

125 FERC ¶ 61,287  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Joseph T. Kelliher, Chairman;  
Sudeen G. Kelly, Marc Spitzer,  
Philip D. Moeller, and Jon Wellinghoff.

City of Hastings, Minnesota

Project No. 4306-017

ORDER AMENDING LICENSE

(Issued December 13, 2008)

1. On April 24, 2008, and supplemented on April 30, September 26, November 7, and November 13, 2008, the City of Hastings, Minnesota (City), licensee for the 4.4-megawatt (MW) Mississippi Lock and Dam No. 2 Hydroelectric Project No. 4306, filed an application to amend its license to install two 35-kilowatt (kW) hydrokinetic turbines in the project's tailrace. The project is located at the United States Army Corps of Engineers' (Corps) Mississippi Lock and Dam No. 2 on the Mississippi River near the City of Hastings in Dakota County, Minnesota. As discussed below, we grant the application.

**Background**

2. The Mississippi Lock and Dam No. 2 Hydroelectric Project is located on the Mississippi River at river mile 815.2.<sup>1</sup> The City's existing project consists of a powerhouse, containing two 2.2 MW generating units, located between the lock system on the west side and the dam of the east side of the Corps' Lock and Dam No. 2, and a 1,000-foot-long transmission line.<sup>2</sup>

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<sup>1</sup> A 50-year license for the Mississippi Lock and Dam No. 2 Project was issued to the City of Hibbing, Minnesota, in 1983. 24 FERC ¶ 61,020 (1983). The license was later transferred to the City of Hastings. 31 FERC ¶ 62,308 (1985).

<sup>2</sup> The Lock and Dam No. 2 consists of the dam with two locks (one working and one abandoned in place) on the west side. River traffic passes through the working lock nearest the shore. The dam impounds the 32.4-mile-long Pool 2, and marks the upstream extent of the 18.2-mile-long Pool 3.

3. The City proposes to install two hydrokinetic turbines in the tailrace 50 feet downstream of the City's existing powerhouse. The hydrokinetic array would consist of: (1) two 35-kW hydrokinetic turbines, suspended below a 68-foot-wide and 40-foot-long floating barge; (2) two generating units that would sit atop the barge; and (3) a transmission line that would connect to the project's existing transmission line at the powerhouse. The floating barge would be tethered to the dam structure and anchored for stability using anchors and spuds (piles).

4. Operation of the existing project will not change and the hydrokinetic array will operate only when the project's powerhouse is in operation. Since the hydrokinetic array floats on the surface of the water, the operation of the two turbine units does not depend on river water levels. If the river flow increases causing the water level to rise, the units will rise with the water surface to maintain a constant depth of the turbine rotors from the water surface.

5. On April 28, 2008, the Commission issued public notice that the amendment application was accepted for filing, that the project was ready for environmental analysis, and soliciting comments, recommendations, terms and conditions, and prescriptions. In response, timely motions to intervene were filed by the U.S. Department of the Interior (Interior), American Rivers, Trout Unlimited, and American Whitewater. Timely recommendations and comments were filed by D.E. Shaw Company, Brookfield Renewable Power, Inc., National Hydropower Association, Interior, Congressman John Kline, American Rivers, Trout Unlimited, and American Whitewater.

6. On September 26, 2008, the Commission issued an Environmental Assessment (EA) to evaluate the potential environmental effects of the proposal and identify environmental measures to mitigate or reduce potential impacts. Comments on the EA were received from American Rivers, American Whitewater, Trout Unlimited, and Interior. The motions to intervene, comments, and recommendations have been fully considered in determining whether, and under what conditions to issue this amendment.

### **Water Quality Certification**

7. Under section 401(a) of the Clean Water Act (CWA),<sup>3</sup> the Commission may not issue a license for a hydroelectric project that authorizes any activity that may result in a discharge from the project unless the state water quality certifying agency either has issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one

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<sup>3</sup> 33 U.S.C. § 1341(a) (2006).

year. Section 401(d) of the CWA provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.<sup>4</sup>

8. In Minnesota, the Minnesota Pollution Control Agency (Minnesota PCA) is the certifying agency. The City submitted a letter to Minnesota PCA on March 20, 2008, requesting an amendment to the water quality certification issued for its license.

9. On November 5, 2008, Minnesota PCA issued an amendment to the October 23, 1984 certification that it had issued for the original project license. The amended certification addresses the amendment proposed in this proceeding. The licensee filed the amendment with the Commission on November 6, 2008. The certification is included as Appendix A of this order, and is made part of the license for the project by Ordering Paragraph (E). The certification, which amends and replaces the prior certification, rescinds two conditions, adds two, revises seven, and retains two unchanged. The certification includes requirements for the licensee to operate in a run-of-river mode, maintain daily flow records, follow best management practices in the installation of equipment to protect water quality, and file certain information. The certification also requires the licensee to monitor water quality for three years and conduct a fish mortality study after the hydrokinetic array is installed. Last, the certification reserves authority to amend the certification as necessary after review of the results of the 3-year water quality monitoring.

### **Mississippi National River Recreation Area**

10. In 1988, Congress established the Mississippi National River Recreation Area (Recreation Area), which encompasses the Mississippi River Corridor within the St. Paul-Minneapolis Metropolitan Area.<sup>5</sup> The Recreation Area is managed by the National Park Service (NPS). The legislation provides that the Commission must notify the Secretary of the Interior (Interior) of its intent to issue any license within the Recreation Area.<sup>6</sup> Interior shall then review the proposed facility or undertaking to assess its compatibility with the Recreation Area's Comprehensive Management Plan (Management Plan). Interior shall make its compatibility determination within 60 days of receiving notice of the proposal. If Interior determines that the proposed facility or undertaking is incompatible with the plan, it must immediately notify the Commission and request that it take actions necessary to conform the proposed facility or undertaking

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<sup>4</sup> 33 U.S.C. § 1341(d) (2006).

<sup>5</sup> The Recreation Area was established in Title VII of the Arizona-Idaho Conservation Act of 1988, Pub. L. No. 100-696, codified at 16 U.S.C. § 460zz (2006).

<sup>6</sup> 16 U.S.C. § 460zz-3(b)(1) (2006).

to the plan. Within 60 days after receiving Interior's request for action, the Commission must notify Interior of the specific decisions made in response to the request.

11. By letter issued September 29, 2008, Commission staff forwarded a copy of the EA to Interior. The letter stated staff's conclusion that the proposed amendment is not inconsistent with the Management Plan and requested that Interior complete its review of the proposal.

12. On December 1, 2008, the Deputy Secretary of the Interior filed a letter with the Commission stating that Interior does not have enough information to determine whether the proposed license amendment is inconsistent with the Management Plan. Interior states that, to make that determination, the technology would need to be carefully tested, and additional adaptive management measures would need to be developed for the project. Interior states that a 3-5 year pilot project license would be more appropriate for this project (instead of an amendment to an existing license), because a pilot license would allow testing and analysis of the project while minimizing the risk of adverse environmental impacts that might result from operation of this new technology. Interior states that, if, at the conclusion of the pilot project period, it is determined that the technology has minimal environmental effects or that any impacts can be easily mitigated, Interior would then be able to determine the compatibility of the hydrokinetic array with the Management Plan.

13. In the EA, staff found that the proposed amendment was not inconsistent with the Management Plan.<sup>7</sup> To encourage the development of this new technology and in light of the expected minimal environmental effects due to the small size of the project and the location within the tailrace of an existing project, we are issuing an amendment for this proposal instead of a 3-5 year pilot license. However, to ensure that the project does not affect the recreation area, we are requiring the licensee to monitor potential impacts to environmental resources such as fish survival and entrainment, water quality, and avian resources. This monitoring will occur in consultation with the agencies. If at any time, monitoring results indicate that the hydrokinetic array is causing adverse environmental impacts, Article 63 reserves the Commission's authority to require changes to the hydrokinetic array's structures or operations, including removal of the facilities, as appropriate. Thus, while we are granting the amendment for the full term of the license, rather than issuing a pilot license as Interior suggests, we are including in the license the special protections that we would include in a pilot license, thereby ensuring that the recreation area is fully protected.

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<sup>7</sup> EA at 15.

### **Threatened and Endangered Species**

14. Section 7(a)(2) of the Endangered Species Act of 1973,<sup>8</sup> requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of their designated critical habitat.

15. The federally endangered Higgins' eye pearlymussel (*Lampsilis higginsii*) occurs in Pools 2 and 3 of the upper Mississippi River. The Higgins' eye pearlymussel prefers gravel or sand substrates on river bottoms, and because the hydrokinetic array would be located in the project's tailrace, where the substrate is already armored with rock scour protection, the EA concluded that the project is unlikely to adversely affect the Higgins' eye pearlymussel.<sup>9</sup> By letter issued July 22, 2008, the Commission requested concurrence with the U. S. Fish and Wildlife Service (FWS) that the installation and operation of the hydrokinetic array is not likely to adversely affect the federally listed Higgins' eye pearlymussel. The FWS concurred with staff's determination by letter filed December 2, 2008.

### **National Historic Preservation Act**

16. Under section 106 of the National Historic Preservation Act (NHPA),<sup>10</sup> and its implementing regulations,<sup>11</sup> federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register (defined as historic properties) and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. This generally requires the Commission to consult with the State Historic Preservation Office (SHPO) to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

17. The Minnesota SHPO determined in 1981 that the project area did not include any historic properties, and the Corps informed the licensee in an email dated September 21,

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<sup>8</sup> 16 U.S.C. § 1536(a) (2006).

<sup>9</sup> EA at 14.

<sup>10</sup> 16 U.S.C. § 470 (2006) *et seq.*

<sup>11</sup> 36 C.F.R. Part 800 (2008).

2007, that the Mississippi Lock and Dam No. 2 is not eligible for the National Register and is not within or part of any historic district.<sup>12</sup>

18. By letter issued July 30, 2008, the Commission concluded that the proposed license amendment would not affect any historic properties and requested comments and recommendations on this determination from the Minnesota SHPO. The SHPO responded on September 9, 2008, that additional information pertaining to the Area of Potential Effect and the eligibility of Lock and Dam No. 2 for listing on the National Register was necessary to complete the section 106 review. The Commission provided the requested information on September 23, 2008. The SHPO filed a letter on November 14, 2008, stating that it concluded that no historic properties listed in or eligible for the National Register of Historic Places will be affected by the proposed license amendment.

### **Section 18 Fishway Prescriptions**

19. Section 18 of the Federal Power Act (FPA)<sup>13</sup> provides that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate. No fishway prescriptions or reservations of authority were filed under section 18 of the FPA.

### **Recommendations Pursuant to Section 10(J) of the FPA**

20. Section 10(j) of the FPA<sup>14</sup> requires the Commission to include license conditions based upon recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act,<sup>15</sup> to "adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat)" affected by the project. No 10(j) recommendations were submitted for this application.

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<sup>12</sup> The email was submitted as part of the licensee's amendment application on April 24, 2008.

<sup>13</sup> 16 U.S.C. § 811 (2006).

<sup>14</sup> 16 U.S.C. § 803(j) (2006).

<sup>15</sup> 16 U.S.C. §§ 661 (2006) *et seq.*

**Recommendations Pursuant to Section 10(A)(1) of the FPA**

21. Section 10(a)(1) of the FPA<sup>16</sup> requires that any project for which the Commission issues a license shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes. Interior, American Rivers, Trout Unlimited, and American Whitewater made recommendations that we consider under the broad public interest standard of FPA section 10(a)(1).<sup>17</sup>

**A. Emergency Shutdown and Removal**

22. Interior states that the project should be capable of quick shutdown or removal on short notice, and the option to decommission and restore the site to its previous operating conditions should be considered in the event serious circumstances arise. In addition, American Rivers, American Whitewater, and Trout Unlimited comment that although they generally support the need for small-scale testing of hydrokinetic technology in a riverine environment, they recommend that the license amendment contain the same general principles the Commission has adopted in the hydrokinetic pilot process. We agree and have incorporated these measures into the license. Article 63 reserves the Commission's authority to require the licensee to cease operation of the hydrokinetic array in the event that doing so is necessary for the protection of the environment or the life, health, or property of the public. In addition, Article 62 requires the licensee to develop a project removal plan prior to starting on-site hydrokinetic turbine array installation. This will ensure quick removal of the project in the event the Commission orders the removal of the hydrokinetic array for environmental, safety, or other reasons.

**B. Water Quality Monitoring**

23. The EA found that installation and operation of the licensee's hydrokinetic array has the potential to slightly alter existing dissolved oxygen (DO) and turbidity conditions in the project tailrace due to altered current/flow velocities.<sup>18</sup> However, because the

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<sup>16</sup> 16 U.S.C. § 803(a)(1) (2006).

<sup>17</sup> Congressman John Kline, D.E. Shaw and Company, National Hydropower Association, and Brookfield Renewable Power, Inc., expressed support for the proposed license amendment but did not make any recommendations.

<sup>18</sup> EA at 25-26.

effects of hydrokinetic developments on water quality are largely untested, the EA noted that results of DO and turbidity monitoring could be used to determine if modifications to project operations are needed to continue to meet state water quality standards.<sup>19</sup>

24. In its application, the licensee proposed to conduct limited water temperature, DO, and turbidity monitoring for one month immediately following installation of the hydrokinetic units. The licensee proposed that, if monitoring cannot demonstrate that no significant differences exist in temperature, DO, or turbidity of the water entering and exiting the units, the licensee would discuss an alternative monitoring approach with the Minnesota PCA. However, the water quality certification requires the licensee to implement a three-year water quality monitoring program. The certification states that if at the conclusion of the water quality monitoring, the monitoring demonstrates that DO downstream of the hydrokinetic array is reduced below 5 milligrams per liter (mg/l), two times in a quarter, as a result of hydrokinetic array operations, then Minnesota PCA may require mitigation (e.g., aeration equipment, or discontinuation of hydrokinetic array operation).

25. So that the Commission can keep apprised of the results of the water quality monitoring, Article 64 requires the licensee to file with the Commission copies of all monitoring reports that it files with Minnesota PCA and the reports should include any recommendations by the licensee or agencies regarding future water quality monitoring, or changes to project operation to improve water quality. This will allow the Commission, if needed, to order changes to hydrokinetic array project operation, or require the licensee to remove the hydrokinetic array if warranted by water quality monitoring results.

26. Interior supports the three-year monitoring period required by the water quality certification to demonstrate compliance with state water quality standards through collection of turbidity, DO, and water temperature data. Interior states that if water quality standards are not met, discussions with the Minnesota PCA need to include the identification of mitigation strategies. We agree, and note that the certification requires mitigation if specific DO conditions are not met.

### **C. Fish Entrainment and Survival**

27. Hydrokinetic turbine arrays represent a new technology, and little information is available describing the effects of this equipment on aquatic communities. To estimate fish passage survival through the hydrokinetic array, the licensee proposed to use a HI-Z

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<sup>19</sup> EA at 26.

Turb' N Tag<sup>20</sup> tag-recapture technique. The Minnesota Department of Natural Resources (DNR), Interior, American Rivers, Trout Unlimited, and American Whitewater commented that both survival studies and entrainment studies are needed to evaluate project effects. The EA agreed that both studies are needed to evaluate project effects on fishery resources as a whole.<sup>21</sup> Article 65 requires the licensee to implement its HI-Z Turb'N Tag study, with the addition of the following measures.

28. As discussed in the EA, estimates of fish passage survival through the hydrokinetic array are needed to document whether there is any impact to aquatic diversity.<sup>22</sup> The degree of impact would depend on resulting survival estimates by species. Evidence suggests that survival rates are likely to vary by species. Therefore, the licensee should develop survival/injury estimates for multiple species. A specific species list, to include size ranges, should be developed, in consultation with the resource agencies.

29. As stated in the EA, based on the results of the survival study, the licensee can develop an estimate of fish entrainment through the hydrokinetic turbines.<sup>23</sup> Data is available from the 1990-1991 entrainment study conducted by the licensee, and from the Long Term Resource Monitoring Project conducted by the U.S. Geological Survey for the upper Mississippi River System. Data presented in the 1990-1991 entrainment study provides information on the number of fish by species entrained into the existing turbines. The Long Term Resource Monitoring Project data contains information on fish abundance, frequency of occurrence, community composition and species richness. Using the information in these two databases, the number of fish killed or injured passing through the hydrokinetic array can then be estimated, once the survival rate for the array is known. The licensee should prepare a desktop analysis of possible entrainment rates based on population variability.

30. In order to include these recommended measures as part of the licensee's proposed HI-Z Turb'N Tag study, Article 65 requires the licensee to file a revised fish entrainment and survival study plan with the Commission for approval. The plan should be

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<sup>20</sup> The HI-Z Turb'N Tag is a "balloon tag" consisting of small deflated plastic balloons that are externally mounted to test fish. After the fish are released, the balloons will inflate after a predetermined time period, which will bring the fish to the surface where they can be recaptured.

<sup>21</sup> EA at 33 and 38.

<sup>22</sup> EA at 34-35.

<sup>23</sup> EA at 37.

developed in consultation with the Minnesota DNR, Minnesota PCA, NPS, FWS, and the Corps.

31. Interior states that an entrainment study, specific to the project, needs to be conducted, and should not be estimated from existing data. It argues that entrainment studies should be conducted several times to capture differences due to season, fish movement, and species present. The Minnesota DNR, NPS, and FWS recommend a full flow tailrace netting survey. We disagree. As analyzed in the EA, sufficient data is available to develop estimates of possible fish entrainment.<sup>24</sup> It was concluded that year to year variability in species abundance and diversity could be accounted for statistically by using available data. Information is available on fish relative abundance, frequency of occurrence, community composition and species richness. Once the survival rate is known from the license's survival study, the number of fish killed or injured passing through the turbines can then be calculated.

32. Interior recommends that acceptable mortality rates be determined in consultation with the agencies. We agree. Article 65 requires a Fish Entrainment and Survival Plan that includes a provision to prepare a final report discussing any adverse impacts to fisheries resources and proposed changes to project operation to minimize those impacts. The report is to be developed in consultation with the agencies.

33. Interior recommends including the various fish species that serve as hosts to the Higgins' eye pearl mussel as part of the fish survival monitoring required by this amendment. We are requiring the licensee to develop, in consultation with the agencies, a Fish Entrainment and Survival Plan, which includes a provision to estimate survival/injury for several species. During the development and consultation of the plan, the agencies and the licensee can discuss the need to include a host species as one of the test species for the survival study. Potential effects to host species can then be identified and addressed during the review of the study results.

34. The licensee indicated that tailrace hydraulics would be impacted by the array's operation, with a decrease in water velocity downstream of the array. A decrease in water velocity may allow an increase in predation of fish by establishing feeding stations closer to the face of the dam or downstream of the units in areas with reduced velocity. This has the potential to alter tailrace predation rates and therefore overall survival rates. As stated in the EA, the licensee should provide estimates of predation rates along with the results of the survival/injury study.

35. Interior recommends that mitigation should occur if increased foraging by birds results in impacts to fish species. We agree. Under the required Fish Entrainment and

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<sup>24</sup> EA at 37.

Survival Plan, the licensee is required to develop and implement a method for estimating predation. If the monitoring results indicate adverse impacts, the licensee must propose changes to project operation in order to minimize those impacts.

**D. Bird Monitoring Plan**

36. The EA found that more information is needed to evaluate the potential for turbine injury to diving birds and migratory birds protected by the Migratory Bird Treaty Act.<sup>25</sup> The EA recommended that the licensee consult with the agencies to design and implement a bird monitoring plan to describe bird presence in the tailrace. To capture seasonal effects, including spring and fall migrations, surveys should be conducted at monthly intervals for a year, at a minimum, to provide a basic understanding of how birds may use the tailrace, and to further evaluate whether there is any substantial risk of turbine injury. If monitoring results indicate that diving birds forage in the tailrace, the licensee should consult with the agencies to determine whether additional monitoring is needed and the need for any protection measures. Article 69 requires a bird monitoring plan to be filed no later than 60 days after issuance of this order.

37. Interior states that the bird monitoring plan should be developed prior to project installation. While we agree that the bird monitoring plan should be implemented as soon as possible, we feel that there is no need to delay construction and installation of the hydrokinetic array while the plan is being developed. Interior also suggested that underwater turbine noise be addressed in the bird monitoring plan. The EA found that while the turbines may generate underwater noise, birds that currently use the tailrace will already be acclimated to noise of the tailrace discharge and boat traffic.<sup>26</sup> However, the licensee should address this issue during the development of the plan, which is required to be developed by the licensee in consultation with the agencies.

**E. Mussel Survey and Relocation**

38. While the endangered Higgins' eye pearl mussel is not expected to be present, there are a number of other non-endangered native mussels that may be found in the scour protection area downstream of the proposed hydrokinetic array, where installation of the physical structures such as anchors could damage them. The licensee proposed to remove and relocate any native mussels if they are discovered in the scour protection area during anchor installation. We agree. Article 66 requires the licensee to implement a mussel survey and relocation effort. Since installation of the hydrokinetic array is occurring in an area where federally listed species may occur, the licensee is required to

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<sup>25</sup> EA at 43.

<sup>26</sup> *Id.*

consult with the FWS prior to the start of construction and installation to determine the proper protocol to relocate federally listed species, if any are found. Article 66 also requires that the licensee file a report, describing any mussel species found and its relocation efforts for those species, with the Minnesota DNR, NPS, FWS, Corps, and the Commission within 30 days of completion of mussel relocation.

39. Interior stated that a mussel survey should address the effects of the hydrokinetic array on mussel habitat downstream of the dam. We are not adopting this recommendation because high flows from the existing dam and powerhouse, and the rip-rapped scour protection area already limit the amount of suitable mussel habitat.

#### **F. Zebra Mussel Control and Monitoring Plan**

40. To prevent the spread of the invasive zebra mussel during installation or operation of the hydrokinetic array, the licensee proposed to develop a zebra mussel control program within the project area. The licensee's program would include inspections, and where appropriate, cleaning of any equipment used in the installation, removal and evaluation of the hydrokinetic units. Interior states that the zebra mussel control program needs to be developed prior to turbine installation. Article 67 requires the licensee to develop specific protocols to assure that zebra mussels are not spread to other water bodies as a result of its activities during installation of the hydrokinetic units. Prior to installation, the licensee shall file these protocols with the Commission.

41. Minnesota DNR and NPS requested a long term zebra mussel control and monitoring program. Article 68 requires the licensee to develop and file within 180 days from the issuance of this amendment, for Commission approval, a long-term plan to control zebra mussels at the project, after consultation with agencies. The plan should describe monitoring and control procedures that would be used to prevent project activities from spreading this species into other waters. Monitoring should be focused on project structures rather than broad-level monitoring in the project reach, where a wide variety of influences outside the licensee's control are likely to affect zebra mussel distribution and abundance.

#### **G. Noise Disturbance Monitoring**

42. Interior comments that the licensee should monitor the hydrokinetic array for noise disturbance to terrestrial species, and that acoustic studies should include the collection of data relating to sound pressure level, frequency, audibility, source identification, meteorological conditions, and when possible, biological data. As discussed in the EA, the project location exhibits high levels of ambient noise that result from turbine discharge and electrical generation at the existing hydroelectric project,

commercial and recreational boat traffic, and operation of the lock and dam.<sup>27</sup> Installation of the hydrokinetic array would cause an increase in ambient noise levels due to the presence of machinery and vehicles that typically do not operate in the area. However, installation would not take an extended period of time and any increases in ambient noise levels would be temporary. During normal operations, some noise would be created by the generators located on the hydrokinetic array, but would not be expected to exceed that currently produced during operation of the existing hydroelectric facility. We are not adopting this recommendation because the effects caused by noise will be minor and temporary in duration, and would result primarily from activities relating to the installation of the hydrokinetic array.

## **H. Recreation**

43. Interior states that it does not agree with staff's determination in the EA that no recreational activities would be affected by installation of the hydrokinetic array, and that an evaluation of recreational uses and impacts in and near the project should be conducted in order to balance recreational needs with energy production. Interior is concerned with potential conflicts between recreational uses and public safety, especially if curious boaters want to get a closer look at the facility. Interior requests that a recreation plan be developed in consultation with the NPS that specifically addresses the project's location and new technology.

44. As discussed in the EA, the Corps restricts access in the vicinity of the dam in order to protect public safety and security.<sup>28</sup> This restricted area extends from 600 feet upstream of the dam to 300 feet downstream of the dam, and includes the dam, tailrace, and the licensee's existing hydroelectric project. The location proposed for the hydrokinetic array is within the Corps' restricted access area.

45. Further, Interior proposes additional measures including: (1) installation of interpretive materials and programs that educate the public about this new technology; (2) posting safety precautions to warn the curious recreational observer; (3) a contribution to the development of a water user recreation guide that is currently being developed under the Ford Hydropower Project (FERC Project No. 362); and (4) an annual contribution to a recreational enhancement fund for the remainder of the license period. We agree with Interior's recommendation that the licensee install interpretive materials about the new technology and post safety to educate the public about the new technology involved with the project. We are requiring the licensee to install this signage in Article 70. However, we do not adopt Interior's request that the licensee contribute to the

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<sup>27</sup> EA at 43.

<sup>28</sup> EA at 48.

development of a water user recreation guide being developed for the Ford Hydroelectric Project and make annual contributions to a recreation enhancement fund that has no nexus to the project and is not a specific measure.

### **I. Hydrokinetic Array Safety**

46. Interior agrees that routine operation of the hydrokinetic array would not pose a risk to downstream resources during flood events and changing weather and flow conditions. However, Interior comments that these do not represent all the catastrophic conditions under which the array could break free of its moorings, and recommends that the licensee analyze the potential effects of dislodgement to resources within downstream sensitive areas and revise its operating plan to indicate how the array would be retrieved in the event of dislodgement. Interior also recommends that the Commission's standard hydrokinetic pilot project license articles for a project safety plan should be incorporated.

47. Annual project safety inspections conducted by the Commission's Division of Dam Safety and Inspections would evaluate the integrity of the hydrokinetic array and would require corrective measures to remedy any hazards. These inspections would ensure that the regular operation of the hydrokinetic array would not pose a risk to downstream resources or adversely impact life or property. Further, the licensee proposes to remove the hydrokinetic array from the river when floods, severe weather, or high-flow conditions are expected. The ability to quickly remove the hydrokinetic array would further reduce the risk that the unit may break free of its moorings during adverse conditions. Article 61 requires the licensee to establish a Hydrokinetic Array Safety Plan, which will ensure the safety of the public near the hydrokinetic array area, describe how the hydrokinetic array will be monitored if an emergency occurs, and establish procedures the licensee will follow during an emergency.

### **J. Visual Impacts of Array**

48. Interior notes that the visual simulation conducted by the licensee indicates that the view of the hydrokinetic array would be compatible with the existing hydroelectric facilities; however, it recommends that an analysis of the visual impacts of the array be conducted from various viewpoints and visitor perspectives once installation is complete. Since the array would be located within the tailrace of the existing hydroelectric project and in proximity to other components of the Lock and Dam No. 2 facility, we are not adopting the recommendation that the licensee analyze the visual impacts of the barge after installation. The proximity of the array to existing facilities and its relatively low profile would help to minimize any changes in the appearance of the area.

### **K. Cumulative Impacts**

49. Interior comments that a cumulative impacts analysis needs to be conducted, to address the impacts from the future build-out of proposed projects on the Mississippi and

other rivers. While the Commission has issued a number of preliminary permits to study the feasibility of installing hydrokinetic projects in the Mississippi River, it does not have any pending license applications for hydrokinetic projects. Due to the uncertainty of which, if any, of the issued permits will ultimately lead to license applications, there are no cumulative effects to examine at this point. In any event, the current proposal is for a project within the boundary of an existing license where the potential effects of this array have been considered in the context of the existence of the larger hydropower facility, and the EA examined cumulative effects the new project may create.

### **Comprehensive Plans**

50. Section 10(a)(2)(A)<sup>29</sup> of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving waterways affected by the project.<sup>30</sup> Under this section, federal and state agencies filed 21 comprehensive plans that address various resources in Minnesota. Of these, the staff identified and reviewed three comprehensive plans that are relevant to this project: the Minnesota Department of Natural Resources, Minnesota 2003-2008 State Comprehensive Outdoor Recreation Plan; the Upper Mississippi River Basin Commission, Comprehensive Master Plan for the Management of The Upper Mississippi River System; and the Nationwide Rivers Inventory. No conflicts were found.

### **Applicant's Plans And Capabilities**

#### **A. Conservation Efforts**

51. Section 10(a)(2)(C) of the FPA requires the Commission to consider the electricity consumption improvement program of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost-effectively, taking into account the published policies, restriction, and requirements of state regulatory authorities. The City sells the project's power to Xcel Energy Company, a utility.

52. Staff concludes that, given the limits of its ability to influence users of the electricity generated by the project, the City complies with section 10(a)(2)(C) of the FPA. We agree.

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<sup>29</sup> 16 U.S.C. § 803(a)(2)(A) (2006).

<sup>30</sup> Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19 (2008).

**B. Safe Management, Operation, and Maintenance of the Project**

53. Commission staff has reviewed the City of Hastings' management, operation and maintenance of the Mississippi Lock and Dam No. 2 Project pursuant to the requirements of 18 C.F.R. Part 12 of the Commission's regulations and the Commission's Engineering Guidelines and periodic Independent Consultant Safety Inspection Reports. Staff concludes that the hydrokinetic array is safe, and that there is no reason to believe that the City of Hastings cannot continue to safely manage, operate, and maintain these facilities under a new license. We agree.

**Comprehensive Development**

54. Sections 4(e) and 10(a)(1) of the FPA,<sup>31</sup> require the Commission to give equal consideration to power development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to issue this license amendment, and the terms and conditions included herein, reflect such consideration.

55. The EA for the licensee's proposal contains background information, analysis of impacts, and support for related license articles. We conclude, based on the record of this proceeding, including the EA and comments thereon, that issuing an amendment to the license as described in this order would not constitute a major federal action significantly affecting the quality of the human environment. The project will be safe if operated and maintained in accordance with the requirements of this license.

56. Based on our independent review and evaluation of the project, recommendations from resource agencies, and the no-action alternative, as documented in the EA, we have selected the licensee's proposal, with the staff-recommended measures including the certification conditions because they are mandatory, and find that it is best adapted to a comprehensive plan for improving or developing the Mississippi River.

57. We selected this alternative because: (1) issuance of the amendment will serve to maintain a beneficial, dependable, and inexpensive source of electric energy; (2) the required environmental measures will protect fish and wildlife resources, water quality, recreational resources, and historic properties; and (3) the 70 kW of electric energy generated from this renewable resource may offset the use of fossil-fueled generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution.

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<sup>31</sup> 16 U.S.C. §§ 797(e) and 803(a)(1) (2006).

## **Administrative Conditions**

### **A. Annual Charges**

58. The Commission collects annual charges from licensees for administration of the FPA and for the use, occupancy and enjoyment of federal lands. With the proposed addition of the two hydrokinetic units the total authorized capacity of the project would change from 4.4 MW to 4.47 MW. With the installation of each unit, the annual charges under Article 47 of the license will be revised accordingly. In accordance with the Commission's regulations, for a municipality licensee, the effective date of annual charges will be the date the revised capacity comes on-line.<sup>32</sup> Article 56 requires the licensee to provide the on-line operation date for each proposed unit, which we will use to revise the annual charges under license Article 47.

### **B. Exhibit Drawings**

59. The Commission requires licensees to file sets of approved project drawings on microfilm and in electronic file format. In its supplemental filing on April 30, 2008, the licensee filed an Exhibit G-1 drawing and three Exhibit F drawings. On November 7, 2008, the licensee filed revised Exhibit F drawings, which incorporated the new dimensions of the barge and changes to the mooring system. Staff's review of the Exhibit F and G drawings shows they reflect the proposed changes and have incorporated the hydrokinetic array into the existing project boundary. In addition, staff reviewed the project boundary GIS data along with the drawings and was able to verify the project boundary. This order approves the Exhibit F and G drawings, which conform to the Commission's Rules and Regulations. In Article 55 we are requiring the licensee to file the approved drawings in aperture card and electronic file format.

60. In addition, Article 42 of this order requires the licensee to submit as-built Exhibits A, F and G, as appropriate, to reflect the construction of the facilities approved in this order, within 90 days after construction activities have been completed.

### **C. Review of Final Plans and Specifications**

61. Article 48 requires the licensee to provide the Commission's Division of Dam Safety and Inspections Chicago Regional Office (D2SI-CRO) with cofferdam construction drawings. Article 43 requires the licensee to provide the Commission's D2SI-CRO with final contract drawings and specifications – together with a supporting design report consistent with the Commission's engineering guidelines.

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<sup>32</sup> 18 C.F.R. § 11.1(d)(6) (2008).

62. Article 49 of the license requires the licensee to enter into an agreement with the Corps to coordinate its plans for access to and site activities on lands and property administered by the Corps so that the authorized purposes, including operation of the Federal facilities, are protected. Any construction, operation and maintenance deficiencies or difficulties detected by the Corps inspection shall be immediately reported to the D2SI-Chicago Regional Engineer. Upon review, the D2SI-Chicago Regional Engineer shall refer the matter to the licensee for appropriate action, as required in Article 58.

63. Article 59 requires the licensee to submit for approval an operating plan to the Corps, describing (a) the designed mode of hydrokinetic operation, (b) reservoir flow diversion and regulation requirements for operation of the Corps project during construction as established by the Corps, and (c) integration of the operation of the hydrokinetic facility into the Corps' emergency action plan. The licensee is required, in Article 60, to provide the D2SI-Chicago Regional Engineer two copies of all correspondence between the licensee and the Corps. The D2SI-Chicago Regional Engineer shall not authorize construction of any project work until the Corps' written approval of construction plans and specifications has been received by the Regional Engineer.

64. Article 61 requires the licensee to provide D2SI-Chicago with a project safety plan.

### **Conclusion**

65. We conclude that the installation of a hydrokinetic array in the existing project's tailrace, with the mitigation and monitoring measures required by this order would not constitute a major federal action significantly affecting the quality of the human environment. We therefore grant the amendment application, as considered herein.

### **The Commission orders:**

(A) The license for the Mississippi Lock and Dam No. 2 Hydroelectric Project No. 4306, is amended as provided by this order, effective the day this order is issued.

(B) The application to amend the license, as filed April 24, 2008, supplemented on April 30, 2008, September 26, 2008, November 7, 2008, and November 13, 2008, to install a hydrokinetic turbine array at the Mississippi Lock and Dam No. 2 Hydroelectric Project consisting of two hydrokinetic turbines rated at 35 kW each, suspended below a floating barge is approved as provided for in this order.

(C) Ordering Paragraph (B)(2) of the license is revised to read as follows:

Project works consisting of: (1) a powerhouse containing two generating units rated at 2,200 kilowatts (kW) each; (2) transmission facilities consisting of (a) 6.6-kilovolt (kV) generator leads; (b) two three-phase, step-up transformers; and (c) a 1,000-foot-long transmission line; (3) two hydrokinetic turbines rated at 35 kW each, suspended below a 68-foot-wide, 40-foot-long floating barge tethered to the existing dam structure and anchored for stability using anchors and spuds; (4) two synchronous alternating current (AC) generating units that sit atop the barge; (5) a 225-ampere molded case circuit breaker along with a 480-volt, three-phase feeder connecting the hydrokinetic units to the existing power plant distribution system; and (6) appurtenant facilities.

(D) The following Exhibit F and G drawings, filed on November 7, 2008, and April 30, 2008, respectively, are approved and assigned exhibit drawing numbers as shown in the following table:

Exhibit	FERC No.	Superseding	Title
F-7	4306-018	N/A	Hydro Kinetic Turbine Array Layout
F-8	4306-019	N/A	Hydro Kinetic Turbine Array Plan View, Section and Elevation
G-1	4306-020	4306-04	Project Map and Boundary

(E) Water Quality Certification. The license for the Mississippi Lock and Dam No. 2 is subject to the conditions of the water quality certification, submitted by the Minnesota Pollution Control Agency on November 6, 2008, under section 401 of the Clean Water Act, as those conditions are set forth in Appendix A to this order.

(F) Articles 42, 43, and 48 are revised as follows:

Article 42. As-built Drawings. Within 90 days of completion of all construction activities, the licensee shall file for Commission approval, revised Exhibits A, F and G, as appropriate, describing the project facilities as-built. A courtesy copy shall be filed with the Commission's D2SI – Chicago Regional Engineer, and the Director, Division of Hydropower Administration and Compliance.

Article 43. Contract Plans and Specifications. At least 60 days prior to the start of any construction, the licensee shall submit three copies of its plans and specifications and a supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI) – Chicago Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal to the D2SI-Chicago Regional Engineer must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin

construction until the D2SI-Chicago Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorizes start of construction.

Article 48. Facility Design and Construction. The design and construction of any permanent and temporary facilities, including reservoir impounding cofferdams and deep excavations, that would be an integral part of, or that could affect the structural integrity or operation of the Government project shall be done in consultation with and subject to the review and approval of the Corps' District Engineer. The Corps' review of the cofferdams will be in addition to the review and approval of the final plans, and shall in no way relieve the licensee of responsibility and liability regarding satisfactory performance of the cofferdams. Within 90 days from the issuance date of the license amendment, the licensee shall furnish the Corps and the Commission's D2SI Chicago Regional Engineer, a schedule for submission of design documents and the plans and specifications for the project. If the schedule does not afford sufficient review and approval time, the licensee, upon request of the Corps, shall meet with the Corps and FERC staffs to revise the schedule accordingly.

(G) The license is subject to the following additional articles:

Article 55. Exhibit Drawings. Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file format.

a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" X 7-3/8") aperture cards. Prior to microfilming, the FERC Project-Drawing Number (i.e., P- 4306-018) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., F-7), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card. See Figure 1.

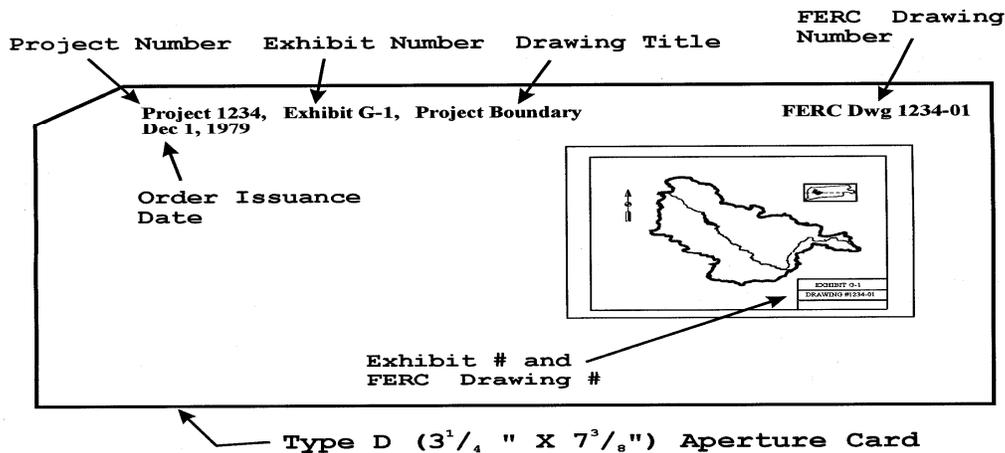


Figure 1.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections Chicago Regional Office.

b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections Chicago Regional Office. Each exhibit drawing must be contained in a separate electronic raster file; which meets the following format specification:

**FILE NAME** – MUST use the format (including commas and dashes)  
P-4306-020, G-1, Project Map and Boundary, MM-DD-YYYY.TIF  
**IMAGERY** - black & white raster file  
**FILE TYPE** – Tagged Image File Format, (TIFF) CCITT Group 4  
**RESOLUTION** –300 dpi desired, (200 dpi min)  
**DRAWING SIZE FORMAT** – 24” x 36” (min), 28” x 40” (max)  
**FILE SIZE** – less than 1 MB desired

The filename for each drawing must include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, FERC approval date, and file extension in the following format [P-4306-020, G-1, Project Map and Boundary, MM-DD-YYYY.TIF]. If the file name is not in this format, the filing will be rejected.

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (i.e., latitude and longitude coordinates, or state plane coordinates), arranged in a triangular format for GIS georeferencing the drawing to the

polygon data. The spatial reference for the drawing (i.e., map projection, map datum, and units of measurement) must be identified on the drawing and each reference point must be labeled. The reference points must be based on a standard map coordinate system. In addition, each project boundary drawing must be stamped by a registered land surveyor.

c) The licensee shall file two separate sets of the project boundary data in a georeferenced electronic file format (such as ArcView shape files, GeoMedia files, MapInfo files, or a similar GIS format) with the Secretary of the Commission, ATTN: OEP/DHAC. The filing shall include both polygon data and all reference points shown on the individual project boundary drawings. A single electronic boundary polygon data file is required for the project boundary. Depending on the electronic file format, the polygon and point data can be included in a single file with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to  $\pm 40$  feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) shall include: FERC Project Number, data description, date of this License, and file extension in the following format [P-4306, boundary polygon/or point data, MM-DD-YYYY.SHP]. The data must be accompanied by a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., UTM, State Plane, Decimal Degrees, etc.), the map datum (i.e., North American 27, North American 83, etc.), and the units of measurement (i.e., feet, meters, miles, etc.). The text file name shall include: FERC Project Number, data description, date of this License, and file extension in the following format [P-4306, project boundary metadata, MM-DD-YYYY.TXT].

Article 56. Installed Capacity. Within 30 days of the on-line operation date of the new authorized capacity, the licensee shall file with the Commission, the on-line date, and descriptions of the modifications and exact installed capacities of each of the two hydrokinetic units. This information will be used to revise the annual charges under Article 47 of the license.

Article 57. Start of Construction. The licensee shall commence construction of the hydrokinetic turbine array within two years of license amendment issuance and shall complete construction within four years of license amendment issuance.

Article 58. Periodic and continuous inspections by the Corps. The construction, operation, and maintenance of the project works that, in the judgment of the Corps, may affect the structural integrity or operation of the Corps project shall be subject to periodic or continuous inspections by the Corps. Any construction, operation, and maintenance deficiencies or difficulties detected by the Corps inspection shall be immediately reported to the D2SI-Chicago Regional Engineer. Upon review, the D2SI-Chicago Regional Engineer shall refer the matter to the licensee for appropriate action. In cases when construction, operation, or maintenance practices or deficiencies may create a situation

posing imminent danger to the structural integrity and safety of the Corps project, the Corps inspector has the authority to stop construction or maintenance while awaiting the resolution of the problem.

Article 59. Operating Plan. The licensee shall at least 60 days prior to start of construction, submit for approval an operating plan to the Corps, describing: (a) the designed mode of hydrokinetic operation, (b) reservoir flow diversion and regulation requirements for operation of the Corps project during construction as established by the Corps, and (c) integration of the operation of the hydrokinetic facility into the Corps' emergency action plan. In addition, the licensee, prior to start of hydrokinetic array operation, shall enter into an operating Memorandum of Agreement (MOA) with the Corps describing the detailed operation of the hydrokinetic facility acceptable to the Corps. The MOA shall specify any restrictions needed to protect the primary purposes of the Corps project for navigation, recreation, water quality, and flood control. The D2SI-Chicago Regional Engineer shall be invited to attend meetings regarding the agreement. The MOA shall be subject to revision by mutual consent of the Corps and licensee as experience is gained by actual operation of the hydrokinetic array. Should the licensee and the Corps fail to reach an agreement, the matter will be referred to the Director, Office of Energy Projects for resolution. Copies of the regulating plan and signed MOA between the Corps and the licensee and any revision thereof shall be furnished to the Director, Office of Energy Projects, Director, D2SI, and the D2SI-Chicago Regional Engineer.

Article 60. Corps' written approval. The licensee shall provide the D2SI-Chicago Regional Engineer two copies of all correspondence between the licensee and the Corps. The D2SI-Chicago Regional Engineer shall not authorize construction of any project work until the Corps' written approval of construction plans and specifications has been received by the Regional Engineer.

Article 61. Hydrokinetic Array Safety Plan. At least 20 days prior to starting construction and operations of the hydrokinetic turbine array, the licensee shall submit one copy of a Project Safety Plan to the Division of Dam Safety and Inspections (D2SI) - Chicago Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The plan shall describe the procedures the licensee will take during any project emergency that could adversely impact life or property. Possible emergencies could include, for example, a turbine break-away, dislodging of the platform from the anchoring system, or damage to the feeder cable.

The plan, at a minimum, shall include: (a) procedures to ensure the safety of the public near the project area; (b) description of how the project will be monitored to determine if there is an emergency; (c) procedures the licensee will take during an emergency (including immediate shutdown, if necessary); (d) procedures for reporting the emergency to local, state, and federal agencies; (e) description of contingency

measures to modify operations or to implement the project removal plan; (f) a plan for annual testing of emergency equipment, including the project's emergency shutdown system; and (g) a plan for annually coordinating with response agencies.

The licensee shall prepare the project safety plan after consultation with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Park Service, and Minnesota Department of Natural Resources. The licensee shall include with the plan documentation of consultation, copies of comments, and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow for a minimum of 10 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The licensee may not begin project construction and operations until the D2SI - Chicago Regional Engineer has reviewed and commented on the plan.

Article 62. Hydrokinetic Array Removal Plan. The licensee shall, prior to starting on-site hydrokinetic turbine array installation, file for Commission approval, a Hydrokinetic Removal Plan that includes, at a minimum: (a) a provision to remove all hydrokinetic array facilities from all project lands and waters in the event of an emergency, the Commission ordering the removal of the hydrokinetic array, or at the termination of the license; (b) a provision to minimize riverbed disturbances and suspended sediments during removal of any underwater facilities; and (c) a provision to monitor the effects of the removal activities on the Higgins' eye pearlymussel.

The licensee shall prepare the plan after consultation with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Park Service, Minnesota Department of Natural Resources, and Minnesota State Historic Preservation Officer. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the consulted entities, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow for a minimum of 15 days for the consulted entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan.

Article 63. Emergency Shutdown and Removal. The D2SI-Chicago Regional Engineer, as the Commission's authorized representative, may order the licensee to cease operation of, or to remove, the hydrokinetic array in the event that doing so is necessary for the protection of the environment or the life, health, or property of the public.

The licensee shall report by telephone to the D2SI–Chicago Regional Engineer and U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Park Service, and Minnesota Department of Natural Resources any hydrokinetic array project-related conditions causing or that may cause injury, or mortality to any federally listed threatened or endangered species under the Endangered Species Act and any other incidents affecting the environment or the life, health, or property of the public as soon as possible, but no longer than 24 hours after becoming aware of the threat or incident without unduly interfering with any necessary or appropriate emergency response or other action procedure for protecting the affected species.

Upon initial notification, the licensee shall consult with the D2SI–Chicago Regional Engineer, and notified entities on the immediate course of action to take to prevent injury or minimize or eliminate the threat to the extent possible. The licensee shall propose to the D2SI–Chicago Regional Engineer immediate measures, based on consultation with the agencies and tribe(s), and implement such immediate measures as the D2SI–Chicago Regional Engineer so directs, which may include immediate shutdown of all project operations related to the hydrokinetic array.

No later than 7 days after becoming aware of any such threat incident, or any alternative schedule specified by the D2SI–Chicago Regional Engineer, the licensee shall file with the Commission and submit to the aforementioned agencies and tribe, a written report on the condition affecting the Endangered Species Act-listed species, or other environmental resources, the public, or property. The written report, in addition to any information required by the D2SI–Chicago Regional Engineer at the time of initial contact, shall include the following: (a) the location, date, time, and causes of the condition to the extent known; (b) a description of any unusual occurrences or operating conditions preceding to the condition; (c) an account of any measure(s) taken to immediately alleviate the condition; (d) a detailed description of any injuries or mortalities of the Endangered Species Act-listed species, or any adverse effects on other environmental resources, the public, or property as applicable; (e) a detailed description of the measures recommend by the agencies and tribe; and (f) a detailed description of the measures or actions that would be taken to prevent further such occurrences.

The D2SI–Chicago Regional Engineer may direct the licensee to commence the removal of the hydrokinetic array if no practical course of action can be taken to minimize the types of project-related adverse effects noted above.

Article 64. Water Quality Monitoring. Beginning no later than four months after installation of the first hydrokinetic array unit, the licensee shall, within 30 days of filing monitoring reports with the Minnesota Pollution Control Agency pursuant to the water quality certification filed on November 6, 2008, file copies of such monitoring reports with the Commission. In addition, the license shall include with the monitoring reports

the following: (a) analysis of the data, (b) a determination of whether state standards for dissolved oxygen have been met, or whether there have been adverse impacts caused by turbidity or temperature; and (c) if not met or adverse impacts caused, a description of measures to be undertaken. Each report shall be prepared in consultation with the Minnesota Pollution Control Agency, U. S. Fish and Wildlife Agency, National Park Service, and Minnesota Department of Natural Resources, and shall include documentation of consultation with these agencies, to include any agency comments or recommendations.

Article 65. Fish Entrainment and Survival Plan. The licensee shall, within 60 days of the issuance of this order, file for Commission approval, a Fish Entrainment and Survival Monitoring Plan. The plan shall be developed in accordance with Condition No. 3 of the state Water Quality Certificate and shall include provisions for: (1) estimating survival/injury for several species; (2) a method for estimating predation; (3) a desktop analysis of possible entrainment rates based on population variability, using data collected in the 1990-1991 entrainment study, the Long Term Resource Monitoring Program database, and results of the current survival study; and (4) a provision to file a final report, describing the results of the monitoring, with the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, National Park Service, U.S. Fish and Wildlife Service and the Commission. The final report shall include a discussion of the overall effects of the project on the fisheries resources at the Mississippi River Lock and Dam No. 2. If there are any adverse impacts to fisheries resources, the report shall include proposed changes to project operation in order to minimize those impacts. The final report shall be filed with the Commission, after consultation with the agencies.

The plan shall be developed in consultation with the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, National Park Service, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. The licensee shall include with the plan, documentation of consultation, copies of recommendations on the completed plan after it has been provided to the resource agencies, and any specific descriptions of how agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 66. Mussel Survey and Relocation. The licensee shall implement its proposal to remove and relocate any native mussels, including the federally listed

Higgins' eye pearly mussel, if they are discovered in the scour protection area during anchor installation, as identified on page E-4 of its April 24, 2008 amendment application. Prior to start of construction and installation, the licensee shall consult with the U.S. Fish and Wildlife Service to determine the proper protocol to relocate mussels, if any are found. The licensee shall file a final report of the results of the relocation efforts with the Minnesota Department of Natural Resources, National Park Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the Commission within 30 days of completion of anchor installation and mussel relocation.

Article 67. Zebra Mussel Control During Installation. The licensee shall implement its proposal, as identified on page 17 of its Study Plan filed on April 24, 2008, to develop specific protocols to assure that zebra mussels are not spread to other water bodies as a result of its activities during installation of the hydrokinetic units. Prior to installation, the licensee shall file these protocols with the Commission, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, National Park Service, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. The protocols shall include inspections, and if appropriate, cleaning of any equipment used during installation, evaluation and removal of the units.

Article 68. Zebra Mussel Control and Monitoring Plan. The licensee shall, within 180 days of issuance of this order, file for Commission approval, a long-term Zebra Mussel Control and Monitoring Plan. The plan shall describe the control procedures that would be used to prevent project activities from spreading this species into other waters. Monitoring shall be focused on project structures and the effectiveness of control methods implemented by the licensee rather than broad-level monitoring in the project reach, where a wide variety of influences outside the licensee's control are likely to affect zebra mussel distribution and abundance.

The plan shall be developed in consultation with the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, National Park Service, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. The licensee shall include with the plan, documentation of consultation, copies of recommendations on the completed plan after it has been provided to the resource agencies, and any specific descriptions of how agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 69. Bird Monitoring Plan. The licensee shall within 60 days of issuance of this order, file for Commission approval, a Bird Monitoring Plan, to provide an understanding of how birds use the tailrace, and to further evaluate whether there is any substantial risk of turbine injury. The plan should incorporate monitoring to describe bird use in the tailrace, including, but not be limited to, diving birds and migratory birds. The plan shall include a provision to monitor at monthly intervals for a minimum of one year, to capture seasonal effects, including spring and fall migrations. The monitoring shall provide a basic understanding of how birds may use the tailrace, and to further evaluate whether there is any substantial risk of turbine injury. If monitoring results indicate that diving birds forage in the tailrace, the licensee shall consult with the agencies to determine whether additional monitoring is needed, and the need for any protection measures. The plan shall also include a provision to submit a final report to the agencies and the Commission at the completion of the monitoring.

The plan shall be developed in consultation with the Minnesota Department of Natural Resources, National Park Service, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. The licensee shall include with the plan, documentation of consultation, copies of recommendations on the completed plan after it has been provided to the resource agencies, and any specific descriptions of how agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 70. Interpretive Signage. Within 6 months of the date of this order, the licensee shall install interpretive signage at the Lock and Dam No. 2 observation deck and Lake Rebecca Park. The purpose of the signage is to educate the public about the hydrokinetic technology being used at the project, and to advise the public of safety precautions and restrictions for boating in the vicinity of Lock and Dam No. 2 and the tailrace area.

The licensee shall install the signage after consultation with the Army Corps of Engineers and the National Park Service. Within 30 days of installation, the licensee shall file with the Commission, documentation of consultation with the Army Corps of Engineers and National Park Service and installation of the signage. The documentation shall include photographs of the signage and a description of the information displayed on the signs.

(H) This order constitutes final agency action. Requests for rehearing of this order may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

By the Commission.

( S E A L )

Kimberly D. Bose,  
Secretary.

Project No. 4306-017

APPENDIX A

STATE OF MINNESOTA  
POLLUTION CONTROL AGENCY

ORDER NO. 4306

401 WATER QUALITY CERTIFICATION FOR THE MISSISSIPPI LOCK AND DAM  
NO. 2 PROJECT (FERC NO. 4306)

Filed November 6, 2008

The following conditions modify the original conditions found in the October 23, 1984 Water Quality Certification as noted. *The text of the original conditions 8 and 9 have been added for ease of reference.*

**Condition #1**

The City of Hastings (City), or its designee, shall operate the facility in a strict run of river mode. If river forecasts predict low flow such that a peaking mode of operation will be necessary to maintain the power production of the facility, then prior written approval of the anticipated peaking procedure shall be obtained from the MPCA Commissioner. In seeking approval of the Commissioner, the City or its designee shall submit an impact assessment of the proposed peaking operational procedure to the Commissioner 30 days prior to the desired commencement of peaking operation. This impact statement shall include but not necessarily be limited to the following:

- a. Impacts to fish and wildlife resources resulting from the changes in existing flow patterns and water levels both upstream and downstream of the entire hydropower facility, including the effects of changes in downstream flow patterns on aquatic habitat and resulting changes in fish distribution.
- b. The potential for increased thermal effects below Xcel Energy's Prairie Island Nuclear Generating Plant.
- c. Changes in dissolved oxygen levels below the entire hydropower facility.
- d. Effects of peaking on scour and sedimentation upstream and downstream of the entire hydropower facility and the impacts to habitat and water quality.

**Condition #2**

The City, or its designee, shall monitor the water quality of the Mississippi River at two locations: (1) between the platform that houses the hydropower turbine array (HTA) and the Main Facility; and (2) downstream of the platform that houses the HTA at a point and depth representative of the water passed through the HTA. (The sampling location between the platform and the Main Facility is necessary as the information on the sampling location for the water quality data collected by Metropolitan Council–Environmental Services appears to be upstream of the abandoned lock chamber and, therefore, is not representative of the water quality that exits the Main Facility.)

- a. The City should take the water quality samples year round at least once per week prior to 9:00 a.m. to catch the low point of the diurnal dissolved oxygen cycle. If the City monitors any parameter more frequently than once per week, then the results and frequency of monitoring shall be reported to the MPCA.
- b. The City shall take water quality samples year round with sampling required only monthly from December 1<sup>st</sup> to March 31<sup>st</sup>. If the HTA is removed from the river, then water quality sampling can be reduced to location (1) cited above when the HTA is not installed.
- c. The City should only conduct sampling during winter months when safety concerns are not compromised (e.g., no sampling when the ice is too thin to support all of the necessary equipment or when there is an extremely low air and/or wind chill temperature that could negatively affect sampling personnel).
- d. If the City misses a sampling event, regardless of the time of year, then the reason for the omission must be documented in the report on the data.
- e. The City must record the following at each sampling location for each sampling event:
  - i. Dissolved oxygen (D.O.) (in milligrams/Liter).
  - ii. Water temperature (in °C).
  - iii. Turbidity in nephelometric turbidity units (NTU).
  - iv. Depth of the D.O., water temperature and turbidity reading for each sampling event.
  - v. Date of each sampling occurrence.
  - vi. Time of the sampling at each site.
  - vii. All information on equipment calibration and maintenance (e.g., date, time, equipment setting, etc.).
  - viii. River flow (in cubic feet/second).
  - ix. Air temperature (in °F).

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- x. Which dam gates are open and what the opening is for each,
  - xi. Which turbine(s) is/are operating in the Main Facility.
  - xii. Wind speed and direction.
  - xiii. Percent (%) cloud cover.
  - xiv. Information on the most recent precipitation event (e.g., date, duration, and amount – if known or obtainable).
- f. The City, or its designee, is required to calibrate all field instruments in the field prior to sample collection. All monitoring and analytical instrumentation, used to monitor any of the parameters required as part of the license amendment, must be calibrated and maintained at the intervals recommended by the equipment manufacturer(s) to insure the accuracy of all measurements.
- g. The City must conduct the water quality monitoring for a period of three years in order to minimize the influence of abnormal weather conditions. The City must submit the water quality data and equipment calibration and maintenance records to the MPCA on a quarterly basis during the first year of monitoring. At the conclusion of the first year of monitoring, the MPCA will evaluate the first year's monitoring results to determine the frequency for report submittals in the second and third year.
- h. At the conclusion of the water quality monitoring, if the monitoring demonstrates that D.O. downstream of the HTA is reduced below the 5.0 milligrams/Liter water quality standard two times in a quarter as a result of HTA operations, then the MPCA will revoke this 401 certification and may require mitigation (i.e., use of aeration equipment, discontinuation of HTA operation during critical aquatic life stages, etc.) in the new water quality certification that the MPCA would then issue to extend through the remainder of the facility's license from the FERC.

### **Condition #3**

The City, or its designee, shall, after consultation with the MPCA, the MDNR, and the U.S. Fish and Wildlife Service (USFWS), conduct a study to determine fish mortality that may be associated with impingement and turbine passage. Within six (6) months after completion of the above study, the City shall, in cooperation with the above agencies, review the effects of project operation on the downstream passage of fish and develop recommendation to mitigate any project related adverse effects on the fishery.

### **Condition #4**

Daily records of flow through the hydropower facility and over and through Lock and Dam 2 shall be kept in cooperation with the St. Paul District of the Corps of Engineers and the U.S. Geological Survey and shall be made available on the internet.

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**Condition #5**

“Detailed project plans and specifications shall be submitted to the MPCA Director, for approval at least thirty (30) days prior to construction. The plans and specifications shall address erosion control, dewatering discharges, solid waste disposal or utilization (including removed concrete), and removal of dredged or excavated material. Construction shall be generally in accordance with Part II of the October 13, 1982 certification which this document modifies” is hereby rescinded as this condition was met on September 3, 1985.

**Condition #6**

The City, or its designee, shall submit certification by a professional engineer that the Main Facility was constructed in accordance with the approved plans.

**Condition #7**

“Aeration equipment shall be installed in the turbine and shall be demonstrated by analytical or by empirical data to provide aeration equivalent to the present flow over the weirs. The operation of the equipment shall be operated, so as to maintain water quality standards, by automated equipment or by a testing program in accordance with MPCA approved procedures” is hereby rescinded as the requirement for the installation of aeration equipment was replaced by a Dissolved Oxygen Mitigation Plan developed by the City of Hastings and approved by the MPCA and the COE in the spring of 1990.

**Conditions # 8 and 9**

Remain unchanged and in effect.

*Condition 8. A model of the stream flow velocities upstream and downstream of the turbine under various flow conditions shall be developed to determine scour effects and sedimentation patterns. The model shall be sufficiently detailed to satisfy the Corps of Engineers and the MPCA with regard to stability of the structure and downstream sedimentation effects on habitat and biota.*

*Condition 9. The permittee must provide a hydraulic analysis documenting any changes in the 100-year flood profile caused by the project. The permittee shall provide all necessary information required to amend the Federal Flood Insurance Studies in this reach of the river.*

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**Condition #10**

The City, or its designee, shall ensure that the party/ies installing the HTA and operating the entire hydropower facility has/have received and thoroughly understands all conditions of the permit.

**Condition #11**

Any modification of the proposal from the original license application and application for license amendment shall require separate action by and written approval from the MPCA Commissioner prior to implementation.

**Condition #12**

The City, or its designee, shall employ Best Management Practices during the installation of the platform housing the HTA to protect water quality from drill cuttings and other materials used in the installation.

**Condition #13**

The City, or its designee, shall submit a copy of the zebra mussel control and monitoring plan during the plan's development to the MPCA for review and comment on potential adverse impacts to water quality.