

FEDERAL ENERGY REGULATORY COMMISSION  
WASHINGTON D.C. 20426  
June 10, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029-Nebraska  
Loup River Hydroelectric Project  
Loup Power District

Mr. Neal Suess, President/CEO  
Loup Power District  
2404 15<sup>th</sup> Street  
P.O. Box 988  
Columbus, NE 68602-0988

**Reference: Determination on Requests for Modifications to the Loup River  
Hydroelectric Project Study Plan**

Dear Mr. Suess:

Pursuant to 18 CFR § 5.15(c), this letter contains my determination on requests for modifications to Loup Power District's Study Plan for the Loup River Hydroelectric Project (Loup River Project or project).

Background

Loup Power District filed its Second Initial Study Report on February 14, 2011, and held meetings on February 23 and 24, 2011, to discuss the study results presented in the report. Loup Power District subsequently filed revisions to its Second Initial Study Report on March 10, 2011, and a summary of the meetings on March 11, 2011.

The Second Initial Study Report provided results for the following approved studies:

- Study 1.0 – Sedimentation (describes additional sedimentation studies completed after submittal of the Initial Study Report)
- Study 2.0 – Hydrocycling
- Study 4.0 – Water Temperature in the Project Bypass Reach
- Study 5.0 – Flow Depletion and Flow Diversion
- Study 8.0 and Study 9.0 – Recreation Use and Creel Survey
- Study 12.0 – Ice Jam Flooding on the Loup River

Written comments on the Second Initial Study Report were filed by the U.S. Fish and Wildlife Service (FWS) on April 7, 2011; Federal Energy Regulatory Commission staff (Commission staff) on April 8, 2011; and the Nebraska Game and Parks Commission (Nebraska Game and Parks) on April 11, 2011. None of the commenting entities requested that new studies be conducted; however, the FWS and the Nebraska Game and Parks recommended modifications to four of the previously approved studies: Study 1.0 – Sedimentation, Study 2.0 – Hydrocycling, Study 4.0 – Water Temperature in the Project Bypass Reach and Study 5.0 – Flow Depletion and Flow Diversion. Loup Power District responded to all comments and recommendations on May 11, 2011.

### Study Determination

Commission staff reviewed the recommended modifications to the approved study plan, comments on the Second Initial Study Report, and other related elements on the record and made recommendations on the need to modify the Study Plan. Based on staff's analysis and recommendations, I am not requiring the agency recommended modifications for three of the studies (Study 2.0 – Hydrocycling, Study 4.0 – Water Temperature in the Project Bypass Reach, and Study 5.0 – Flow Depletion and Flow Diversion); however, I am modifying Study 1.0 (Sedimentation) to require Loup Power District to:

- Relate effective discharge to channel geomorphologic characteristics (mean velocity, flow width, flow depth and flow area).
- Using each of the four channel geomorphologic characteristics developed at each of the seven gaged sites and five ungaged sites, make longitudinal (spatial) comparisons of all of the sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream.

The procedures for implementing these modifications and my reasons for requiring them as well as for not making other recommended modifications are explained in detail in Appendix A. The Updated Study Report, including the results of the approved modifications above, is due by August 26, 2011.

If you have any questions, please contact Lee Emery at (202) 502-8379 or [Lee.Emery@ferc.gov](mailto:Lee.Emery@ferc.gov).

Sincerely,

Jeff C. Wright  
Director  
Office of Energy Projects

cc: Mailing List  
Public File

## APPENDIX A

### Staff's Recommendations and Findings on Requested Study Modifications

Below, we discuss the comments on the Second Initial Study Report, filed on February 14, 2011, and provide our reasons for requiring or not requiring certain requested modifications to the Study Plan.

#### Study 1.0 – Sedimentation

##### Requested Modification

FWS recommended that Loup Power District compare the river geomorphology at all sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream. FWS referenced our August 26, 2009 Study Plan Determination, where we required a spatial analysis of the geomorphologic data. Additionally, FWS referenced the Revised Study Plan, dated July 27, 2009, where Loup Power District stated that the channel geomorphology associated with the effective discharges would be calculated. FWS stated that this commitment was partially satisfied in the Initial Study Report, filed on August 27, 2010, and the Second Initial Study Report, filed on February 14, 2011. However, FWS stated that Table 5-1 of the Sedimentation Addendum in the Second Initial Study Report does not adequately relate sediment transport effects to channel geomorphology. FWS requests that all channel geomorphologic characteristic information for the Loup and the Lower Platte rivers be presented as longitudinal (spatial) comparisons starting at the most upstream site on each river, and progressing downstream.

Loup Power District responded by stating that the requested spatial analyses have been performed and are presented in the appendices of the Second Initial Study Report (Appendix B, Study 2.0 - Hydrocycling and Appendix D, Study 5.0 - Flow Depletion and Flow Diversion). Loup Power District stated that “differences in channel geometries are consistent with the differences in effective and dominant discharges resulting from the different flow hydrographs acting in shaping the channel differently at each location.”

##### Discussion and Conclusions

Loup Power District has developed the channel geomorphologic characteristic information requested by the FWS, including effective discharge, dominant discharge, mean velocity, flow width, and flow depth. This information was developed for seven U.S. Geological Survey (USGS) gages (two sites are on the Loup River and five sites are on the Lower Platte River) and five ungaged sites (two sites are on the Loup River and three are on the Lower Platte River). This information is contained in numerous documents, including the Initial Study Report's Sedimentation Study Report and the

Second Initial Study Report's Sedimentation Addendum, Hydrocycling, and Flow Depletion and Flow Diversion reports. However, absent is a comprehensive and cohesive spatial comparison and analysis of geomorphologic data as was originally required by our August 26, 2009 Study Plan Determination and now recommended by the FWS. This information is still needed for us to assess the geomorphologic conditions on the Loup and Lower Platte rivers, which are part of the project's affected environment. Although we agree with Loup Power District that "differences in channel geometries are consistent with the differences in effective and dominant discharges resulting from the different flow hydrographs acting in shaping the channel differently at each location," our analysis also needs to include an evaluation of the relationship between discharge and mean velocity, flow width and flow depth between the sites.

Therefore, for each of the seven USGS sites and five ungaged sites, we recommend that Loup Power District relate effective discharge to mean velocity, flow width, flow depth, and flow area.<sup>1</sup> Using each of the four channel geomorphologic characteristics (mean velocity, flow width, flow depth and flow area) developed at each of the seven gaged sites and five ungaged sites, Loup Power District should make longitudinal (spatial) comparisons of all sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream. The Loup River analysis should include comparisons of ungaged site 1, ungaged site 2, USGS gage no. 06793000 (Genoa gage), and USGS gage no. 06794500 (Columbus gage).<sup>2</sup> Similarly, the Lower Platte river analysis should include comparisons of USGS gage no. 06774000 (Duncan gage), ungaged site 3, ungaged site 4, USGS gage no. 06796000 (North Bend gage), ungaged site 5, USGS gage no. 06796500 (Leshara gage), USGS gage no. 06801000 (Ashland gage) and USGS gage no. 06805500 (Louisville gage) progressing upstream to downstream. To facilitate the spatial analysis, we recommend that Loup Power District present the information graphically similar to figure 5-2 of the Sedimentation Addendum, dated February 11, 2011 (filed on February 14, 2011).

Our justification for the recommended modification is that we still need this information as part of our assessment of project effects on sedimentation and any related effects on plover and tern habitat, and that this previously approved study was not completed as required by the August 26, 2009 Study Plan Determination (18 C.F.R. §5.15(d)(1)).

---

<sup>1</sup> Flow area can be obtained by dividing the discharge and mean velocity.

<sup>2</sup> In other words, ungaged site 1 should be compared to ungaged site 2, ungaged site 2 should be compared to the Genoa gage, and so on and so forth progressing downstream.

## Study 2.0 – Hydrocycling

### Requested Modification

FWS recommended that Loup Power District resurvey the stream cross sections at sites 3, 4, and 5 during the first week in May, first week in July, and first week in August 2011. FWS stated that the dates of the cross-sectional surveys as provided in table 4-4 of the Hydrocycling Report<sup>3</sup> indicate that the measurements would be inadequate in assessing rates of erosion. The FWS stated that it would be difficult to measure sandbar erosion rates using the existing data in the report because of a peak discharge that occurred on June 14, 2010 that likely redistributed sandbars between the 2010 cross-sectional surveys. The FWS stated that the addition of a July cross-sectional survey would allow comparisons of erosion rates associated with a flood (peak) event should one occur during mid to late June 2011.

Loup Power District responded that FWS' requested modification is unnecessary, because FWS made this request with the understanding that only one of the cross-sectional surveys was collected after the peak discharge that occurred on June 14, 2010. Loup Power District stated that FWS referenced the incorrect table in the hydrocycling report. Loup Power District stated that the correct dates of the survey are presented in table 4-1<sup>4</sup> and that table 4-4 includes the flow rates used to calibrate the HEC-RAS model. As identified in table 4-2, site 3 was surveyed three times, two of which were after the June 14 peak discharge event.

### Discussion and Conclusions

FWS' requested modification to Study 2.0 – Hydrocycling was based on the assumption that the results of only one cross-sectional survey were collected at site 3 following the June 14, 2010 event. However, as noted above, table 4-2 indicates that site 3 was surveyed on two occasions following the June 14 event: August 11 and September 29. Therefore, existing survey information meets the study objectives as approved on August 26, 2009. For this reason, we find that there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).

---

<sup>3</sup> Filed as appendix B of the Second Initial Study Report on February 14, 2011.

<sup>4</sup> The survey dates are specifically contained in table 4-2.

## **Study 4.0 – Water Temperature in the Project Bypass Reach**

### Requested Modification

The FWS and Nebraska Game and Parks recommended that Loup District conduct an additional year of temperature monitoring at the Merchiston and Genoa sampling sites. The resource agencies stated that the additional year of temperature monitoring in the Loup River bypassed area was needed, because missing temperature data occurred during low flow conditions in the bypassed reach when exceedances of water temperature standards likely occurred. The resource agencies concluded that this missing data prevents an adequate determination of the relationship between Loup River streamflow and temperature exceedances in the Loup River bypassed reach, and the collection of additional data would allow them to make an estimate of the “No Diversion” condition effects on temperature exceedances.

Loup Power District acknowledged that temperature data were missing during a portion of the study period at the Merchiston and Genoa sites.<sup>5</sup> However, Loup Power District noted that because Study 4 clearly showed that water temperature is highly correlated to ambient air temperature, and air temperature data are available during the water temperature data gap, the missing water temperature data do not substantially alter the conclusions of the study. The Loup Power District also noted that a statistical analysis of water temperature exceedances above the project diversion weir at Merchiston was intended to be a surrogate for the “No Diversion” condition. Thus, Loup Power District concludes that another year of temperature sampling at the Merchiston and Genoa sites is unnecessary.

### Discussion and Conclusions

Based on our review of Loup Power District’s response and the study results, we agree with Loup Power District that the failure of the gages to collect temperature data at the Merchiston and Genoa sites for short periods did not significantly affect the study results. Ambient air temperature data can be used to inform an analysis on whether water temperature exceedances likely occurred during the period when the gages were inoperable. We therefore find that there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).

---

<sup>5</sup> On page 5 of Study 4.0 - Water Temperature in the Project Bypass Reach, there is a discussion of the data gap in temperature recordings from June 28 to 30, 2010 at the Merchiston site. The discussion indicates that the data gap was likely the result of the probe being exposed to the atmosphere from low water levels. On June 10, 2010 the temperature sensor at the Genoa gage was washed away as a result of high flows, causing the data gap at this gage; a replacement sensor was installed on July 19, 2010.

## **Study 5.0 – Flow Depletion and Flow Diversion**

### Requested Modification

The FWS recommends that the “Montana Method” be used to evaluate the “No Diversion” aquatic resource condition of the Platte River bypassed reach. The FWS bases this request on a comparison of the Montana Method results of the Duncan study site to the results at Site 3. The Duncan site is located on the Platte River upstream from the bypassed reach of the Platte River, and Site 3 is located within the bypassed reach of the Platte River. The FWS contends that an evaluation of the No Diversion condition is critical to understanding the project’s diversion-related effects on the health of aquatic resources in the bypassed reach of the Platte River.

The Loup Power District concludes that there is no need to conduct the requested analysis, because: (a) the Montana Method is used to determine minimum flows in a stream based on the average of flows in the stream over the course of a year; (b) evaluating habitat conditions using the Montana Method is essentially comparing a stream to itself and does not require comparisons to other locations or streams; and (c) using the Montana Method evaluation of habitat at the Duncan gage illustrated that flows are degraded on the Platte River upstream of the Loup River confluence and that habitat conditions are generally improved at Site 3 (i.e., Site 3 had 49 months of “favorable” flows versus 10 months of favorable flows for the Duncan site).

### Discussion and Conclusions

The Platte River is a braided stream, and as such, has wide fluctuations in river flows and aquatic habitat. The Montana Method does not model the dynamics or complexity of a river system; rather it provides the percentages of mean annual flows needed to maintain a healthy stream environment. The bypassed section of the Platte River is a relatively short stream section of about 2 miles.

The morphology of the Platte River has changed over the long period of time that the project has been operating due to the stream hydrograph that has resulted under project operations. The use of the Montana Method under the “No Diversion” scenario for the bypassed reach would require application of a pre-project mean annual flow to the computation, which would be a misapplication of the methodology given that the current channel morphology reflects today’s mean annual flow rather than the pre-project mean annual flow. In any event, we find that the existing information for Site 3 is sufficient for our analysis of the effects of different flows on stream health in the Platte River bypassed reach, and therefore, there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).