

# **System-Wide Low-Flow Management Plan Mississippi River above St. Paul, Minnesota Revised March 11, 2004**

## **Introduction**

During extreme low-flow events on the Mississippi River above St. Paul, Minnesota, hydropower operations and adjustments to reservoir control structure gates have the potential to cause large percentage changes in river flow. Large flow fluctuations, especially during periods of low flow, can have significant negative impacts on instream fish and wildlife, and create water supply problems for downstream users. Droughts and associated low flows are inevitable, but artificial flow fluctuations can exacerbate the negative impacts.

## **Planning Process**

Prevention of artificial flow fluctuations was raised as an issue during the federal relicensing process for several hydropower facilities on the Mississippi River. The current Federal Energy Regulatory Commission (FERC) licenses for the Rapids Energy Center (previously known as Blandin Paper) facility at Grand Rapids, Wausau Paper Company (previously known as Potlatch Corporation, and then Minnesota Paper) at Brainerd, and Minnesota Power at Little Falls require development of a low-flow management plan in cooperation with the U.S. Army Corps of Engineers (Corps) and the Minnesota Department of Natural Resources (DNR).

To facilitate coordinated, system-wide planning the DNR and the St. Paul District US Army Corps of Engineers (USACE) co-sponsored a meeting of hydropower operators in Brainerd on September 20, 1995. All the hydropower representatives agreed to participate in a low-flow planning effort. A follow-up meeting was held in Brainerd on February 28, 1996. Participants agreed that improved communication among operators of both hydropower facilities and dams, and access to good flow information, were important in achieving the goals of this low-flow planning effort.

## **Purpose**

The hydropower facilities on the Mississippi River licensed by the FERC are required to operate “run-of-river”, meaning that instantaneous inflow equals instantaneous outflow to the greatest possible extent. The purpose of this low-flow plan is to help ensure that “run-of-river” operations are maintained during periods of low flow to minimize artificial flow fluctuations and protect the aquatic resources and other values of this nationally important river.

## **Plan Update/Revision**

River conditions will be monitored by the DNR during periods of low flow to evaluate how well this plan is being implemented and whether it achieves the purpose of minimizing artificial fluctuations in river flow. If the need for plan updates or revisions becomes evident, the DNR and the USACE will facilitate a plan review process in cooperation with Mississippi River hydropower facility and dam operators.

## **2004 Need for Revisions**

The main purpose of this March, 2004 plan revision is to acknowledge new ownership of the Blandin and Potlatch facilities, obtain the signatures of Rapids Energy Center, Wausau Paper of Minnesota, and add a proposed facility at Lower St. Anthony Falls: SAF Hydroelectric, LLC.

In addition, since 1996, Minnesota Power’s Blanchard facility received a new 40-year FERC license effective

August 25, 2003. In that Minnesota Power was already signatory to this Plan, and did not propose a change in operation, FERC did not specifically state that the Blanchard facility be signatory to the Plan. The new FERC license allows the Blanchard facility to operate with a  $\pm 0.5$ -foot band, rather than a  $\pm 0.25$ -foot band (as shown in the original matrix). The new FERC license does state in Article 401, however, that the “licensee shall not use the plus or minus 0.5-foot operating band for pulsing or peaking purposes.”

A coordination meeting was held with signatories and stakeholders of the Low-Flow Management Plan on March 10, 2004 . The participants agreed that limiting fluctuations during low flows is crucial to downstream stakeholders (e.g., Xcel’s Monticello Nuclear Plant and Sherco Coal Plant, and the Minneapolis water supply), and agreed that better communication is needed during periods of low flow. Suggestions for improvement included: raising the trigger flows for earlier notification and improved response purposes (see discussion below under “Low-Flow Operating Principles”); changing the trigger flows from average daily river flow to “instantaneous” flow; communication prior to construction activities, and the establishment of a web page for easy reference of existing flows, predicted flows, hydropower operator contact information and agency contact information.

Other minor revisions made in the document simply correct outdated information.

## **Low-Flow Operating Principles**

### **1) Trigger Flows**

This plan will be in effect at a particular hydropower facility or dam when the instantaneous river flow is at or below the trigger flow listed in the attached matrix.

(It should be noted that the previous Low-Flow Management Plan was more restrictive than drought management plans prepared by the Metropolitan Council and the USACE, which use trigger flows based on the “72-hour average” flow. The participants of the March 10, 2003 meeting agreed that “average daily” flow was not restrictive enough for timely reaction to upstream flow changes. The trigger flows were not increased in this Plan as suggested above. Rather, the notification conditions have been elevated, as listed below under “Communication.”)

Trigger flows for this plan are measured at the closest active United States Geological Survey (USGS) gaging station and roughly approximate the annual 90% exceedance flow at each gage. The trigger flow of 2000 cfs at Anoka corresponds to the “drought watch” phase described in the DNR Drought Response Plan. The 90% exceedance flow is also the current “minimum flow” level used by the DNR Waters for suspension of certain surface water appropriations.

Direct phone access to the USGS gage at Brainerd is not available at this time, but in an emergency, real-time data can be obtained by contacting the dam operator listed in the matrix. Facility owners will ensure that gage phone numbers and gage rating tables are kept by every operator, and that every operator can convert river stage data to river discharge using a rating table. Operators can access up-to-date gage rating tables at the USGS website <http://mn.usgs.gov/wrd/ratings/index.html> .

The USACE has adopted low-flow guidelines for the headwaters reservoirs (including Winnibigoshish and Pokegama) that are triggered by reservoir water levels. The guidelines suggest minimum release flow values for various reservoir levels. The minimum release flow values for the Winnibigoshish and Pokegama Dams (based on an Order of the Commissioner of Conservation, State of Minnesota dated April 19, 1963) were originally shown in the attached matrix in place of trigger flows. However, for consistency and clarity, the trigger flow of 400 cfs at Grand Rapids is now shown for the USACE reservoirs, and the minimum release information will be included under the “Notes” column.

### **2) Reservoir Operating Bands**

As stated above, all of the hydropower facilities are required to operate "run-of-river". Moderate incremental adjustments in gate settings and turbine operations are performed to mimic natural inflows to a facility and provide relatively stable reservoir levels and gradually varied flow conditions downstream. Reservoir operating bands are specified in most FERC hydropower licenses. Where no operating band is currently prescribed for a gated reservoir, the operating band for the purpose of this plan is normal pool  $\pm 0.25$  feet. Reservoir operating bands are contained in the attached matrix.

### **3) Ramping Rates**

Ramping rates limit the artificial changes in flow through the facility so that sudden, unexpected increases or decreases in river flow can be avoided. Where no ramping rate is currently prescribed, the ramping rate for the purposes of this plan is no more than a 10% gradual change in flow over a two-hour period. Ramping rates are contained in the attached matrix. These ramping rates apply to artificial increases and decreases in flow through the facility.

Due to equipment failure or variation in precipitation across the state, flow could drop to trigger or near-trigger levels on certain reaches of the Mississippi River while remaining within a normal range on other reaches. Operators and the USACE will notify all participating facilities immediately, and DNR Waters as soon as possible, whenever emergency circumstances cause or require a deviation from the ramping rates set forth in this plan.

### **Communication**

Phone numbers for key organizations and agencies are listed in the table at the end of this document. This Plan, and an interactive matrix, will be posted on a DNR-sponsored web page.

Additional phone numbers and e-mail addresses for facility operators and phone numbers for gaging stations with remote access are contained in the matrix. Agency internet addresses that may be useful are:

USGS Real-Time Flow data: <http://waterdata.usgs.gov/mn/nwis/current?type=flow>  
USACE Real Time: <http://www.mvp-wc.usace.army.mil/dcp/>  
DNR Climate Data: <http://climate.umn.edu/>  
National Weather Service Advanced Hydrologic Prediction Service (NWS AHPS):  
<http://www.crh.noaa.gov/ncrfc/>

The DNR Division of Waters will provide a general alert to all Mississippi River facilities when river conditions are receding and there is a likelihood that flow will fall to the trigger flow value at any of the Mississippi River gages used in the attached matrix. Facility operators will notify the DNR Waters Surface Water Unit when the instantaneous flow approaches 100 cfs above the trigger flow value at their particular facility.

Again, operators and the USACE will notify the next downstream (and adjacent) facilities immediately, and DNR Division of Waters as soon as possible, whenever emergency circumstances (or planned construction activities) cause or require a deviation from the operating criteria set forth in this plan. Emergencies include emergency power demands made under the Mid-Continent Area Power Pool Agreement. E-mail correspondence is encouraged for notification purposes, allowing all facilities to learn of conditions both upstream and downstream of their facilities.

### **Record Keeping**

Several FERC-licensed facilities already are required to maintain records of flow and headwater and tailwater elevations on an hourly basis during all flow conditions. This documentation is especially important during periods of low flow. All facilities agree to ensure that records of flow and headwater and tailwater elevation are maintained on an hourly basis when flow at their facility is less than the trigger value. Facilities that currently lack

the necessary equipment to maintain a permanent record of hourly data agree to have the necessary equipment in place by December 31, 2004.

## USACE Operations

The St. Paul District Army Corps of Engineers is committed to managing the six Mississippi River Headwaters Reservoirs at Lake Winnibigoshish, Pokegama Lake, Leech Lake, Big Sandy Lake, Cross Lake, and Gull Lake consistent with the operating principles contained in this low-flow plan, except when compliance with this plan would be inconsistent with existing federal mandates (with the understanding that USACE facilities are not subject to FERC or DNR regulatory jurisdiction). The USACE may have to restrict lockages through the Upper St. Anthony Falls Lock & Dam, Lower St. Anthony Falls Lock & Dam, and Lock & Dam #1 during periods of low flow. The decision to restrict lockages would be coordinated through the Corps' Locks and Dam Project Manager's office, and any adjacent and downstream hydropower facilities.

## Participating Parties

The following parties have participated in the development of the System-Wide Low-Flow Management Plan for the Mississippi River above St. Paul originally dated September 1996 and revised March 11, 2004, and agree to make good faith efforts to implement its provisions (individual signature pages for all Parties to this Plan are included and made a part of this agreement):

### SIGNATORIES:

#### Rapids Energy Center (Blandin Dam)

By Gordon Ranta Title Lead Station Operator Date 03/07/05

#### International Paper

By Ken Gallant Title Utilities Manager Date 6/15/05

#### City of St. Cloud

By Kenneth H. Robinson Title Public Utilities Director Date 3/30/05

#### Crown Hydro

By Thomas R. Griffin Title President Date 03/10/05

#### Ford Motor Company

By Rick Troness Title Environmental Engineer Date \_\_\_\_\_

#### Minnesota Department of Natural Resources

By Mel Sinn Title Technical Resources Section Administrator Date \_\_\_\_\_

#### ALLETE, Inc (d/b/a Minnesota Power Inc.)

By Thomas R. Hughes Title Hydro Operations Supervisor Date 03/14/05

#### Xcel Energy (Northern Power Corporation)

By Patrick Flowers Title Mgr of Water Quality, Environmental Services Date \_\_\_\_\_

**Wausau Paper of Minnesota, LLC (Brainerd)**

By George Ketchum Title E/I & Utilities Superintendent Date 03/9/05

**St. Paul District U.S. Army Corps of Engineers**

By Robert Engelstad Title \_\_\_\_\_ Date \_\_\_\_\_

**Three Rivers Park District (Coon Rapids Dam)**

By Douglas Bryant Title Park District Superintendent Date 03/17/05

**SAF Hydroelectric, LLC (Lower St. Anthony Falls)**

By Doug Spaulding Title President Date \_\_\_\_\_

**System-Wide Low-Flow Management Plan Matrix**

[http://files.dnr.state.mn.us/natural\\_resources/climate/drought/low-flow\\_management\\_plan\\_matrix.pdf](http://files.dnr.state.mn.us/natural_resources/climate/drought/low-flow_management_plan_matrix.pdf)