

RIVER FALLS HYDRO OPERATION

Operating Protocol for the hydro units at River Falls, Wisconsin

The objective of the plan is to operate the units with minimal effect on downstream levels. Following is operational criteria that will be met in order to achieve this objective.

UNIT #2:

Normal Ramping Procedure – *This procedure is for making gate corrections to maintain pond levels, necessitated by incoming flow changes. Weather conditions will be the main cause of varying inflows.*

To correct for falling pond level (inflow decreasing): Turn back gate at a rate of 5 KW (3 CFS). Maintain gate position for a minimum of 15 minutes before another gate adjustment is made.

To correct for rising pond level (inflow increasing): Use the same 5 KW (3 CFS) going the other way (opening gate). Maintain gate position for a minimum of 15 minutes before another gate adjustment is made.

Ramping Procedure for Trash Rack Cleaning – *The object of this plan is to minimize downstream water level fluctuations during trash rack cleaning operation. Effort will be made to reduce the amount of times that trash racks are cleaned. Cleaning will be done only when the debris in the rack is causing a reduction in output of the generator. There are many different flow conditions that will be seen during the year that will have an effect on the operation of the hydro units.*

General Criteria for Trash Rack Cleaning: The day Plant Operator will, when reporting to work on Mondays and Thursdays, make a trip to the #2 Lower Hydro to observe the racks and make a judgment as to the need for cleaning.

Operational Criteria During Spring and Summer Season Conditions: The ramping down procedure will be the same as adjusting the output to maintain pond levels. Reduce output by 5 KW (or 3 CFS). Maintain gate position for a minimum of 15 minutes before another 5 KW adjustment can be made.

Operational Criteria During Fall Season Conditions: During the Fall season, grate cleaning is needed more frequently, due to falling leaves. At times, when the leaf load is high, the lake level will be raised, so overtopping is taking place. This will permit floating leaves to pass over the dam. This will reduce the amount of leaves collected in the trash racks, therefore reducing the need for cleaning. If it becomes necessary during heavy leaf loading, the unit will be shut down until such time as the leaf loading subsides. This will maintain a steady level downstream during a potentially critical time.

Operational Criteria During Winter Season Conditions: Very little grate cleaning is needed during the winter season. Grates are observed during biweekly visits to the plant.

Ramping Up Procedure: The ramping up after grate cleaning or maintenance work will be, under all conditions, as follows. Place unit on line at an output of 5 KW. Ramp up in 5 KW (3 CFS) increments. Maintain gate position for a minimum of 15 minutes before another 5 KW adjustment is made.

UNIT #1:

Same procedure as Unit #2, with the following considerations:

Correcting water levels on the upper pond are not as critical, as the lower pond acts as a buffer for flows discharged from the upper unit. Ramp up or down at a rate of 10 KW to maintain desired levels as observed on the level indicator.

The above is true only when the lower unit is in operation. *At times when the lower unit is off line and all water is being passed over the lower dam, the ramping will be the same as Unit #2, as changes in the flow from the upper unit will impact down stream levels immediately.*

* Conditions and Estimated Timelines for Ramping Procedures (both units):

High Inflow Conditions: This condition is when the dam is overtopping while the unit is at full capacity. Time line may be reduced as conditions allow. Base line is at least 70 CFS (3 inches) passing over the top of the dam before shutting down the turbine. The time line under this condition will vary from 1 to 4 hours.

Normal Inflow Conditions: This condition is when the unit can be operated at full capacity (70 CFS) while the pond level is stabilized at the required level. The time line for ramping down during this condition will be from 6 to 10 hours.

Low Inflow Condition: This condition exists when the unit can only be operated at a maximum of 75% (52 CFS) of rated load of 70 CFS. The time line for ramping down under this condition will be from 10 to 24 hours.