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February 5, 2015

Aaron Mason
Willow River State Park Superintendent
1034 County Road A
Hudson, WI 54016

Subject: Impending Drawdown of the Impoundment held by the Little Falls Dam, Field File 55.01, KSN 54, St. Croix County, Wisconsin

Dear Mr. Mason,

This letter is a follow-up on the findings by the Department of Natural Resources Dam Safety Program based on the inspection completed on September 20, 2013 and submitted on March 28, 2014. Prior to that, the most recent inspections of the Little Falls dam were conducted in 2011 and 2009.

The Little Falls Dam is a large, high hazard dam located on the Willow River in Willow River State Park. From left to right, looking downstream, the dam contains a 117 foot concrete barrel arch non-overflow section, a 22 ft. by 12 ft. tainter gate, 43 ft. wide powerhouse section, three 12 ft. by 9 ft. tainter gates and a 72 ft. concrete ogee overflow spillway. As a result of a Dam Failure Analysis (DFA) approved in January of 2014, the dam as currently configured does not have adequate capacity to pass the 100-year event. Chapter NR 333, Wisconsin Administrative Code requires high hazard dams to have the capacity to pass the 1000-year event.

The current condition of the dam based on the 2014 inspection is as follows. Tainter gates are numbered from left to right, looking downstream of the dam. Gate 1 is in good condition, gates 2 and 4 are inoperable and in poor condition, and gate 3 is operable but in poor condition. The ogee overflow spillway portion of the dam is the oldest section of the structure and its condition is difficult to assess due to daily flow conditions and an inability to access this area.

The non-overflow barrel arch section of the dam (left side) is experiencing seepage along its downstream side and a V-notch weir has been installed to monitor this seepage. Past records in the file indicated that vortices have been observed along the upstream side of this section but repair work may have taken care of this issue, however, the downstream seepage is a function of seepage through, around or under this portion of the dam.

The foundation on the right side of the powerhouse appears to be in poor condition, as there is indication of possible movement due to gate 2 binding against its abutment wall and water spilling into the gate bay through a crack at the contact of the gate's left abutment wall. Foundation problems in this area are likely responsible for the fact that gates 3 and 4 do not function properly. Additionally, there are no plans indicating how the powerhouse flume was abandoned during the powerhouse decommissioning.

Cracking observed in the left abutment wall of gate 2 and water seepage at the base of this wall seems to indicate subgrade foundation problems or issues associated with the decommissioned flume. Again, this area is not readily available for inspection.

There are concerns at the contact of the right abutment and the sandstone bedrock interface. Seepage from the impoundment has a readily visible downstream flow path through the bedrock indicating that water is piping around the structure in an uncontrolled manner. Unless addressed as a probable failure mode, this situation will get progressively worse with each freeze/thaw cycle it endures.

A portion of a timber crib structure from the original construction exists in front of the left half of the ogee overflow spillway. The condition of the submerged structure and its ability to function as a structural component is questionable and unknown.

The low draw sluice gate was indicated to be partially operable, however it is unknown if the gate is fully functional which may be due to added sediment load on the upstream face.

Significant sediment accumulation has occurred at the upstream face of the dam, causing for added pressure on the structure.

The results of the 2014 inspection report indicate serious concerns with the overall safety and structural integrity of the Little Falls Dam. In order to give Willow River State Park time to plan for this eventuality, the Department's Dam Safety Program will not issue an Administrative Order for drawdown of the impoundment held by the Little Falls Dam until September 2015. The Administrative Order will, at that time, set a timeline for Park personnel to begin the drawdown process. Please note, if the condition of the dam deteriorates and warrants an Administrative Order at any time before September 2015, the Department's Dam Safety Program is prepared to move forward with an Order for an immediate drawdown. The condition of the dam will be closely monitored by both Park and Dam Safety Staff between now and September.

Timelines will be established in the Administrative Order for Willow River State Park to decide how they wish to proceed; if they wish to reconstruct the structure or if they choose to abandon the structure.

If you have any questions regarding this letter please contact this office at your convenience,

Sincerely,



Michael R. Rogney
Water Management Engineer
Eau Claire Service Center

Cc: Bill Sturtevant P.E., WDNR, State Dam Safety Engineer
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