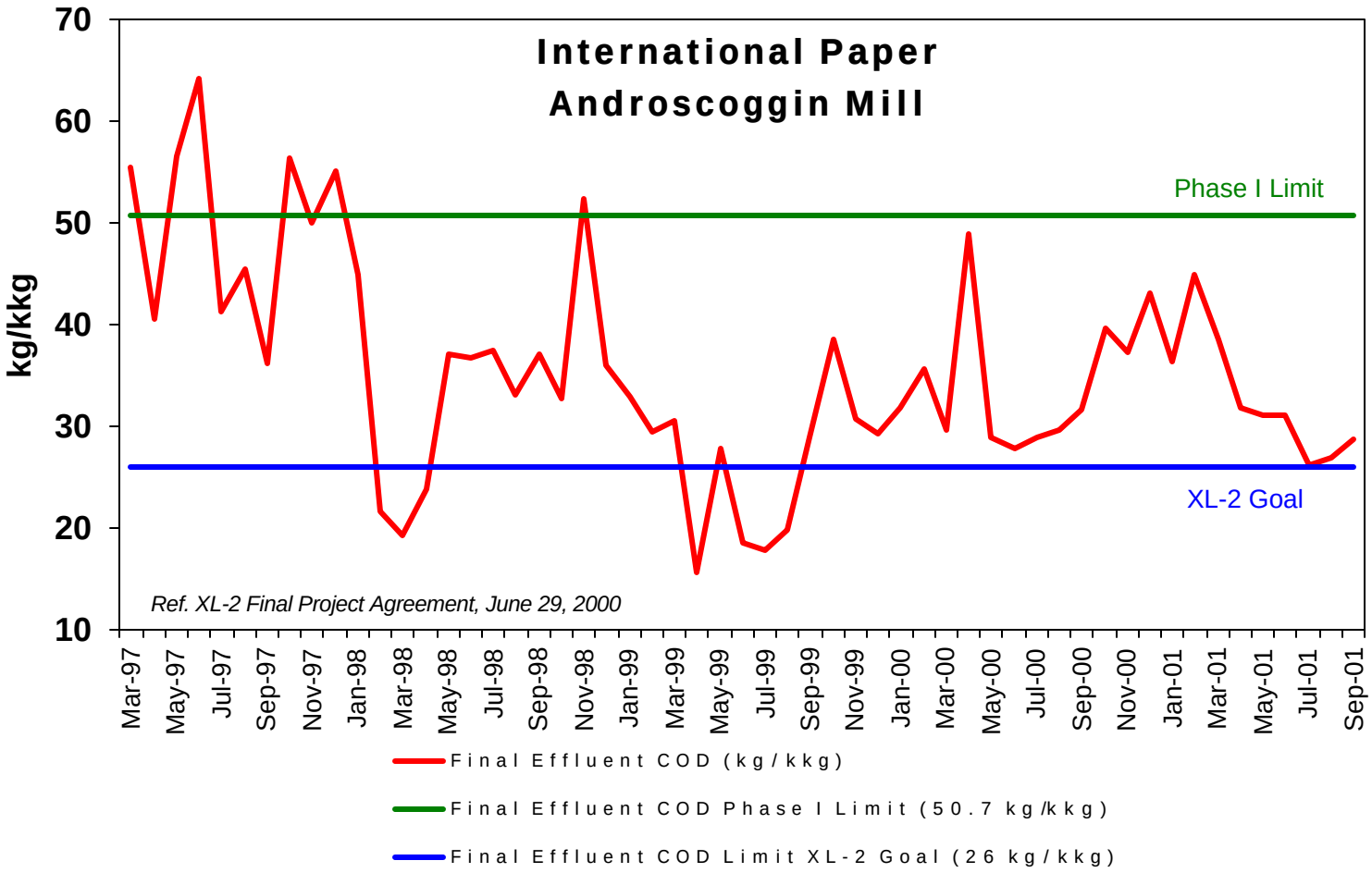

Figure 2

Quarterly Color (Lbs/AD Short Ton Pulp) Discharge in Mill Effluent

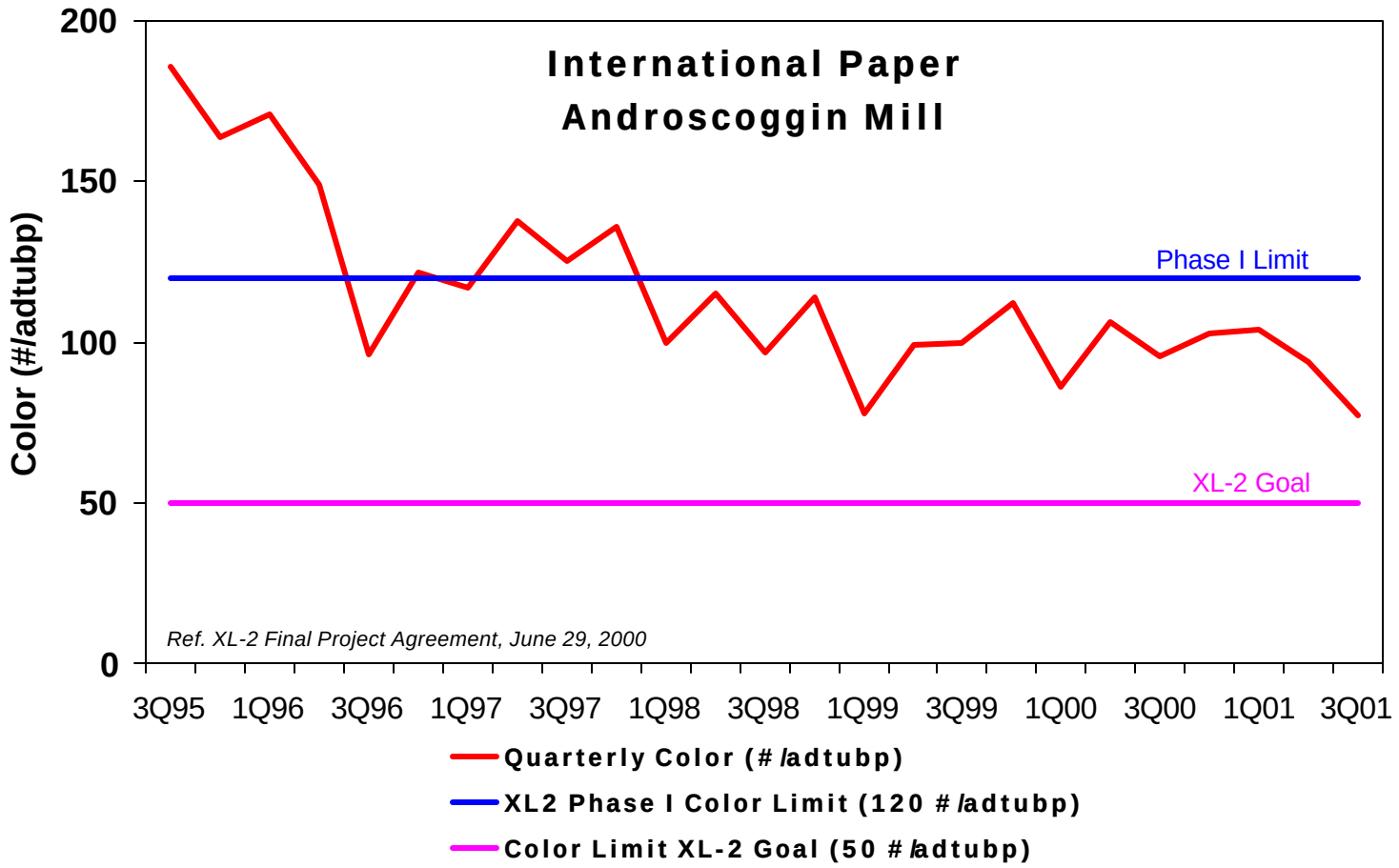

Figure 3
Layout of Mill Sewer System