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June 19, 2013

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington DC 20426

Subject: The Central Nebraska Public Power and Irrigation District, Project No. 1417  
Article 421, FERC Project Boundary Review  
Proposed Changes to the Project Boundary for Johnson Regulating Reservoir

Secretary Bose:

The Central Nebraska Public Power and Irrigation District (Central) filed a request with the Federal Energy Regulatory Commission (FERC) on December 3, 2012 for a six-month extension of the Johnson Regulating Reservoir (Johnson Reservoir) (a.k.a. Johnson Lake) FERC Project boundary review due date from December 31, 2012 to June 30, 2013. Central has completed that review, and hereby submits to FERC the following summary concerning the FERC Project Boundary at Johnson Reservoir.<sup>1</sup>

**Introduction**

Central filed with FERC the Project boundary review for Johnson Reservoir in 2002. On December 12, 2003, FERC issued the "ORDER AMENDING LICENSE TO CHANGE PROJECT BOUNDARY." Subsequent to the December 13, 2003 Order, Central discovered that the changed boundary excluded certain Projects works, specifically portions of the East Dike.<sup>2</sup>

As mentioned in the December 3, 2012 letter from Central to FERC, use of the December 2008 *Nebraska Statewide Probable Maximum Precipitation (PMP) Study* has the potential to reduce the peak elevation scenario at Johnson Reservoir to the point that the Johnson Reservoir East Dike is no longer needed by Central's Project, and could be removed from the FERC Project boundary.

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<sup>1</sup> This review will also be discussed in a less-detailed summary in the next Project Boundary Review Annual Progress Report due July 31, 2013.

<sup>2</sup> Earlier reviews and communication to FERC suggested that part of the Johnson Dam had also been excluded from boundary, based on a mistaken identification of the location of the east end of the dam. Further review has identified that only portions of East Dike were excluded from boundary.

The primary focus of the current boundary review was to assess whether the East Dike is no longer needed, and should be removed from the Project. As further described below, Central has concluded that the East Dike is no longer needed, should be removed from the Project, and the FERC Project boundary adjusted accordingly.

During this review, Central also identified a small part piece of land near the inlet to Johnson Reservoir that also should be removed from the Project Boundary.

### **East Dike**

Johnson Reservoir is an off-channel regulating reservoir on Central's main Supply Canal. It was created by construction of a dam (Johnson Dam) across the lower end of a wide, shallow natural basin, and occupies almost the entirety of the drainage basin above the dam that creates it. The inlet canal is on the west side of the reservoir and the outlet canal is on east side of the reservoir. There are no outlet works or flows through or around Johnson Dam; all outflows are through the constructed outlet canal.

Johnson Dam is on the south side of reservoir, running approximately east-west across the natural basin opening. From the west end of Johnson Dam, a dike extends westward along the southwest side of the reservoir (West Dike). From the east end of Johnson Dam, another dike extends northward to the east of the reservoir (East Dike). The East Dike was the primary focus of this review. The East Dike is described in Central's FERC License Exhibit A, and is shown in Exhibit F drawing F-SCB-28 *Location of East Dike* (FERC Drawing 1417-1348 Revised October 2007). The approximate location and alignments of the East Dike is shown in Attachment A (dated June 17, 2013), and is labeled as "Area A."

Both the Johnson Dam and West Dike serve as regular water retaining structures within the normal range of operations of the reservoir. By contrast, the design purpose of the East Dike was to prevent water from emptying out of the reservoir to the south and east should water levels in the reservoir ever get so high that it would not be contained by the natural terrain. Whereas the reservoir water is regularly in contact with and retained by the Johnson Dam and the West Dike, the reservoir has never come in contact with the East Dike in more than 70 years of operation of the Project.

Whether or not the East Dike should fall within the Project boundary logically depends on whether or not the East Dike is a necessary part of the Project works for containing water within the reservoir. Central investigated whether the East Dike is needed by comparing maximum possible water reservoir elevations against terrain elevations in the vicinity of the reservoir and the East Dike to see if this Dike is needed to prevent water from flowing unimpeded out of the reservoir under an extreme high water event.

The highest possible reservoir elevation was determined by applying a very conservative Probable Maximum Flood analysis to Johnson Reservoir. On October 10, 2012 FERC approved the December 2008 *Nebraska Statewide Probable Maximum Precipitation (PMP) Study* for use in future studies for FERC projects. For purposes of this analysis, Central used a PMP value of 23 inches, estimated from Figure 12.5 of the Nebraska PMP Study, which provides all-season values for 72 hours and 10 square miles. The Johnson Lake drainage area, including the area occupied by the lake, is approximately five square miles. The surface area of Johnson Lake is approximately 2,500 acres. The normal maximum surface water elevation is 2621.0 feet above mean sea level (ft msl). Assuming that all of the precipitation over the entire watershed would translate into 100% runoff to the lake without any losses to interception, infiltration, etc.; and further assuming that Central would make no changes to increase canal outflows over canal inflows (or, conversely, to reduce canal inflows below canal outflows); then the resultant increase in lake volume would be approximately 6,100 acre-feet, or 2.5 feet of elevation increase, to a maximum elevation of 2623.5 ft msl.

Central then performed an elevation survey of the natural terrain throughout the area around and between the Johnson Reservoir and the East Dike. The survey showed that a continuous line of natural terrain in excess of elevation 2623.5 ft msl exists between the reservoir and the East Dike, and that therefore the East Dike is not needed for purposes of containing water and preventing it from flowing uncontrolled away from the reservoir even under the extremely conservative PMF scenario that was analyzed.

There are no other known operational, environmental, or cultural resources needs associated with the East Dike. Therefore, the entire East Dike and its associated lands could be removed from the Project.

#### **Land on North Side of Inlet Canal**

Coincident with Central's review of the East Dike and associated lands, Central also took note of and reviewed a small projection of Project lands north of the inlet canal. This piece of land follows a natural draw, and likely was originally included as part of the Project based on an elevation when it was anticipated that the reservoir would be operated higher than it actually is. The location of this piece of land is shown in Attachment A (dated June 17, 2013), and is labeled as "Area B." Central surveyed this piece of land for elevations and confirmed it to be well outside of the normal range of operations for the reservoir. There are no known operational, environmental, or cultural resources needs for this piece of land, and it can be removed from the Project boundary.

### **Conclusions and Next Steps**

Central has determined that the East Dike is not needed as Project works. There are no other known operational, environmental, or cultural resources associated with the East Dike. The entire East Dike and associated lands totaling approximately 174 acres are not needed within the FERC Project boundary.

The small piece of land north of the inlet also is not needed for operational purposes. There are no known operational, environmental, or cultural resources associated with this piece of land. Therefore, this piece of land totaling approximately 3 acres should be removed from the Project boundary.

Central next plans to do the following:

1. Seek review and approval from the FERC Division of Dam Safety and Inspections of Central's determination that the East Dike is not needed as Project works.
2. Pending the results of item 1 above, consult with the U.S. Fish and Wildlife Service and the Nebraska Game and Parks Commission regarding the removal of the East Dike and associated lands from the Project.
3. Pending the outcome of item 2 above, file with FERC the appropriate changes to Exhibit A, Exhibit F, and Exhibit G removing the East Dike; and
4. Coincident with item 3 above, also file with FERC changes to Exhibit G removing the small piece of land on the north side of the inlet canal from the Project boundary.

Respectfully submitted,



Michael A. Drain, P.E.  
Natural Resources Manager

Attachment

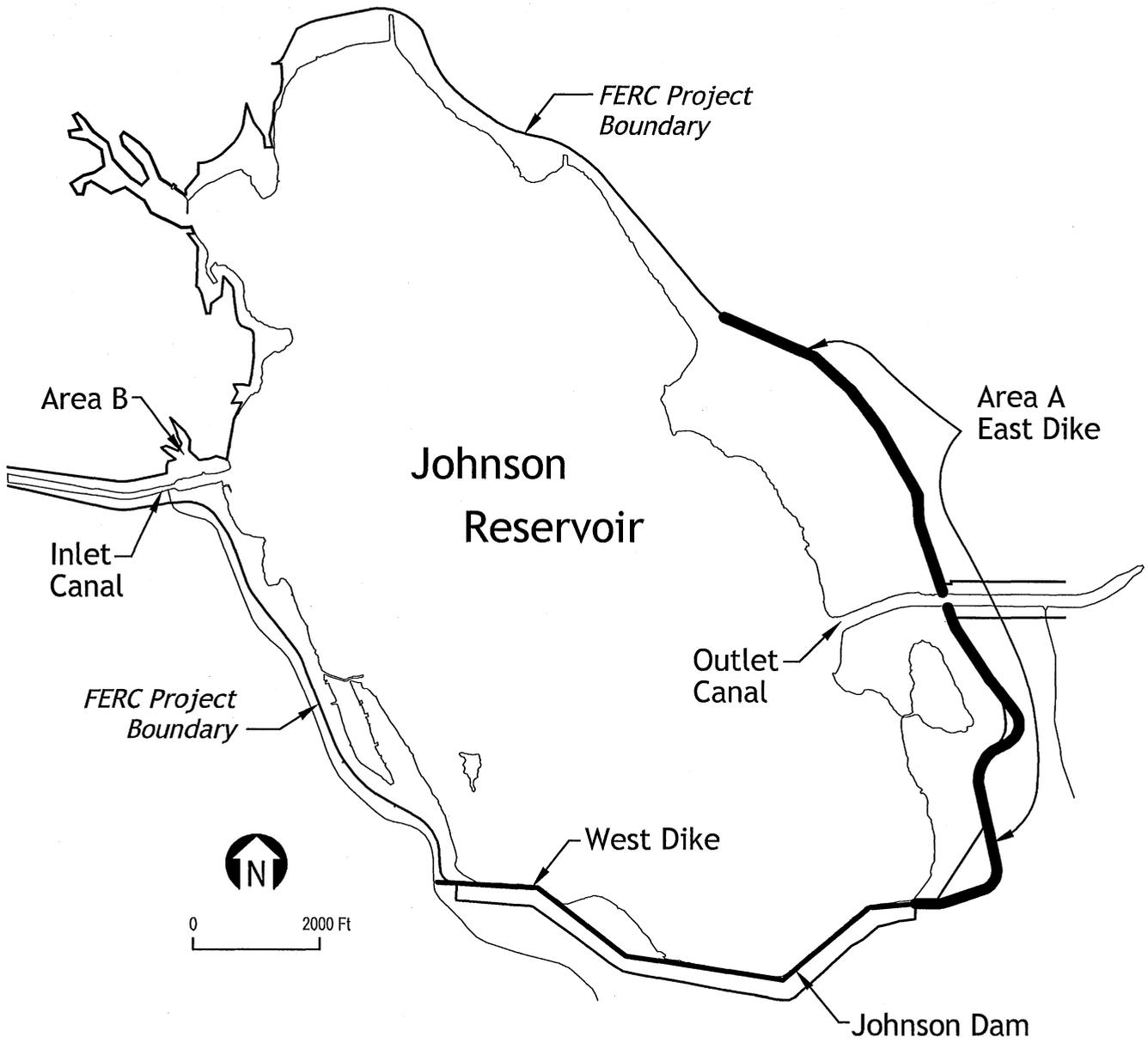
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June 17, 2013

# Attachment A