

Mother Ann Lee Hydropower Facility

Recertification Application to the Low Impact Hydropower Institute

LIHI #24 and FERC Project No. 539



Prepared by

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Lock 7 Hydro Partners, LLC

September 29, 2016

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INTRODUCTION

This is an application to the Low Impact Hydropower Institute (LIHI) for recertification of Mother Ann Lee hydroelectric facility (LIHI #24), subsequent to a previous LIHI certification that expires December 31, 2016. There have been no material changes in the facility design or operation since the most recent LIHI review that was concluded in December 2012 (see LIHI reviewer's report by Sarah A. Verville, dated 12/5/2012¹). There also have been no material changes in the environmental conditions in the project vicinity since that most recent LIHI review. The only material changes that have occurred recently are in the revised LIHI certification criteria described in the 2016 version of LIHI's certification handbook.


I have reviewed the project description for Mother Ann Lee facility that is posted on the LIHI website and determined that it is an accurate representation of the subject facility. The information provided in this recertification application provides an update to support a new LIHI certification.

¹ (insert URL to FERC license or LIHI posted documents)

PART I. FACILITY DESCRIPTION

The key features of the Mother Ann Lee Hydroelectric Facility (the “Facility”) are described in Table 1. A description of the facility can be found on the LIHI website at <http://lowimpacthydro.org/lihi-certificate-24-mother-ann-lee-hydroelectric-station-kentucky-ferc-539/>.


Table 1. Facility Description Information for recertification of the Me Hydropower Facility (LIHI #74).


Information Type	Facility Description
Name of the Facility	<ul style="list-style-type: none"> • Mother Ann Lee Hydroelectric Station, FERC Project No. 539
Location	<ul style="list-style-type: none"> • Kentucky River, River Mile 117.0 • Kentucky River basin • Mercer County, Kentucky, and near Harrodsburg
Facility Owner	<ul style="list-style-type: none"> • Owner: Lock 7 Hydro Partners, LLC • Operator: Shaker Landing Hydro Associates, Inc. • Authorized Representative: David Brown Kinloch, President/CEO
Regulatory Status	<ul style="list-style-type: none"> • FERC Project Number 539 • Major License, 5 MW or Under, Issued May 26, 1992, Expires on May 1, 2022 • Water Quality Certification # 2005-0103-8, issued Oct. 17, 2005 by the Kentucky Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water. • Hyperlinks to facility FERC records on FERC e-library website: <div style="text-align: center;">  <p>Results.html</p> </div> <p>Three significant documents in these records are: 19920604-0461(29982271) – Issuing of P-539 License 20051123-3013(14270448) – Transfer of P-539 License to Lock 7 Hydro 20140123-3116(29077944) – Non-capacity Amendment of License</p>
Characteristics of the Power Plant	<ul style="list-style-type: none"> • Date of construction - 1927 • Total name-plate capacity – 2.209 • Average annual generation – 8,535 MWH/year (since #2 runner replacement) • Plant has three turbine/generators <ul style="list-style-type: none"> Unit 1 – Semi-Kaplan (fixed blade propeller) turbine, 1000 Horsepower, 743 cfs (maximum and minimum) hydraulic capacity. Unit 2 – Kaplan (with manually adjustable blades) turbine, 1132 Horsepower, 929 cfs maximum and 227 cfs minimum hydraulic capacity. Unit 3 – Semi-Kaplan (fixed blade propeller) turbine, 1000 Horsepower, 743 cfs (maximum and minimum) hydraulic capacity. • Modes of operation: Run-of-river

Information Type	Facility Description
	<ul style="list-style-type: none"> • Major equipment upgrades – Unit 2 Runner Replacement – Begun September 2013, completed January 2015. This replacement has had no effect of project operation, other than a little higher energy output due to the higher efficiency runner. • There have been no recent operational changes • There are no planned facility upgrades at this time
Characteristics of the Dam or Diversion:	<ul style="list-style-type: none"> • Date of construction - 1896-1897 • Dam height – 15.3 feet • Spillway elevation – 514.6 ft (250 foot Concrete-capped Timber-crib dam) • Tailwater elevation – 499.3 ft • Length and type of all penstocks and water conveyance structures between reservoir and powerhouse - None • Dates and types of major, generation-related infrastructure improvements – Hydro facility was added in 1927
Characteristics of Reservoir and Watershed:	<ul style="list-style-type: none"> • Pool 7: Gross volume and surface area at full pool – dam has no storage capability • Pool 7:Maximum water surface elevation (ft. MSL) – 558.5 ft – Flood of Record, December 8, 1978. • Pool 7:Maximum and minimum volume and water surface elevations for designated power pool: <ul style="list-style-type: none"> • Pool 7:Maximum - 558.5 ft – Flood of Record, December 8, 1978, 142,560 cfs (est). • Pool 6: Gross volume and surface area at full pool – dam has no storage capability • Pool 6:Maximum water surface elevation (ft. MSL) – 536.93 ft – Flood of Record, December 8, 1978. • Pool 6:Maximum and minimum volume and water surface elevations for designated power pool: <ul style="list-style-type: none"> • Pool 6:Maximum – 536.93 ft – Flood of Record, December 8, 1978, 144,000 cfs. • Upstream dams by name, ownership and river mile <ul style="list-style-type: none"> Dix Dam, Kentucky Utilities Co., Dix River Mile 2. Lock and Dam 8, Kentucky River authority, KY River Mile 139.9. Lock and Dam 9, Kentucky River authority, KY River Mile 157.5. Lock and Dam 10, Kentucky River authority, KY River Mile 176.4. Lock and Dam 11, Kentucky River authority, KY River Mile 201.0. Lock and Dam 12, Kentucky River authority, KY River Mile 220.9. Lock and Dam 13, Kentucky River authority, KY River Mile 239.9. Lock and Dam 14, Kentucky River authority, KY River Mile 249.0. <p>All of the Kentucky River dams have no storage capacity. Dix Dam creates a 2,335 acre reservoir (Herrington Lake), which is about 3 miles upstream of Lock 7. The lake has a storage capacity of 537,000 acre-feet. Releases are made through a peaking hydroelectric plant. Because releases are from the bottom of the lake, water from the Dix River tributary tends to have very low dissolved oxygen and can cause low dissolved oxygen conditions at the Mother Ann Lee Station, if flow in the main steam of the Kentucky River is low (last Summer and early Fall).</p> • Operating agreements with upstream or downstream reservoirs that affect water

Information Type	Facility Description
	availability, if any, and facility operation - None <ul style="list-style-type: none"> Area inside FERC project boundary – approximately 700 acres (upper pool)
Hydrologic Setting:	<ul style="list-style-type: none"> Average annual flow at the dam – 8,148 cfs Average monthly flows <ul style="list-style-type: none"> January – 10,600 cfs February – 11,500 cfs March – 13,500 cfs April – 11,200 cfs May – 9,200 cfs June – 4,920 cfs July – 2,510 cfs August – 2,030 cfs September – 1,920 cfs October – 2,060 cfs November – 4,150 cfs December – 7,670 cfs Location and name of relevant stream gauging stations above and below the facility: <ul style="list-style-type: none"> Above – Pool 7 – <ul style="list-style-type: none"> USGS 03286500 KENTUCKY RIVER AT LOCK 7 AT HIGHBRIDGE, KY Below – Pool 6 – <ul style="list-style-type: none"> USGS 03287000 KENTUCKY RIVER AT LOCK 6 NEAR SALVISA, KY Watershed area at the dam : 5,036 square miles
Designated Zones of Effect:	<ul style="list-style-type: none"> The Mother Ann Lee Hydroelectric Station has one Zone of Effect. This zone consists of the main stem of the Kentucky River between Lock and Dam 7, where the hydro station is located, at river mile 117.0 and Lock and Dam 6 at river mile 96.2. The delimiting structures of the Zone of Effect are Lock and Dam 7 and Lock and Dam 6 Attached is a map that shows the Designated Zone of Effect According to the Kentucky Division of Water’s regulation on designated water uses, 401 KAR 10:026, the main stem of the Kentucky River is designated for the uses of warm water aquatic habitat, primary contact recreation, secondary contact recreation, and domestic water supply
Additional Contact Information:	<ul style="list-style-type: none"> List names, addresses, phone numbers and e-mail for local resource agencies and non-governmental stakeholders: Active Stakeholders: Jerry Graves Kentucky River Authority 627 Wilkinson Boulevard Frankfort, KY 40601 502-564-2866 Jerry.Graves@ky.gov Ms. Joyce Fry

Information Type	Facility Description
	<p>Department of Natural Resources and Environmental Protection Division of Water 200 Fair Oaks Ln. - 4th Floor Frankfort, KY 40601-1189 502-564-3410 ext. 4878 Joyce.Fry@ky.gov</p> <p>Mr. Joseph Zimmerman Kentucky Department of Fish and Wildlife Resources #1 Sportsman's Lane Frankfort, KY 40601 502-564-7109 ext. 4473 Joseph.Zimmerman@ky.gov</p> <p>Ms. Carrie Allison U.S. Fish and Wildlife Service J.C. Watts Federal Building 330 West Broadway, Room 265 Frankfort, KY 40601 502-695-0468 ext. 103 carrie_allison@fws.gov</p> <p>Craig A. Potts, State Historic Preservation Officer Kentucky Heritage Council 300 Washington Street Frankfort, KY 40601 (502) 564-7005</p> <p>Lee Anne Devine Lee Anne Devine, Regulatory Branch Louisville District P.O. Box 59 Louisville, KY 40201-0059 (502) 315-6458 Lee.Anne.Devine@usace.army.mil</p> <p>Pat Banks, Director Kentucky Riverkeeper 300 Summit Street Richmond, KY 40475 859-622-3065 kyriverkeeper@eku.edu</p> <p>Tim Joice, Water Resources Program Director Kentucky Waterways Alliance</p>

Information Type	Facility Description
	<p>Bakery Square, Suite 217 120 Webster Street Louisville, KY 40206 (502) 589-8008 Tim@kwalliance.org</p>
Photographs of the Facility	<ul style="list-style-type: none">• Photographs of key features of the facility and each of the designated zones of effect 

Information Type	Facility Description
	

PART II. STANDARDS MATRICES

There is only one designated zone of effect for this application, beginning at the turbine intake on the upstream side of Lock and Dam 7 and extending downstream approximately 20.8 miles to Lock & Dam 6, the next downstream dam. The standards selected to satisfy the LIHI certification criteria in these zones are identify in the following tables.

Table II-1. LIHI standards selected for each certification criterion for Zone 1.

Criterion		<i>Alternative Standards Applied</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
A	Ecological Flow Regimes	X				
B	Water Quality		X			X
C	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection	X				
G	Cultural and Historic Resources Protection	X				X
H	Recreational Resources	X				X

PART III. SUPPORTING INFORMATION

This section contains information that explains and justifies the standards selected to pass the LIHI certification criteria (see Part II for selections).

III.A.1 Ecological Flow Standard for Zone 1.

The facility satisfies Standard A-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

Criterion	Standard	Instructions
A	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Confirm the location of the powerhouse relative to other dam/diversion structures to establish that there are no bypassed reaches at the facility. • If Run-of-River operation, provide details on how flows, water levels, and operation are monitored to ensure such an operational mode is maintained. • In a conduit project, identify the water source and discharge points for the conduit system within which the hydropower plant is located. • For impoundment zones only, explain how fish and wildlife habitat within the zone is evaluated and managed – NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.

- Confirm the location of the powerhouse relative to other dam/diversion structures to establish that there are no bypassed reaches at the facility.



The Google Earth image above shows the powerhouse on the left, the dam in the center and the

abandoned lock on the right. This confirms that there are no bypassed reaches at the facility.

- *If Run-of-River operation, provide details on how flows, water levels, and operation are monitored to ensure such an operational mode is maintained.*

Our FERC License requires run-of-river operations in Article 401. To monitor flows and water levels, Article 403 of the License required the previous Licensee, Kentucky Utilities Co. (KU) to install a water level gage to monitor plant operations. KU accomplished this by having USGS install a gage in Pool 7 at the Lock 7 site, and KU paying part of the annual fee to maintain the gage to USGS. When we purchased the powerplant from KU in December 2005, one of the conditions of sale, included in the purchase agreement, was that KU agreed to continue to pay USGS the annual fee to maintain the Pool 7 gage (the gage is also helpful to KU for their Dix Dam plant).

Run-of-river operations are also required in Section 2(d) of our Lease and Operating Agreement with the Kentucky River Authority. This agreement better defines in practical terms of actually how the plant will be operated to maintain “run-of-river”. The agreement states,

(d) The hydro plant shall be operated according to standards established by the Kentucky River Authority including but not limited to (1) run-of-river operation such that Pool 7 does not drop below the crest of Dam 7 due to operation of the hydro plant; (2) the hydro plant will not be operated when the Harrodsburg Water System is ordered to reduce withdraws from Pool 7 due to low flow limits imposed by the Kentucky Division of Water; (3) the hydro plant will not be operated when the Kentucky River Authority implements a bypass valve release from Pool 7 due to low flows in the river. The Lessee shall stop operation of the hydro plant, in accordance with standards (2) and (3) above after it has been notified by the Kentucky River Authority that a specific low flow limitation is in place. The Kentucky River Authority shall notify the Lessee as soon as the low flow limitation has been lifted, and the Lessee can resume operation of the hydro plant at that time. These standards shall remain in effect unless otherwise amended in writing by the Executive Director of the Kentucky River Authority.

So on an operational basis, the plant must only use the water coming to it and may not use any water held back below the dam. Using the USGS gage, the water level in Pool 7 may not drop below crest of Dam 7 due to our plant’s operation, which is set at the USGS gage as 9.20 feet. At our plant, both a primary and back-up water level sensors are connected to a Programmable Logic Controller (PLC) that will shut down generating units when the river level drops to 9.20. These water level sensors are recalibrated to the USGS gage on a regular basis. The plant also has a float sensor that serves as an additional back-up that will shut the entire plant down if the PLC based sensors fail for any reason.

The USGS gage is available publicly on-line at the USGS website. Resource agencies and anyone else can monitor this gage to make sure the plant maintains its run-of-river operations.

- *In a conduit project, identify the water source and discharge points for the conduit system within which the hydropower plant is located.*

Not Applicable – not a conduit project

- *For impoundment zones only, explain how fish and wildlife habitat within the zone is evaluated and managed – **NOTE:** this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.*

Not Applicable – This is not an impoundment zone.

III.B.1 Water Quality in Zone 1

The facility satisfies Standard B-2, Agency Recommendations, in Zone 1.

Supporting Information Required.

<i>B</i>	<i>2</i>	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none"> • <i>If facility is located on a Water Quality Limited river reach, provide an agency letter stating that the facility is not a cause of such limitation.</i> • <i>Provide a copy of the most recent Water Quality Certificate, including the date of issuance.</i> • <i>Identify any other agency recommendations related to water quality and explain their scientific or technical basis.</i> • <i>Describe all compliance activities related to the water quality related agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.</i>
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- *If facility is located on a Water Quality Limited river reach, provide an agency letter stating that the facility is not a cause of such limitation.*

Not Applicable, because the Kentucky River in this zone is not on the state 303(d) list. This part of the Kentucky River does conform to the State’s water quality criteria for warmwater streams.

- *Provide a copy of the most recent Water Quality Certificate, including the date of issuance.*

The plant was issued Water Quality Certification # 2005-0103-8 by the Kentucky Division of Water on October 17, 2005. This certification is available on the LIHI website at:

<http://www.lowimpacthydro.org/assets/files/lihi-cert-app-files/401WaterQualityCertification.pdf>

- *Identify any other agency recommendations related to water quality and explain their scientific or*

technical basis.

There are no other agency recommendations related to water quality.

- *Describe all compliance activities related to the water quality related agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.*

The Water Quality Certification requires that monitoring be done for the 5 month of the year when river water is warmer and Dissolved Oxygen tends to be lower. The plant is also required to shutdown units if Dissolved Oxygen levels drop below the Kentucky state standard for warm water streams, 5 mg/l over a 24 hour average or 4 mg/l instantaneously.

To comply with these requirements, we have installed continuously DO monitoring equipment, using Optical DO technology for accuracy and reliability. A reading is taken every 15 minutes and logged. While required for 5 months a year, readings are taken year round to provide a complete data set. Data is sent to the plant’s Programmable Logic Controller (PLC). If DO levels drop below the state minimum, the PLC shuts down units until DO levels increase to above the state standard.

At the end of each calendar year, a report is sent to the Division of Water that details if and when the plant shut down in the previous year because of dissolved oxygen. The last 5 annual Water Quality Reports are attached in Appendix A. The raw data for the previously year is put on our website, and is available to anyone for research at:

<http://www.kyhydropower.com/data.html>

This facility is the only location on the Kentucky River where continuous DO monitoring is being done. Thus it is very important that data taken be made available to agencies and the general public through our website.

III.B.PLUS PLUS Standard Qualification

The facility qualifies for the PLUS standard for water quality.

Supporting Information Required.

<i>B</i>	<i>PLUS</i>	<p><u><i>Bonus Activities:</i></u></p> <ul style="list-style-type: none"> • <i>Describe any advance technologies that have been deployed at the facility to enhance ambient water quality and how its performance is being monitored.</i> • <i>If adaptive management is being applied, describe the management objectives, the monitoring program pursuant to evaluating performance against those objectives, and the management actions that will be taken in response to monitoring results.</i>
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- *Describe any advance technologies that have been deployed at the facility to enhance ambient water quality and how its performance is being monitored.*

Not Applicable

- *If adaptive management is being applied, describe the management objectives, the monitoring program pursuant to evaluating performance against those objectives, and the management actions that will be taken in response to monitoring results.*

With respect Water Quality, we have gone beyond what was required to satisfy LIHI's water quality goal in three ways:

1) Requesting Stricter Water Quality Certification.

When we bought the abandoned powerplant and FERC license from Kentucky Utilities Co. in December 2005, it came with a 401 Water Quality Certificate that we considered to be extremely sub-standard. The certification required no DO monitoring of any kind. We felt this 401 set a very bad precedent for developers seeking new FERC hydropower licenses in Kentucky. One of our first acts was to go to the Kentucky Division of Water and request a new 401 with much stricter standards, the result is Water Quality Certification # 2005-0103-8, described above. If we had not done this, we could still be operating today with a sub-standard 401, and saved ourselves a lot of time and money, and still be in perfect compliance with our FERC License and the Division of Water. But in the last year, three new FERC licenses have been issued for Kentucky River sites, and all three have 401 certificates with robust DO monitoring and compliance standards, which proved the value of seeking a stronger 401 Certificate.

2) Collecting much more Water Quality Data than required.

Our 401 Water Quality Certification requires DO monitoring between June 1st and October 31, a five month period. Our site goes far beyond this minimum monitoring, and instead does DO monitoring 12 months a year. This is because our facility is the only site on the Kentucky River with continuously monitoring DO, and collection of 12 month of data per year, instead of just five, offers resource agencies and researchers more complete data sets.

3) Aeration to improve Water Quality.

Our 401 Water Quality Certification requires that we shut down units when DO drops below the state minimum levels, in order to bring oxygen levels back above the standard. While our turbines don't consume oxygen, nor do they add oxygen to the water when running. Instead, of going through our turbines, water that does not go through our plant tumbles over the dam and is aerated. This is especially important since water released upstream from Dix Dam is released from the bottom of the lake and that water is very low in oxygen.

In the past, when KU shut down units, they would apply brakes to stop the units, which minimized water leaking through wickets gates. We have instead employed a different strategy. When we turn off a unit, we allow it to continue to spin, which draws or "wastes" additional water. But with the design of turbines we have, the suction of the draft tube with the spinning turbines pulls a lot of air through holes in the crown plate. The result is significant aeration. For some reason, this effect is especially powerful with our Unit 1. After being shut down and spinning, the roar of air into the turbine is so loud that you can almost not hear in the turbine pit. In the tailrace, the water coming out is just full of small bubbles, all adding oxygen to the low DO water. Because Unit 1 is so effective at aerating, we have the PLC turn this unit off first in low DO shutdowns, and this one turbine alone many times can add enough oxygen to bring DO levels up above the state minimum.

This technique is used on all shutdowns to help aerate the water, not just low DO shutdowns. While this aeration technique is not required in our FERC License or 401 Certificate, and doing this

does “waste” some water that might be used for generation, we feel that the benefits for Water Quality outweigh any losses in revenue.

III.C.1 Upstream Fish Passage in Zone 1

The facility satisfies Standard C-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

Criterion	Standard	Instructions
C	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural upstream movement (e.g., entrainment into hydropower turbines). • For riverine fish populations that are known to move upstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.

- Explain why the facility does not impose a barrier to upstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural upstream movement (e.g., entrainment into hydropower turbines).

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has done specific studies of the fish species found in the different pools on the Kentucky River using boat electrofishing. Summary table are contained in the documentation section below. While this work was done for Pools 9 through 14, it is also representative of the species that would be found in Pools 6 and 7. All of the species of fish identified in these studies are Riverine varieties of fish. There were no Anadromous or Catadromous species found in any of these studies. Thus there are no specific fish that need upstream passage at Dam 7.

That being said, according to KDFWR, some upstream fish passage still does take place. During high water events, the tailwater rises much faster than the headwater, to the point that there is little to no difference in the headwater and tailwater pool elevations. At this point the water is moving too fast for upstream fish passage in the center of the stream, but along the edges the water is moving slow or not at all. Fish will move to the edges to avoid the high flows, and at these edges can move upstream or downstream. When the flow returns to normal, the fish are then left in which ever pool they moved to during the high water event.

As a result, there is no need for upstream fish passage at Lock and Dam 7, and no agency has ever recommended it for our project.

- *For riverine fish populations that are known to move upstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles.*

None of the riverine fish in the Kentucky River need to move upstream to complete their life cycles. As a result, there is no need for upstream fish passage at Lock and Dam 7, and no agency has ever recommended it for our project.

- *Document available fish distribution data and the lack of migratory fish species in the vicinity.*

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has done specific studies of the fish species found in the different pools on the Kentucky River using boat electrofishing. The summary tables from this work in pools 9 through 14 in 1998, 2000 and 2002 are in Appendix B.

While this work was done for Pools 9 through 14, it is also representative of the species that would be found in Pools 6 and 7. All of the species of fish identified in these studies are Riverine varieties of fish. There were no Anadromous or Catadromous species found in any of these studies.

- *If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.*

In the past, when the locks were in use, fish could move upstream moving through the lock chambers when boats were locked through. At that time, it is reported that American Eels, a Catadromous species, would move upstream to the headwater of the Kentucky River using the lock chambers. But since Locks 5 through 14 were retired in the 1980's, the American Eel is no longer found past Pool 4. This is confirmed with the KDFWS electrofishing studies and by antidotal evidence from long-time fishermen. The American Eel is still reported to be found up to Pool 4 even today, because Lock 1 through Lock 4 are still in use. But the American Eel has no way to reach the Zone of Effect, since they have no way to get past Dam 5 or Dam 6.

Our facility had nothing to do with loss of the American Eel in the Zone of Effect, since the Eel co-existed with the operation of our plant up until the 1980's. The permanent closing of Locks 5 through 14 is the primary reason the American Eel is no longer in our section of the Kentucky River, and our plant had nothing to do with the operation or closing of the locks.

III.D.1 Downstream Fish Passage in Zone 1

The facility satisfies Standard D-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

Criterion	Standard	Instructions
<i>D</i>	<i>1</i>	<u>Not Applicable / De Minimis Effect:</u>

Criterion	Standard	Instructions
		<ul style="list-style-type: none"> • <i>Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines).</i> • <i>For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles.</i> • <i>Document available fish distribution data and the lack of migratory fish species in the vicinity.</i> • <i>If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.</i>

- *Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines).*

The maximum hydraulic capacity of the turbines is 2,386 cfs. Flow in the Kentucky River exceeds the maximum turbine usage 47% of the time. At these times when there is significant water flowing over the main dam, fish freely move downstream, not always by choice. Due to the high flows in the river, primarily during the Winter and Spring, a significant portion of the fish population is washed downstream to the Ohio River. The Kentucky Department of Fish and Wildlife Resources (KDFWR) thus needs to do significant stocking of the Kentucky River each year, primarily in the headwaters, to replace the fish that move downstream during high water events. Thus the facility at Lock 7 does not impose a barrier to downstream movement of fish.

- *For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles.*

The facility at Lock 7 does not impose a barrier to downstream movement of fish.

- *Document available fish distribution data and the lack of migratory fish species in the vicinity.*

See the electrofishing studies data in III.C.1 Upstream Fish Passage in Zone 1 above.

All of the species of fish identified in these studies are Riverine varieties of fish. There were no Anadromous or Catadromous species found in any of these studies.

- *If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.*

The American Eel was found in the Zone of Effect until the 1980's. The Eel is no longer in this area due to an inability to move upstream, since downstream movement is not a problem at all but very low flows. See the information in III.C.1 Upstream Fish Passage in ZoE #1 above, for more information on upstream passage problems for the American Eel.

III.E.1 Watershed and Shoreline Protection in Zone 1

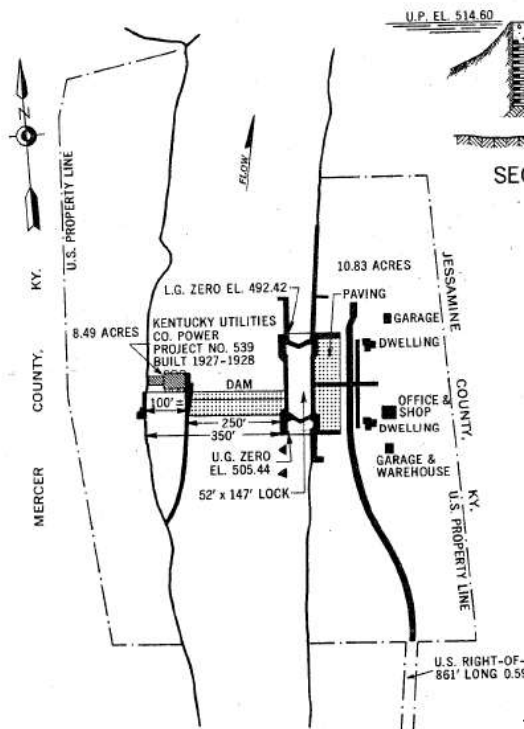
The facility satisfies Standard E-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary). Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.
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- If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary).

The only land under project control is the property leased from the Kentucky River Authority for use of the water retaining structures. This is 10.83 acres on the Lock side of the river where the old Lock Tender Houses once stood, and 8.49 acres on the powerplant side of the river which is wooded cliff areas. No significant ecological value has ever been associated with this land. If there was at one time an significant ecological value associated with this land, it would have been destroyed in 1896 when the dam was built. There was no significant ecological value identified in the Environmental Assessment that was part of our 1992 FERC license, and no resource agencies has ever identified an significant ecological value associated with this land. See FERC license in Part I, Regulatory Status.



This map shows the land owned and controlled by the Kentucky River Authority and leased to the Licensee.

- Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.

There were no Shoreline Management Plans or similar protection requirements for the facility identified in the Environmental Assessment that was part of our 1992 FERC license, and no resource agencies has ever proposed Shoreline Management Plans or similar protection requirements for the facility or this land. See FERC license in Part I, Regulatory Status.

III.F.1 Threatened and Endangered Species in Zone 1

The facility satisfies Standard F-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

<i>F</i>	<i>1</i>	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Document that there are no listed species in the facility area or affected riverine zones downstream of the facility. • If listed species are known to have existed in the facility area in the past but are not currently present, explain why the facility was not the cause of the extirpation of such species. • If the facility is making significant efforts to reintroduce an extirpated species, describe the actions that are being taken.
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- Document that there are no listed species in the facility area or affected riverine zones downstream of the facility.

We have just finished licensing two new hydro plants on the Kentucky River upstream from Lock 7. As part of the process, on March 31, 2015, the U.S. Fish and Wildlife Service (USFWS) submitted a letter with respect to Endangered Species in this area and how they were addressed in the FERC Environmental Assessments for the projects. The Endangered Species in this area are listed below in this section from the USFWS letter - the full letter is contained in Appendix C.

Endangered Species Act Comments

The EA addresses all of the federally listed species that the Service believes have the potential to be affected by the proposed projects. Those species are:

<u>Common Name</u>	<u>Scientific Name</u>	<u>Federal Status</u>
Indiana bat	<i>Myotis sodalis</i>	endangered
Gray bat	<i>Myotis grisescens</i>	endangered
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	endangered

There are three species listed, all bats. There are no endangered aquatic species identified as being in

the Kentucky River. The USFWS had concerns with respect to the impact on bats during the construction of the new hydro plants, specifically removal of trees and bats that might be in the abandoned Lock Tender Houses. There were no concerns expressed with respect to the operation of the projects once completed.

The Mother Ann Lee plant at Lock 7 is existing with no need for any construction, thus the continued operation of the plant should have no impact on bats. There are no other endangered species in the Zone of Effect, including no aquatic endangered species. Thus the continued operation of the plant will not impact any endangered species.

The Environmental Assessment in the project’s FERC license concurs that there should be no impact on endangered bats by continued operation of the facility. On page 3 of the Environmental Assessment attached to our FERC License states:

Remarks: The project is within the range of the Indiana bat (*Myotis sodalis*) and gray bat (*M. grisescens*), both federally listed endangered species. Continued project operation would not affect either of these species (pers. comm. with R. Bay, FWS Field Office, Cookeville, Tennessee, on August 26, 1991).

A copy of the FERC license can be found in Part I of this application, under “Regulatory Status”.

- *If listed species are known to have existed in the facility area in the past but are not currently present, explain why the facility was not the cause of the extirpation of such species.*

We know of no endangered species that existed in the facility area that are no longer there.

- *If the facility is making significant efforts to reintroduce an extirpated species, describe the actions that are being taken.*

We know of no endangered species that existed in the facility area that are no longer there.

III.G.1 Cultural and Historic Resources in Zone 1

The facility satisfies Standard G-1, Not Applicable/De Minimis Effect, in Zone 1.

Table III-1. Supporting Information Required.

G	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility. • Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.
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- *Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility.*

On page 8 of the Environmental Assessment attached to the project’s FERC License, the EA concluded

with respect to Cultural and Historic Resources:

2. Cultural resources. We have determined that no eligible properties would be adversely affected. Nevertheless, there is still the possibility that there could be significant undiscovered properties in the project area that could be adversely affected by the project. If such properties are found during project operation which is approved in the license, the licensee should (a) consult with the State Historic Preservation Officer (SHPO); (b) based on consultations with the SHPO, prepare a plan describing the appropriate course of action and a schedule for carrying it out; (c) file the plan for Commission approval; and (d) take the necessary steps to protect the discovered properties from further impact until notified by the Commission that all of these requirements have been satisfied.

A copy of the FERC license can be found in Part I of this application, under "Regulatory Status".

At that time, and since that time, the Mother Ann Lee station has never been identified as a historic resource.

Since the issuance of the License, no "significant undiscovered properties in the project area that could be adversely affected by the project" have been identified. Thus the continued operation of our plant should have no impact on any Cultural or Historic resources.

- *Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.*

We obtained the plant and FERC license from Kentucky Utilities in December 2005. Since then there has been no construction that would adversely affect cultural or historic resources. Likewise, the continued operation of the plant has no adverse impact on cultural or historic resources.

III.G.2 PLUS Standard for Historic Resources

The facility satisfies the PLUS standard for Historic Resources in Zone 1.

Supporting Information Required.

G	PLUS	<p><u>Bonus Activities:</u></p> <ul style="list-style-type: none"> • <i>Document any substantial commitment that the facility has made to restoring one or more significant cultural or historical resource in the vicinity, beyond what is required in existing plans such as a Historic Resources Management Plan.</i> • <i>Document any significant new educational opportunity about cultural or historical resources in the area that the Facility has created, including contractual obligations that guarantee that this opportunity will exist for the duration of the LIHI certification.</i>
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- *Document any substantial commitment that the facility has made to restoring one or more significant cultural or historical resource in the vicinity, beyond what is required in existing plans such*

as a Historic Resources Management Plan.

In 2014, the Unit #2 turbine runner was replaced with a new runner. Instead of scrapping to old runner, it was given to the Jessamine County Parks and Recreation Department and put on display in the area across the river from the plant. Jessamine County is currently completing a lease for this land with the Kentucky River Authority and intends to open this area up to the public. At that time, we will add interpretative signage that explains what the runner is and how it was used between 1927 and 2014.

- *Document any significant new educational opportunity about cultural or historical resources in the area that the Facility has created, including contractual obligations that guarantee that this opportunity will exist for the duration of the LIHI certification.*

We have forged a long-term relationship with Centre College (about 15 miles from the plant) which has resulted in the students voting by an 86-14% margin to raise their tuition by \$20 per year to purchase RECs from the Mother Ann Lee Hydroelectric Station. Part of this relationship includes class tours of the plant and presentation to student on the campus. Tours and lectures include information on the plant's history, discussions of who Mother Ann Lee and the Shakers were, and discussions about renewable energy. Tours are also given to students from other colleges and universities in the region.

In an attempt to raise awareness of renewable energy and to beautify the plant, we engaged the 4th Grade class at Bloom Elementary School in a very special project. During the renovation of the plant, the generators were painted "Marti Gras" colors (green, yellow and purple) to make the plant as "un-utility" as possible (the generators had been gray and rusty). To finish the effect, we removed the 23 cover plates around the base of the generators, had them sandblasted and primed, then took them to the Art Teacher at Bloom Elementary. After we gave the 4th grade students a talk about renewable energy and hydropower, the Art teacher put up a poster of the types of fish found in the Kentucky River, and each of the students painted a plate with a fish theme. These plates were then re-installed on the generators and our hydro plant has been transformed into a Children's Art Gallery. A few pictures of the generators are below. A picture of all of the plates, along with the name of each kid that did the artwork, and pictures of the class in action painting can be found at our website at:

<http://www.kyhydropower.com/art.html>

Student representatives of the class then came to the plant for a tour and to shoot a video, which was later shown to all the students at Bloom Elementary.

Before:



After:





Student Artists at work:



III.H.1 Recreational Resources in Zone 1

The facility satisfies Standard H-1, Not Applicable/De Minimis Effect, in Zone 1.

Supporting Information Required.

H	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Document that the facility does not occupy lands or waters to which public access can be granted and that the facility does not otherwise impact recreational opportunities in the facility area.
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- Document that the facility does not occupy lands or waters to which public access can be granted and that the facility does not otherwise impact recreational opportunities in the facility area.

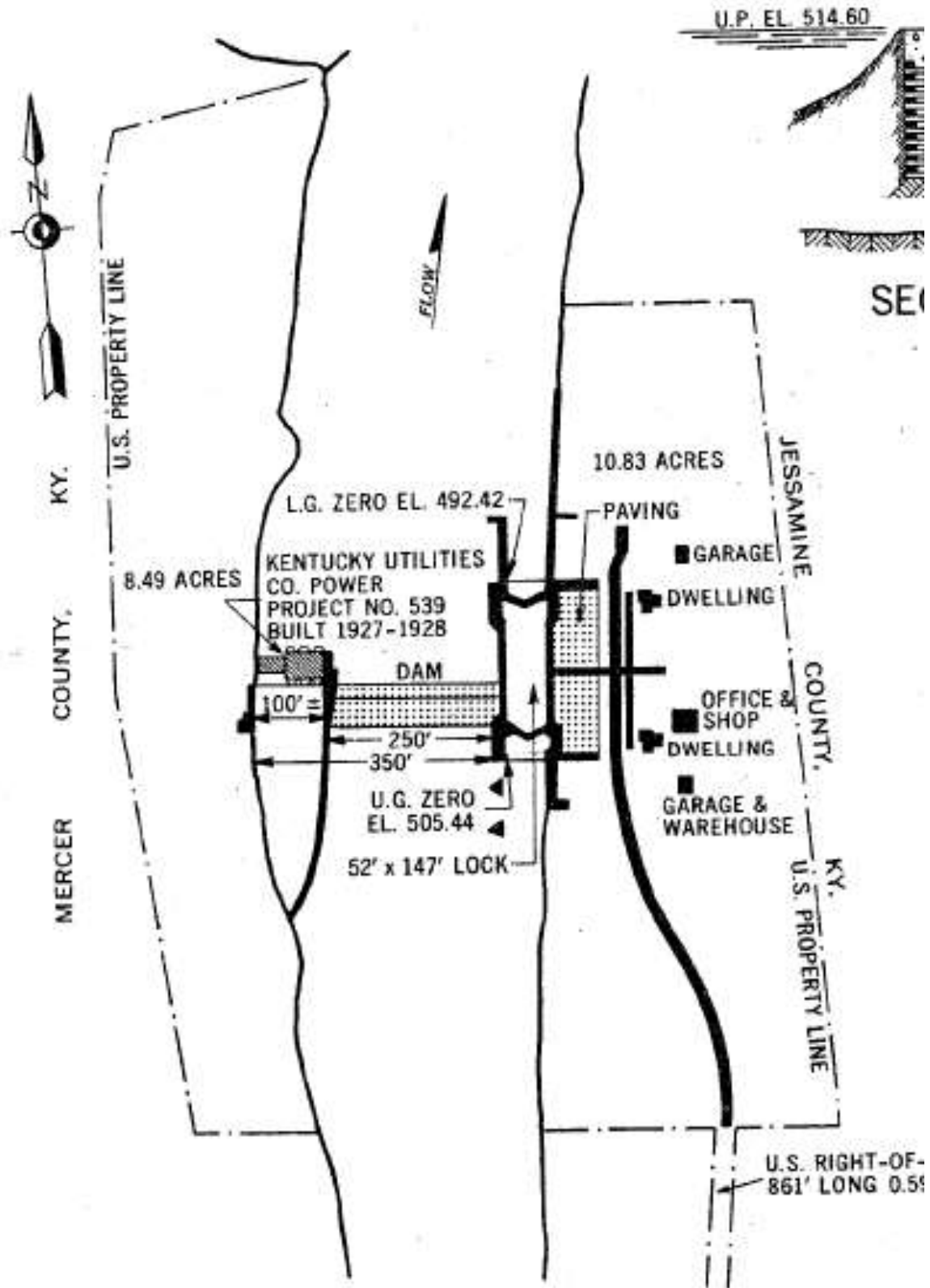
The Environmental Assessment in our FERC license states:

e. Recreation: There is no recreational use on project lands and little recreational use in the vicinity. There is some fishing downstream from the project and boating use in the dam No. 7 impoundment. While some recreational boat traffic uses Lock No. 7 to pass the dam, most boating on the Kentucky River is within navigation pools (pers. comm. with R. Bay, FWS Field Office Cookeville, Tennessee, on August 26, 1991).

A copy of the FERC license can be found in Part I of this application, under “Regulatory Status”.

Currently the land across the river from the powerplant, owned and operated by the Kentucky River Authority, is off limits to the public. The hiking trail which is the access to the powerplant is also off limits to the public because of safety concerns. All lands along Pool 6 and Pools 7, the Zone of Effect, are private lands. Since the license was issued, the locks have been permanently closed and abandoned, eliminating recreational boat traffic between pools. Recreational opportunities are still quite limited, with only a few boat ramps upstream in Pool 7 and a few ramps downstream in Pool 6.

The map below shows the land owned by the Commonwealth of Kentucky and operated by the Kentucky River Authority. Land on the power plant side of the river is inaccessible to the public due to its remote location with no road access. Land on the Lock side of the river is posted by the Kentucky River Authority as “No Trespassing”. Currently the general public can assess the river through a public boat ramp located a quarter mile upstream that is owned and operated by the Kentucky Department of Fish and Wildlife Resources, and thus no requests for access have been made for the Kentucky River Authority Land.



III.H.2 PLUS Standard for Recreation

The Facility qualifies for the PLUS standard for recreation.

Supporting Information Required.

<i>H</i>	<i>PLUS</i>	<p><u>Bonus Activities:</u></p> <ul style="list-style-type: none"> • <i>Document any new public recreational opportunities that have been created on facility lands or waters beyond those required by agencies (e.g., campgrounds, whitewater parks, boating access facilities and trails).</i> • <i>Document that such new recreational opportunities did not create unmitigated impacts to other resources.</i>
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- *Document any new public recreational opportunities that have been created on facility lands or waters beyond those required by agencies (e.g., campgrounds, whitewater parks, boating access facilities and trails).*

We are working with the Jessamine County Parks and Recreation Department to open up the land across from the powerplant for the public to use for recreation. Jessamine County is currently negotiating a lease with the Kentucky River Authority to use the land. It is our intention, which has been expressed to Jessamine County, to make recreation the primary focus of our FERC relicensing efforts that begin in 2017. We have verbally committed to Jessamine County that we will pay for canoe portage, a fishing pier, and a walkway to gain safe access to the tailwater area for fishing. This is a perfect arrangement since Jessamine County has plans for a canoe portage and fishing pier for this site, but no way to fund it. When complete, the public will finally have a good public access point for this section of the river (this is near the town of Wilmore and Asbury University). We also intend to provide signage for our retired runner on the site as well as historic interpretation of the significance of the Kentucky River and the Lock and Dam system in the early settlement of this part of Kentucky.

- *Document that such new recreational opportunities did not create unmitigated impacts to other resources.*

Recreational development will be kept to the Kentucky River Authority property, which has already been impacted by the development of the Lock and Dam, and associated buildings.

PART IV. SWORN STATEMENT AND WAIVER

As an Authorized Representative of Lock 7 Hydro Partners, LLC, the Undersigned attests that the material presented in the application is true and complete. The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's Certification Program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions. The undersigned further acknowledges that if certification of the applying facility is issued, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified. The undersigned Applicant further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's Certification Program.



David Brown Kinloch
President/CEO
Lock 7 Hydro Partners, LLC

9/29/16

Date

PART V. CONTACTS

Table V-1. Complete contact information for the facility owner and other associated parties.

Project Owner:	
Name and Title	David Brown Kinloch, President/CEO
Company	Lock 7 Hydro Partners, LLC
Phone	502-589-0975
Email Address	kyhydropower@gmail.com
Mailing Address	414 S. Wenzel Street, Louisville, KY 40204
Project Operator (if different from Owner):	
Name and Title	David Brown Kinloch, President
Company	Shaker Landing Hydro Associates, Inc.
Phone	502-589-0975
Email Address	kyhydropower@gmail.com
Mailing Address	414 S. Wenzel Street, Louisville, KY 40204
Consulting Firm / Agent for LIHI Program (if different from above):	
Name and Title	n/a
Company	
Phone	
Email Address	
Mailing Address	
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	David Brown Kinloch, President/CEO
Company	Lock 7 Hydro Partners, LLC
Phone	502-589-0975
Email Address	kyhydropower@gmail.com
Mailing Address	414 S. Wenzel Street, Louisville, KY 40204
Party responsible for accounts payable:	
Name and Title	David Brown Kinloch, President/CEO
Company	Lock 7 Hydro Partners, LLC
Phone	502-589-0975
Email Address	kyhydropower@gmail.com
Mailing Address	414 S. Wenzel Street, Louisville, KY 40204

Table V-2. Current and relevant state, federal, provincial, and tribal resource agency contacts (copy and repeat the following table as needed).

Agency Contact (Check area of responsibility: Flows <u>X</u> , Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Department of Natural Resources and Environmental Protection Division of Water
Name and Title	Ms. Joyce Fry, Environmental Biologist Consultant
Phone	502-564-3410 ext. 4878
Email address	Joyce.Fry@ky.gov
Mailing Address	200 Fair Oaks Ln. - 4th Floor, Frankfort, KY 40601-1189

Agency Contact (Check area of responsibility: Flows __, Water Quality <u>X</u> , Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Department of Natural Resources and Environmental Protection Division of Water
Name and Title	Ms. Joyce Fry, Environmental Biologist Consultant
Phone	502-564-3410 ext. 4878
Email address	Joyce.Fry@ky.gov
Mailing Address	200 Fair Oaks Ln. - 4th Floor, Frankfort, KY 40601-1189

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources <u>X</u> , Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kentucky Department of Fish and Wildlife Resources
Name and Title	Mr. Joseph Zimmerman, Environmental Biologist Consultant
Phone	502-564-7109 ext. 4473
Email address	Joseph.Zimmerman@ky.gov
Mailing Address	#1 Sportsman's Lane, Frankfort, KY 40601

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources __, Watersheds <u>X</u> , T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kentucky Department of Fish and Wildlife Resources
Name and Title	Mr. Joseph Zimmerman, Environmental Biologist Consultant
Phone	502-564-7109 ext. 4473
Email address	Joseph.Zimmerman@ky.gov
Mailing Address	#1 Sportsman's Lane, Frankfort, KY 40601

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. <u>X</u> , Cultural/Historic Resources __, Recreation __):	
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Mother Ann Lee Recertification Application

Agency Name	U.S. Fish and Wildlife Service
Name and Title	Ms. Carrie Allison,
Phone	502-695-0468 ext. 103
Email address	carrie_allison@fws.gov
Mailing Address	J.C. Watts Federal Building, 330 West Broadway, Room 265, Frankfort, KY 40601

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources <u>X</u> , Recreation __):	
Agency Name	Kentucky Heritage Council
Name and Title	Craig A. Potts, State Historic Preservation Officer
Phone	(502) 564-7005
Email address	
Mailing Address	300 Washington Street, Frankfort, KY 40601

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation <u>X</u>):	
Agency Name	Kentucky Department of Fish and Wildlife Resources
Name and Title	Mr. Joseph Zimmerman, Environmental Biologist Consultant
Phone	502-564-7109 ext. 4473
Email address	Joseph.Zimmerman@ky.gov
Mailing Address	#1 Sportsman's Lane, Frankfort, KY 40601

Appendix A:

Annual Water Quality Monitoring Reports, last 5 years

Lock 7 Hydro Partners, LLC

414 South Wenzel Street - Louisville, KY 40204

February 8, 2016

Re: Water Quality Certification # 2005-0103-8
FERC License No. 539
Mother Ann Lee Hydroelectric Station
AINo.: 51793
Activity ID: APE20050001,
Kentucky River at Lock 7
Mercer County, Kentucky

Ms. Joyce Fry
Department of Natural Resources
and Environmental Protection
Division of Water
200 Fair Oaks Ln. - 4th Floor
Frankfort, KY 40601-1189

Dear Ms. Fry,

As part of our 401 Water Quality Certification, Lock 7 Hydro Partners is required to test the Dissolved Oxygen (DO) levels at Lock 7 on the Kentucky River between June 1st and October 31st each year. If the DO level drops below 5 mg/l averaged over a 24 hour period or 4 mg/l for a single reading, the Mother Ann Lee plant's turbines are to be shut down until reading return to above this standard.

During 2015, DO at Lock 7 was measured automatically and on a continuous basis using a YSI 6000 sonde that measures DO, with an Optical DO probe, and measures temperature. Reading were taken every 15 minutes during the year and recorded. The data collected during this period (about 25,000 readings) is available to be downloaded and analyzed at <http://www.kyhydropower.com/data.html>.

During 2015, unusual rainfall patterns (large rain events followed by no rain for long periods) led to large releases from Herrington Lake at Dix Dam at times there was low flow in the main stem of the Kentucky River. These releases from Herrington Lake contained water with very low Dissolved Oxygen. This resulted in DO levels measured at our plant below the State Standard, causing our computer to shut down one or more turbine/generator units to help improve water quality. Our system is designed to shut down Unit 1 first and set it in an "idling" mode. Having the unit spinning with the wicket gates closed pulls significant air through the turbine and adds a significant amount of oxygen to the water (because of the unique condition of each of the old turbines, Unit 1 does a much better job of aerating the water than Units 2 or 3). In 2015, we had 11 low DO events, where Unit 1 was shut down and put

into an aerating mode until water quality improved. Listed below are the dates when these events occurred:

- July 30, 2015 - 24 hour Average below 5.0 mg/l - Shut down Unit 1 to aerate
- October 15, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 16, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 17, 2015 thru October 18, 2015
 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 19, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 22, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 23, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 24, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 25, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 26, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate
- October 27, 2015 - Instantaneous reading below 4.0 mg/l - Shut down Unit 1 to aerate

In most of these events, Unit 1 was shut down and used to aerate for about 8 hours before DO levels returned to high enough levels to return to generation. The exception was on October 17 and 18, when DO levels were so low that using Unit 1 for aeration instead of generation lasted almost 2 days.

While shutting down units and spinning them to aerate the water reduced our power output and revenues (during these times when the river flow was more than enough to make power from all units), in each case we were able to increase DO levels to above the State Standard.

This year we also experienced equipment failures twice, once in February, before the required monitoring period began, and also in December, after the required monitoring period ended. The equipment did operate flawlessly during the required monitoring period. The equipment has undergone a major repair now and will be reinstalled soon, ready for the 2016 monitoring period.

If you should have any questions, please don't hesitate to contact me at (502) 589-0975.

Sincerely,

David Brown Kinloch
President/CEO
Lock 7 Hydro Partners, LLC

Lock 7 Hydro Partners, LLC

414 South Wenzel Street - Louisville, KY 40204

January 6, 2015

Re: Water Quality Certification # 2005-0103-8
FERC License No. 539
Mother Ann Lee Hydroelectric Station
AINo.: 51793
Activity ID: APE20050001,
Kentucky River at Lock 7
Mercer County, Kentucky

Ms. Joyce Fry
Department of Natural Resources
and Environmental Protection
Division of Water
200 Fair Oaks Ln. - 4th Floor
Frankfort, KY 40601-1189

Dear Ms. Fry,

As part of our 401 Water Quality Certification, Lock 7 Hydro Partners is required to test the Dissolved Oxygen (DO) levels at Lock 7 on the Kentucky River between June 1st and October 31st each year. If the DO level drops below 5 mg/l averaged over a 24 hour period or 4 mg/l for a single reading, the Mother Ann Lee plant's turbines are to be shut down until reading return to above this standard.

During 2014, DO at Lock 7 was measured automatically and on a continuous basis using a YSI 6000 sonde that measures DO, with an Optical DO probe, and measures temperature. Reading were taken every 15 minutes during the entire year and recorded. The data collected during this period (about 35,000 readings) is available to be downloaded and analyzed at <http://www.kyhydropower.com/data.html>.

During 2014, the lowest DO reading occurred on October 29, 2014 at 2:45 pm, with a DO reading of 5.50 mg/l, above the minimum level in our 401 Water Quality Certification. As such, the Mother Ann Lee was never shut down during the year due to low DO. It should be noted data collection didn't begin until February 20th, after substantial rebuild and repair of the monitoring equipment was complete.

If you should have any questions, please don't hesitate to contact me at (502) 589-0975.

Sincerely,

David Brown Kinloch
President/CEO
Lock 7 Hydro Partners, LLC

Lock 7 Hydro Partners, LLC
414 South Wenzel Street - Louisville, KY 40204

January 21, 2014

Re: Water Quality Certification # 2005-0103-8
FERC License No. 539
Mother Ann Lee Hydroelectric Station
AINo.: 51793
Activity ID: APE20050001,
Kentucky River at Lock 7
Mercer County, Kentucky

Ms. Joyce Fry
Department of Natural Resources
and Environmental Protection
Division of Water
200 Fair Oaks Ln. - 4th Floor
Frankfort, KY 40601-1189

Dear Ms. Fry,

As part of our 401 Water Quality Certification, Lock 7 Hydro Partners is required to test the Dissolved Oxygen (DO) levels at Lock 7 on the Kentucky River between June 1st and October 31st each year. If the DO level drops below 5 mg/l averaged over a 24 hour period or 4 mg/l for a single reading, the Mother Ann Lee plant's turbines are to be shut down until reading return to above this standard.

During 2013, DO at Lock 7 was measured automatically and on a continuous basis using a YSI 6000 sonde that measures DO, with an Optical DO probe, and measures temperature. Reading were taken every 15 minutes during the entire year and recorded. The data collected during this period (about 35,000 readings) is available to be downloaded and analyzed at <http://www.kyhydropower.com/data.html>.

In reports submitted to you in all previous years since we began operating the renovated plant in 2006, our monitoring showed that DO levels had never dropped below the levels referenced in our 401 Certificate, which we concluded was normal for this monitoring site. But in 2013, conditions were such that the DO did drop below 5 mg/l, and at some points even below 4 mg/l. This was an unusual year in that we experienced heavy rains up into the summer. This allowed for significant storage at Herrington Lake, just upstream of our site. Large prolonged releases from Herrington Lake by KU in October, which are uncommon, resulted in large volumes of water, with very low DO, entering the Kentucky River from the Dix River. This was at a time when the flow of water in the main stem of the Kentucky River was very low. This resulted in slugs of water, during Herrington Lake releases, causing the DO in the Kentucky River at Lock 7 to drop significantly very quickly.

Looking at our 2013 DO data, this significant drop first occurred on October 3, and happened on and off for about a month. Checking our website with real-time data, we first noticed that the DO had dropped below 4 mg/l on afternoon of October 14, but also noticed that our plant computer (a Programmable Logic Controller or “PLC”) had failed to shut a turbine or turbines down to respond to the low DO. Thus on day, October 14th, Unit 1 was shutdown manually to increase oxygenation of the water, and the DO levels returned to acceptable levels.

At this point we began to investigate why the turbines were not being shutdown automatically when low DO levels were detected. After a lot of investigation, it was found that there was a software problem in the software being run in the PLC. This software problem had apparently been there since we began automatically monitoring DO in 2008, but had never been noticed since we had never experienced very low DO before. The software dealing with DO had to be re-written, and on October 30th, the revised software was loaded in the PLC. On that day, October 30th, a low DO event occurred (perfect to test the new software), and the PLC worked perfectly and shut down Unit 1 as soon as DO below 4 mg/l was detected. Within an hour, the additional oxygenation from Unit 1 being shut off was able to raise the DO back above 5 mg/l, as we expected. The new software also contains a function that keeps a rolling 24 hour DO average, and will shut down a unit if this rolling 24 average goes below 5 mg/l. On our website, both the instantaneous DO and the 24 hour DO average are now both displayed.

The PLC then went on to automatically shut down units in response to low DO on October 31st and November 5th and 6th. No other low DO events occurred after November 6th. With the automatic shutdowns on these 4 low DO days after November 29th, we are confident that the bugs are out of the system, the software problem is completely corrected, and that the DO monitoring system should work correctly in the future. Units are not restarted automatically once DO levels exceed 5 mg/l, but instead require a manual restart when the operator makes a judgment that DO levels had recovered enough to sustain DO without the oxygenation from an additional turbine remaining shut down. Should the operator misjudge, the automatic system will shut the turbine down again if DO levels drop too low.

During the two weeks between October 14th and October 30th, while the problem was being investigated and the software was being rewritten, the DO levels were monitored manually through our website real-time data, and turbines were shutdown manually to improve DO when DO was observed to be low. A turbine was shut down manually on October 14th, Oct 17th, October 18th, October 25th and October 28th. On all of these occasions, Unit 1 was shut down and the DO levels recovered to above 5 mg/l. The one exception was October 17th, when the entire plant had to be shut down in order to obtain enough additional oxygenation to get the DO back above 5 mg/l. It should be noted that after the DO levels fully recovered after the October 14th event and we began manually shutting down when low DO was observed, at no time did the 24 hour average DO level drop below 5 mg/l. It should also be noted that after reviewing the 2013 data, it was determined that DO levels also went below the 401 Certificate level of 4 mg/l on the 7 days before the equipment problem was detected. As in previous years, all the 2013 data (and previous years’ data) will be available for download from our website, in an EXCEL format, as soon as we can get the data placed there. All DO data is available at www.kyhydropower.com, click on “Data Archive”. To this annual data, this year we have added a column that shows the average DO value for the previous 24 hours.

There is one other DO item to note. In late December 2013, when after this data was downloaded from the DO sonde and a new membrane was installed and calibrated for 2014, we noticed

that there was a problem with one of the pins on the sonde's connector. It was sent to Fondriest Environmental for servicing, and when servicing, a number of potential problems were found. The sonde is presently be overhauled and should be placed back into service by the end of January 2014, to begin collecting 2014 data.

If you should have any questions, please don't hesitate to contact me at (502) 589-0975.

Sincerely,

David Brown Kinloch
President/CEO
Lock 7 Hydro Partners, LLC

Lock 7 Hydro Partners, LLC
414 South Wenzel Street - Louisville, KY 40204

December 31, 2012

Re: Water Quality Certification # 2005-0103-8
FERC License No. 539
Mother Ann Lee Hydroelectric Station
AINo.: 51793
Activity ID: APE20050001,
Kentucky River at Lock 7
Mercer County, Kentucky

Ms. Joyce Fry
Department of Natural Resources
and Environmental Protection
Division of Water
200 Fair Oaks Ln. - 4th Floor
Frankfort, KY 40601-1189

Dear Ms. Fry,

As part of our 401 Water Quality Certification, Lock 7 Hydro Partners is required to test the Dissolved Oxygen (DO) levels at Lock 7 on the Kentucky River between June 1st and October 31st each year. If the DO level drops below 5 mg/l averaged over a 24 hour period or 4 mg/l for a single reading, the Mother Ann Lee plant is to be shut down until reading return to above this standard.

During 2012, DO at Lock 7 was measured automatically and on a continuous basis using a YSI 6000 sonde that measures DO, with an Optical DO probe, and measures temperature. Reading were taken every 15 minutes during the entire year and recorded. The data collected during this period (about 35,000 readings) is available to be downloaded and analyzed at <http://www.kyhydropower.com/data.html>.

During 2012, the lowest DO reading occurred on September 19, 2012 at 11:30 pm, with a DO reading of 5.49 mg/l, above the minimum level in our 401 Water Quality Certification. As such, the Mother Ann Lee was never shut down during the year due to low DO. It should be noted that this and a few other lower DO periods in September and October were due to short releases from the bottom of Herrington Lake, just upstream of our plant, during KU's peak electric generating times.

If you should have any questions, please don't hesitate to contact me at (502) 589-0975.

Sincerely,

David Brown Kinloch
President/CEO
Lock 7 Hydro Partners, LLC

Lock 7 Hydro Partners, LLC

414 South Wenzel Street - Louisville, KY 40204

April 10, 2012

Re: Water Quality Certification # 2005-0103-8
FERC License No. 539
Mother Ann Lee Hydroelectric Station
AINo.: 51793
Activity ID: APE20050001,
Kentucky River at Lock 7
Mercer County, Kentucky

Ms. Joyce Fry
Department of Natural Resources
and Environmental Protection
Division of Water
200 Fair Oaks Ln. - 4th Floor
Frankfort, KY 40601-1189

Dear Ms. Fry,

As part of our 401 Water Quality Certification, Lock 7 Hydro Partners is required to test the Dissolved Oxygen (DO) levels at Lock 7 on the Kentucky River between June 1st and October 31st each year. If the DO level drops below 5 mg/l averaged over a 24 hour period or 4 mg/l for a single reading, the Mother Ann Lee plant is to be shut down until reading return to above this standard.

During 2011, DO at Lock 7 was measured automatically and on a continuous basis using a YSI 6000 sonde that measures DO, with an Optical DO probe, and measures temperature. Reading were taken every 15 minutes during the entire year and recorded. The data collected during this period (about 35,000 readings) is available to be downloaded and analyzed at <http://www.kyhydropower.com/data.html>.

During 2011, the lowest DO reading occurred on October 18, 2011 at 7:00 pm, with a DO reading of 4.52 mg/l, but the 24 hour average DO level for October 18th was 5.70 mg/l, above the minimum level in our 401 Water Quality Certification. As such, the Mother Ann Lee was never shut down during the year due to low DO. It should be noted that this and a few other low DO periods in October were due to short releases from the bottom of Herrington Lake, just upstream of our plant, during peak electric generating times.

If you should have any questions, please don't hesitate to contact me at (502) 589-0975.

Sincerely,

David Brown Kinloch
President
Lock 7 Hydro Partners, LLC

Appendix B.

Kentucky Department of Fish and Wildlife Resources (KDFWR) electrofishing studies summary tables for Kentucky River in pools 9 through 14 in 1998, 2000 and 2002

Table 1. Fish species collected (boat electrofishing) from Kentucky River in pools 10-14
 NOTE: (Pools 10 and 14 sampled August-September 2000, 11-13 August 2002).

Species	8/2002					
	8/2000	10	11	12	13	14
Game fishes						
Muskellunge	X	X	X	X	X	X
White bass		X	X	X	X	X
Sauger	X	X			X	
Walleye		X			X	X
Largemouth bass	X	X	X	X	X	X
Smallmouth bass	X		X	X	X	X
Spotted bass	X	X	X	X		X
black crappie			X			
White crappie	X	X	X			
Food fishes						
Channel catfish	X	X	X	X		X
Flathead catfish	X	X	X	X		X
Panfishes						
Rock bass				X		
Bluegill	X	X	X	X		X
Green sunfish		X	X	X		X
Hybrid sunfish				X		X
Longear sunfish	X	X	X	X		X
Redear sunfish		X	X			
Warmouth	X	X	X	X		X
Other fishes						
Mooneye	X					X
Longnose gar	X	X	X	X		X
Bigmouth buffalo		X				
Smallmouth buffalo	X	X	X	X		X
Highfin carpsucker				X		
Quillback carpsucker	X			X		X
River carpsucker				X ⁺		
Northern hogsucker		X	X	X		X
Black redhorse			X			
Golden redhorse	X	X	X	X		X
River redhorse	X	X	X	X		X
Shorthead redhorse	X	X	X	X		X
Silver redhorse			X	X		X
Spotted sucker	X	X	X	X		X
Common carp	X	X	X	X		X
Goldfish						X
Yellow bullhead		X				

Table 1(Cont.). Fish species collected (boat electrofishing) from Kentucky River in pools 10-14
(Pools 10 and 14 sampled August-September 2000, 11-13 August 2002).

Species	Pool				
	10	11	12	13	14
Freshwater drum	X	X	X	X	X
Ohio lamprey					X
Gizzard shad	X	X	X	X	X
Spotfin shiner		X	X	X	X
Steelcolor shiner	X		X		X
Striped shiner			X		X
Emerald shiner	X	X	X	X	X
Silver shiner					X
Mimic shiner					X
Bigeye chub					X
River chub	X				X
Silver chub				X*	
Stream line chub				X*	
Bluntnose minnow		X	X		X
Bullhead minnow				X	
Stone roller			X		
Logperch	X	X	X	X	X
Blackside darter	X				X
Greenside darter			X		
Sharpnose darter	X				
Dusky darter					X
Brook silverside		X	X	X	X

*(Collected Nov. 24, 1998 during nocturnal electrofishing below L&D 14)

Table 1. Fish species collected (boat electrofishing) from Kentucky River (above Lock No. 14) and portions of North, South and Middle forks (21-24 August 2000)^a and from pool 10 (Aug - Sept 2000).

	A	B	C	x	D	E x	Pool 10
Game fishes							
Muskellunge	X	X	X		X	X	X
Sauger							X ^b
Walleye ^c					X	X	
White bass		X	X				
White crappie							
Largemouth bass	X	X	X	x	X	X	X
Smallmouth bass ^c	X		X		X	X	X
Spotted bass	X	X	X	x	X	X x	X
Food fishes							
Channel catfish	X			x	X	X	
Flathead catfish	X	X			X	X	X
Panfishes							
Green sunfish ^c	X	X	X				
Warmouth	X			x			X
Bluegill	X	X	X	x	X	X	X
Longear sunfish	X	X	X	x	X	X x	X
Hybrid sunfish	X	X	X			X	
Other fishes							
Quillback carpsucker	X		X				X
Northern hogsucker					X	X x	
Smallmouth buffalo ^c	X	X	X		X		X
Spotted sucker	X	X		x			X
Silver redhorse					X ^e		
River redhorse	X	X	X		X	X x	X
Golden redhorse	X	X	X	x	X	X x	X
Shorthead redhorse				x	X	X	X
Brook silverside			X			X	
Ohio lamprey					X ^e		
Longnose gar	X	X				X	X
Gizzard shad	X	X	X	x	X	X x	X
Mooneye	X		X			X	X
Goldfish	X ^e						X
Spotfin shiner					X	X	
Steelcolor shiner					X		
Common carp	X	X			X		X ^b
Striped shiner				x	X	X	X
River chub					X	X	X ^b

	A	B	C	x	D	E x	Pool 10
Bigeye chub						X	
Emerald shiner			X		X		X
Silver shiner						X	
Sand shiner						x	
Mimic shiner						X ^c	
Bluntnose minnow	X			x		X	
Logperch	X		X		X	X x	X
Blackside darter						X ^c	X ^b
Sharpnose darter							X ^b
Dusky darter					X ^c	X ^c	
Freshwater drum	X	X	X		X	X x	X

^a Primarily collecting game, food and panfish. Water clarity poor during sample period.

A - Kentucky River from Lock No. 14 (vic Hiedelburg) upstream to S. Fk Kentucky River confluence, vic Beattyville, Lee Co., KY, 21-22 Aug 2000

B - South Fork Kentucky River, upstream approx. 3.0 mi, vic. Beattyville, Lee Co., KY, 21&24 Aug 2000

C - North Fork Kentucky River, from confl. with S. Fk, upstream to confl. with M. Fk. Kentucky River, Lee Co., KY, 22 Aug 2000

D - North Fork Kentucky River, upstream of M. Fk confl, to vic Log Shoal Branch confl., Lee Co., KY, 23 Aug 2000

E - Middle Fork Kentucky River, upstream to first riffle (Long Shoal Creek), Lee Co., KY, 24 Aug 2000

x - Prather. 1985. Muskellunge study sites same localities; however, on North Fork he did not differentiate between upstream or downstream of Middle Fork confluence.

^b New locality record for those sites within pool 10.

^c New locality record for those sites within pool 14.

Sauger were stocked into the three forks and at Beattyville from 1981-1985.

Walleye have been stocked into the same area since 1989.

Muskellunge have been stocked into pool 10 and 14 and the three tributaries.

Hybrid striped bass have been stocked into pool 10.

Kentucky River mainstem L&D 9 & 14 tailwater sampling (nocturnal)

Table 1. List of fish species collected while nocturnal sampling for sauger and walleye below Lock and Dam 9 (Madison/Jessamine Co., 23 Nov) and 14 (Lee Co., 24 Nov) on 1998

	<u>L&D 9</u>	<u>L&D 14</u>
Longnose gar	x	
Mooneye	x	
Gizzard shad	x	x
Spotfin shiner	x	
Steelcolor shiner	x ^a	
Streamline chub		x ^b
Silver chub		x
Emerald shiner	x	x
Ghost shiner	x	
Rosyface shiner	x	
Bluntnose minnow	x	
Bullhead minnow	x ^b	x ^b
River carpsucker		x ^a
Quillback carpsucker		x
Highfin carpsucker	x	x ^a
Northern hog sucker		x
Smallmouth buffalo	x	
Spotted sucker	x	
Silver redhorse	x ^a	x
River redhorse	x	
Golden redhorse	x	x
Shorthead redhorse	x	x
Channel catfish	x	
Flathead catfish	x	
Muskellunge		x
Brook silverside		x
White bass	x	x
Green sunfish	x	x
Bluegill	x	x
Longear sunfish	x	
Smallmouth bass		x
Spotted bass	x	x
Largemouth bass	x	x
White crappie	x	
Black crappie	x ^a	
Dusky darter	x ^b	
Sauger	x ^a	x
Walleye	x ^b	x ^b
Freshwater drum	x	x

^a Significant distribution record from mainstem Kentucky River.

^b New Kentucky River mainstem record (not indicated in Burr and Warren 1986).

Appendix C.

The U.S. Fish and Wildlife Service (USFWS) letter dated March 31, 2015, with respect to Endangered Species.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

March 31, 2015

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

Subject: Environmental Assessment (EA) and Request for Concurrence with Endangered Species Determination for the Heidelberg Hydroelectric Project on the Kentucky River at Lock and Dam 14 Hydro Partners, LLC, (FERC Project No. 13213-003) and the Ravena Dam Hydroelectric Project on the Kentucky River at Lock and Dam No. 12, (FERC No. 13214-003) (ER 15/0116)

Dear Ms. Bose:

The U.S. Fish and Wildlife Service Kentucky Field Office (Service) has reviewed the above-referenced EA and the March 4, 2015 Request for Concurrence submitted with the subject notice. The Service offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Endangered Species Act Comments

The EA addresses all of the federally listed species that the Service believes have the potential to be affected by the proposed projects. Those species are:

<u>Common Name</u>	<u>Scientific Name</u>	<u>Federal Status</u>
Indiana bat	<i>Myotis sodalis</i>	endangered
Gray bat	<i>Myotis grisescens</i>	endangered
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	endangered

Indiana bat

Both of the proposed projects would be within the swarming range of several documented Priority 1 and 2 Indiana bat hibernacula. According to the EA, construction of the project-associated transmission line corridors would result in the removal of some suitable Indiana bat fall swarming / foraging habitat (i.e.; trees). The EA indicates that the project-associated tree removal may occur between the dates of November 15 and March 31, the time period when Indiana bats are not likely to be using the habitat. The Service agrees that this proposed seasonal tree clearing measure would likely avoid direct effects to Indiana bats. However, because there is no data that would show that the resulting loss of habitat would not result in significant

indirect and cumulative effects, the Service does not concur with the effects determination that the proposed projects would not likely adversely affect the Indiana bats.

At this time, the Service believes that the proposed project may result in adverse effects to the Indiana bat. Our belief that adverse effects may occur is based on the estimated amount of known Indiana bat swarming and summer roosting and foraging habitat that would be removed and because there is no data that would show that the resulting loss of habitat would not result in adverse effects to the Indiana bat and, in particular, potential indirect and cumulative effects on the species.

To address our concerns relative to the potential indirect and cumulative effects to Indiana bats, we offer the following options to ensure that the project is in full compliance with the ESA.

- The project proponent can modify the proposed project to eliminate or reduce impacts to suitable Indiana bat habitat, thus avoiding impacts.
- The project proponent can assume presence of the Indiana bat in the proposed project area and mitigate for the impacts of habitat removal on the species by entering into a Conservation Memorandum of Agreement (MOA) with the Service. By entering into an MOA, the Cooperator can gain flexibility in project timing with regard to the removal of suitable Indiana bat habitat and/or avoid the need for surveys or additional analysis. In exchange, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures as set forth in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.
- The project proponent may provide the Service with additional information through the informal consultation process, prepared by a qualified biologist, that includes site-specific habitat information and a thorough effects analysis (direct, indirect, and cumulative) to support a “not likely to adversely affect” determination. The Service will review this and decide if there is sufficient supporting information to concur with the determination.
- The project proponent can request formal section 7 consultation through the lead federal action agency associated with the proposed project. To request formal consultation, the project proponent would need to submit a Biological Assessment that describes the action and evaluates the effects of the action on the listed species in the project area. After formal consultation is initiated, the Service has 135 days to prepare a Biological Opinion that analyzes the effects of the action on the listed species and recommends strategies to minimize those effects.

Gray bat

The Service's January 23, 2014 technical assistance provided the following recommendations to the Commission in regard to the gray bat:

- 1) Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter/summer habitat for gray bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as gray bat habitat by this office.
- 2) Sediment Best Management Practices (BMPs) should be utilized and maintained to minimize siltation of the streams located within and in the vicinity of the project area, as these streams represent potential foraging habitat for the gray bat. A plan for BMP implementation should be submitted to our office for approval.

According to the EA, FERC will require the Applicant to follow these recommendations. However, the Service cannot concur with an effects determination for the gray bat until these recommendations are completed. The effects determination for the gray bat is contingent on the results of the recommended habitat assessments and BMP Plan.

Virginia big-eared bat

As stated in the Service's January 23, 2014 technical assistance, the proposed project areas are in close proximity to several documented occurrences of the federally endangered Virginian big-eared bat. Virginia big-eared bats occur in isolated populations in eastern Kentucky, and live in caves year-round. They prefer caves in karst regions (*i.e.*, areas underlain with limestone bedrock and many caves and sink holes) dominated by oak-hickory or beech-maple-hemlock forest. They tend to feed along the edges of forested areas. Because the proposed project area is partially forested and occurs within a known karst region, the Service has reason to believe that potentially suitable summer roosting and winter hibernacula habitat for the Virginia big-eared bat could occur onsite.

Therefore, we request that the project area be assessed for any caves, rockshelters, and/or abandoned mines, and assess their potential as Virginia big-eared bat summer/winter habitat. This assessment should be separate from the Indiana bat assessment. If potential summer/winter habitat is identified, additional surveys of these areas may be required. Impacts to these areas should be avoided until the surveys are completed and the presence/absence of Virginia big-eared bats within these areas has been determined. Please notify this office with the results of any surveys and an analysis of the "effects of the action," as defined by 50 CFR 402.02 on this listed species including consideration of direct, indirect, and cumulative effects.

The applicant(s) should assess potential impacts to these species and determine if the proposed project may affect them. We recommend submission of a copy of the assessment and findings to

the Kentucky Field Office of the Fish and Wildlife Service, referenced below, for review and potential concurrence. If adverse effects to this federally listed species are likely to occur, consultation under section 7(a)(2) of the Endangered Species Act will likely be necessary.

According to the EA, FERC will require the Applicant to follow these recommendations. However, the Service cannot concur with an effects determination for the Virginia big-eared bat until these recommendations are completed. The effects determination for the Virginia big-eared bat is contingent on the results of the recommended habitat assessments and surveys.

Northern long-eared bat

The northern long-eared bat (*Myotis septentrionalis*) is currently a proposed species for listing. Both of the proposed project areas are within potential northern long-eared bat summer roost/foraging habitat. The entire Commonwealth of Kentucky is considered potential habitat for the northern long-eared bat. During the summer, northern long-eared bats typically roost singly or in colonies in a wide-variety of forested habitats, where they seek shelter during daylight hours underneath bark or in cavities/crevices of both live trees and snags, including relatively small trees and snags that are less than 5 inches in diameter at breast height (DBH). Northern long-eared bats have also been documented roosting in man-made structures (i.e., buildings, barns, etc.) during the summer. According to current winter occurrence data, northern long-eared bats predominately winter in hibernacula that include caves, tunnels, and underground mine passages.

The final rule to list the northern long bat is expected to be published April 1, 2015. If the northern long-eared bat is listed, as threatened or endangered, the federal action agency is required to consult with the Service if it is determined that the proposed project may affect the northern long-eared bat. The Service may recommend additional minimization and mitigation measures to ensure that the proposed project is in full compliance with the ESA relative to the northern long-eared bat.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact James Gruhala at (502) 695-0468 extension 116.

Sincerely,



Virgil Lee Andrews, Jr.
Field Supervisor