

MEMORANDUM

To: E8 IAG Lake Level Fluctuations

From: Kleinschmidt

cc: E2 IAG Erosion & Siltation; Lay Recreation IAG; Project Files

Date: October 30, 2002

RE: Lake Level Fluctuations Research

Introduction

The E8 IAG has been made responsible for studying the effects of project-related, lake level fluctuations on aquatic resources. In this ongoing, cooperative relicensing process, IAG members and other interested stakeholders have frequently been encouraged to share ideas and thoughts relative to this issue.

At the March 12, 2002 IAG meeting, Mr. Don Haney (member of the Lay Lake HOBO Association) presented information to the group documenting five separate Federal Energy Regulatory Commission (FERC) hydroelectric projects with license requirements restricting lake level fluctuations to 0.3-feet. Mr. Haney asked that the IAG look at these projects¹ to see if the same restriction in fluctuation (0.3-ft) could be applied to the Lay Project, which currently has a daily fluctuation restriction of 1-ft.

In order to assess the feasibility of this alternative and its potential applicability at the Lay Project, Kleinschmidt reviewed the physical, biological, and operational factors of these projects to see if they were comparable with APC's run-of-river Lay hydroelectric project.

Summary

Using FERC's Records Information Management System (RIMS), Commission Issuance Posting System (CIPS), and Federal Energy Regulatory Records Information System (FERRIS), Kleinschmidt was able to locate and review the selected projects identified by Mr. Haney.

¹ P-2084 Raquette Project, P-11516 , P-2161 Rhinelander Project, P-2689 Oconto Falls Project & P- 11797

Of the five projects identified, three had the license requirement restricting lake level fluctuations to 0.3-ft. These three projects were located in Michigan and Wisconsin with each project having a total generating capacity of less than 6-MWs, in comparison to the Lay Project which has a total generating capacity of 177-MWs. In addition to significant differences in generation, each of the three projects are relatively small (both reservoir and project flow) when compared to the Lay Project. The 0.3-ft lake level fluctuation restrictions were required mainly due to water quality concerns.

The two remaining projects most likely resulted from a key word search and did not have 0.3-ft lake level fluctuation restriction, but instead used the terms in an unrelated context, i.e. “fluctuations ... are measured from 0.3-ft below the permanent crest of the dam.”

To ensure the completeness of this search, Kleinschmidt independently conducted a review of FERC’s records using several combinations of the key words “0.3-ft lake level fluctuations”. This independent search resulted in numerous results; however, none of the resulting projects were comparable to those of APC and in fact appeared to be associated only with mid-west regional, small hydroelectric projects. Attachment A contains the results of both searches.

After reviewing Mr. Haney’s information and conducting an independent search, Kleinschmidt found no precedent or similar license requirement (0.3-ft lake level fluctuation restriction) for projects comparable to the size and magnitude of any of APC’s run-of-river hydroelectric projects.

Recommendations

Based on the summary above and because there is no comparable example of this lake level restriction, Kleinschmidt recommends that the IAG eliminate the proposed alternative of restricting lake level fluctuations to 0.3-ft on Lay Lake for enhancement of environmental resources from further analysis and consideration.

Attachment A

Kleinschmidt Search Results

Lay Lake Research Results:

Search method:

Using the project number and selected reference(s) identified by Mr. Haney, Kleinschmidt located the source document to determine the context of the reference and then reviewed other related documents to determine specific project information relating to biology, physical characteristics and operational parameters.

P-2084 (New York)

Selected Reference:

“Normal impoundment fluctuations of the developments of the Upper Raquette River Project are measured from 0.3 feet below permanent crest of dam.”

Document Type:

Order Issuing New License

This is the distance from the top of the dam used to measure lake level fluctuations. Actual fluctuations on this project range from 1-2 feet.

Project Specific Information:

NY, Raquette River

101 MWs

P-11516 (Michigan) Unlicensed

Selected Reference:

“Maintain the normal water surface elevation of each project impoundment to within ± 0.3 feet to protect aquatic and riparian habitat in the project impoundments from impacts associated with repeated dewatering;”

“Consistent with the water quality certificate conditions we recommend a band of ± 0.3 feet. We agree that, in addition to protecting near shore habitat through habitat stabilization, erosion would also be minimized.”

Document Type:

Final Environmental Assessment

This was an agency condition, required by the WQC.

Project Specific Information:

The Irving Dam's principal project features would consist of an existing 6-foot-high gravity-earth filled dam, an existing reservoir with a surface area of 25 acres at a maximum pool elevation of 738.5 feet USGS and a storage capacity of 100 acre-feet, a 1,200-foot-long head race canal, and a powerhouse containing one generating unit with a rated capacity of 600 Kw.

P-2161 (Wisconsin)

Selected Reference:

“Rhineland and the DNR and FWS have agreed on a continuance of ROR operations at the project. Specifically, operating the project at an elevation of 1555.45 feet with a +/- 0.3 feet operating range is proposed.”

“Water level fluctuations caused by hydropower peaking operations can impact shoreline erosion and deposition processes. The impacts can include bank failure and slumping, degradation and aggradation of sediments in nearshore areas, as well as increasing sediment loads.”

“On November 18, 1999, DNR and Rhineland reached a settlement agreement resulting from negotiations on the conditional water quality certification issued by DNR on October 27, 1998. The settlement included agreement that Rhineland would continue to operate the project in a ROR mode, maintaining the impoundment at a target level of 1555.45 feet (MSL) with fluctuation of no more than +/- 0.3 feet as measured at the dam.”

Document Type:

Draft Environmental Assessment

Again, this action was linked to the WQC; however, there were conditions for emergency draw downs and fluctuations greater than the 0.3 feet.

Project Specific Information:

The project consists of the following existing facilities: (1) A main dam comprised (31.8 feet high) of 370 feet of earth embankments, in two sections to the left and right of a spillway section containing two 10.7-foot-wide steel roller gates; (2) a 965-foot-long power canal, with a single 36-foot-wide Taintor gate spillway structure located downstream of a 14-gate canal inlet structure, located adjacent to the right embankment of the dam; (3) an 8.5-mile-long, 3,576-acre impoundment with a normal water surface elevation of 1,555.45 feet above mean sea level (msl), and a normal storage capacity of 21,500 acre-feet.

P-2689 (Wisconsin 1.8 MWs)

Selected Reference:

“The Licensee shall operate the project in a run-of-river mode for the protection of aquatic resources in the Oconto River. The Licensee shall at all times act to minimize the fluctuation of the reservoir surface elevation (701.92±0.3 feet NGVD) by maintaining a discharge from the

project so that, at any point in time, flows, as measured immediately downstream of the project tailrace, approximate the sum of inflows to the project reservoir.”

Document Type:

Order Amending License

This was a license article that the licensee tried to change. The licensee requested through the amendment that the upper limit be raised. FERC ordered that the 0.3 feet fluctuations be maintained however, there are exceptions for emergencies.

P-11797 (Michigan) (megawatts)

Selected Reference:

Continue to operate in ROR mode at the same normal reservoir water surface elevation (797.0 NGVD), with fluctuation limited to ± 0.3 feet.

Document Type:

Public Scoping Document

Proposed protection and enhancement measure.

--

Independent FERC RIMS Research:

Complimentary to reviewing the projects identified by Mr. Haney, Kleinschmidt conducted an independent search to determine whether FERC had implemented this restriction on other hydroelectric projects and what the reasoning and conditions surrounding this restrictions were.

Kleinschmidt conducted a key-word search of FERC records producing the following results:

P-11291 “0.3 feet lake level fluctuation” – refers to an intake velocity

P-2431 “0.3 feet lake level fluctuation” – lake level fluctuation range: 5.3 MWs, WI Brule River

P-11291 “0.3 feet lake level fluctuation” – refers to an intake velocity

P-11549 “0.3 feet lake level fluctuation” – Exempt from license

P-2536 “0.3 feet lake level fluctuation” – Reservoir draw down plan

P-2402 “0.3 feet lake level fluctuation” – Lake level fluctuation range: Order Issuing New License “operate the project in a modified run-of-the-river mode with inflow approximating equal to outflow, even when inflows are less than the minimum hydraulic capacity of 82.5 cfs, limiting water level fluctuations in the impoundment to +/- 0.3 feet 80 percent of the time, and +/- 1.0 foot 100 percent of the time on a monthly basis.” 2.2 MWs, MI Sturgeon River

P-11150 “0.3 feet lake level fluctuation” – Lake level fluctuation range: Notice of Environmental Assessment “maintain impoundment levels within plus or minus 0.3 feet of normal headpond water surface elevations at both developments.” Newly issued license, 7 MWs, MI

P-11120 “0.3 feet lake level fluctuation” – Lake level fluctuation range: Order Issuing New License (Minor Project)
“accepted staff’s recommendation to limit impoundment fluctuations to plus or minus 0.3 feet, as required in the WQC. I am requiring the licensee to maintain the Middleville impoundment to a plus or minus 0.3-foot elevation ...” MI

P-11300 “0.3 feet lake level fluctuation” – Lake level fluctuation range: Order Issuing New License (Minor Project)
“accepted staff’s recommendation to limit impoundment fluctuations to plus or minus 0.3 feet, as required in the WQC. I am requiring the licensee to maintain the LaBarge impoundment to a plus or minus 0.3-foot elevation limit ...” 8 MWs, MI

P-10461 “0.3 feet lake level fluctuation” – Reservoir draw down plan